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Gichtel, Johann to Glory

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INITIALS USED IN VOLUME XII. TO IDENTIFY INDIVIDUAL CONTRIBUTORS,[1] WITH THE HEADINGS OF THE ARTICLES IN THIS VOLUME SO SIGNED.

A. A. R.* Arthur Alcock Rambaut, M.A., D.Sc, F.R.S., F.R.A.S. Radcliffe Observer, Oxford. Professor of Astronomy in

	the University of Dublin and Royal Astronomer of Ireland, 1892-1897.	**Grant, Robert.**
A. C. Se.	Albert Charles Seward, M.A., F.R.S. Professor of Botany in the University of Cambridge. Hon. Fellow of Emmanuel College, Cambridge. President of the Yorkshire Naturalists' Union, 1910.	**Gymnosperms.**
A. F. P.	Albert Frederick Pollard, M.A., F.R.Hist.S. Fellow of All Souls College, Oxford. Professor of English History in the University of London. Assistant Editor of the *Dictionary of National Biography*, 1893-1901. Author of *England under the Protector Somerset*; *Life of Thomas Cranmer*; &c.	**Grindal.**
A. Go.*	Rev. Alexander Gordon, M.A. Lecturer on Church History in the University of Manchester.	**Grynaeus, Simon; Haetzer.**
A. G. B.*	Hon. Archibald Graeme Bell, M.Inst.CE. Director of Public Works and Inspector of Mines, Trinidad. Member of Executive and Legislative Councils, Inst.C.E.	**Guiana.**
A. H.-S.	Sir A. Houtum-Schindler, C.I.E. General in the Persian Army. Author of *Eastern Persian Irak*.	**Gīlān; Hamadān.**
A. He.	Arthur Hervey. Formerly Musical Critic to *Morning Post* and *Vanity Fair*. Author of *Masters of French Music*; *French Music in the XIX. Century*.	**Gounod.**
A. H. S.	Rev. A. H. Sayce, D.D. See the biographical article, Sayce, A. H.	**Grammar; Gyges.**
A. J. G.	Rev. Alexander James Grieve, M.A., B.D. Professor of New Testament and Church History at the United Independent College, Bradford. Sometime Registrar of Madras University and Member of Mysore Educational Service.	**Haggai** (*in part*).
A. J. H.	Alfred James Hipkins. Formerly Member of Council and Hon. Curator of Royal College of Music. Member of Committee of the Inventions and Music Exhibition, 1885; of the Vienna Exhibition, 1892; and of the Paris Exhibition, 1900. Author of *Musical Instruments*; *A Description and History of the Pianoforte*; &c.	**Harmonium** (*in part*).
A. L.	Andrew Lang. See the biographical article, Lang, Andrew.	**Gurney, Edmund.**
A. M. C.	Agnes Mary Clerke. See the biographical article, Clerke, A. M.	**Halley; Hansen.**
A. N.	Alfred Newton, F.R.S. See the biographical article, Newton, Alfred.	**Goatsucker; Godwit; Golden-eye; Goldfinch; Goose; Gos-Hawk; Grackle; Grebe; Greenfinch; Greenshank; Grosbeak; Grouse; Guacharo; Guan; Guillemot; Guinea-Fowl; Gull; Hammer-Kop.**
A. Ne.	Alexander Nesbitt, F.S.A. Author of the *Introduction* to *A Descriptive Catalogue of the Glass Vessels in South Kensington Museum*.	**Glass:** *History of Manufacture* (*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.	**Gold and Silver Thread.**
A. Sy.	Arthur Symons. See the biographical article, Symons, A.	**Goncourt, De; Hardy, Thomas.**
A. W. H.*	Arthur William Holland. Formerly Scholar of St John's College, Oxford. Bacon	**Godfrey of Viterbo;**

	Scholar of Gray's Inn, 1900.	**Golden Bull; Habsburg.**
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*.	**Ground Rent; Handwriting.**
A. W. W.	ADOLPHUS WILLIAM WARD, LL.D., LITT.D. See the biographical article, WARD, A. W.	**Greene, Robert.**
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*.	**Grand Alliance, War of the; Grant, Ulysses S.** (*in part*); **Great Rebellion.**
C. Gr.	CHARLES GROSS, A.M., PH.D., LL.D. (1857-1909). Professor of History at Harvard University, 1888-1909. Author of *The Gild Merchant*; *Sources and Literature of English History*; &c.	**Gilds.**
C. H.*	SIR C. HOLROYD. See the biographical article; HOLROYD, SIR C.	**Haden, Sir, F. C.**
C. H. C.	CHARLES H. COOTE. Formerly of Map Department, British Museum.	**Hakluyt** (*in part*).
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.	**Gregory:** *Popes*, **VIII. to XII.; Guibert.**
C. J. L.	SIR CHARLES JAMES LYALL, K.C.S.I., C.I.E., LL.D (Edin.) Secretary, Judicial and Public Department, India Office. Fellow of King's College, London. Secretary to Government of India in Home Department, 1889-1894. Chief Commissioner, Central Provinces, India, 1895-1898. Author of *Translations of Ancient Arabic Poetry*; &c.	**Hamāsa.**
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C. L. K.	CHARLES LETHBRIDGE KINGSFORD, M.A., F.R.HIST.S., F.S.A. Assistant Secretary to the Board of Education. Author of *Life of Henry V.* Editor of *Chronicles of London*, and Stow's *Survey of London*.	**Glendower, Owen; Gloucester, Humphrey, Duke of; Hallam, Bishop; Hardyng, John.**
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.	**Gregory VII.**
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C. M. W.	SIR CHARLES MOORE WATSON, K.C.M.G., C.B. Colonel, Royal Engineers. Deputy-Inspector-General of Fortifications, 1896-1902. Served under General Gordon in the Soudan, 1874-1875.	**Gordon, General.**
C. Pf.	CHRISTIAN PFISTER, D.-ÈS-L. Professor at the Sorbonne, Paris. Chevalier of the Legion of Honour. Author of *Études sur le règne de Robert le Pieux*.	**Gregory, St, of Tours; Gunther of Schwarzburg.**
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C. We.	CECIL WEATHERLY. Formerly Scholar of Queen's College, Oxford. Barrister-at-Law.	**Graffito.**

C. W. E.	Charles William Eliot. See the biographical article, Eliot, C. W.	**Gray, Asa.**
D. C. To.	Rev. Duncan Crookes Tovey, M.A. Editor of The Letters of Thomas Gray; &c.	**Gray, Thomas.**
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.	**Gluck; Handel.**
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D. Ll. T.	Daniel Lleufer Thomas. Barrister-at-Law, Lincoln's Inn. Stipendiary Magistrate at Pontypridd and Rhondda.	**Glamorganshire; Gower.**
D. Mn.	Rev. Dugald Macfadyen, M.A. Minister of South Grove Congregational Church, Highgate. Author of *Constructive Congregational Ideals*; &c.	**Glas, John; Glasites.**
D. M. W.	Sir Donald Mackenzie Wallace, K.C.I.E., K.C.V.O. Extra Groom-in-Waiting to H.M. King George V. Director of the Foreign Department of *The Times*, 1891-1899. Member of Institut de Droit International and Officier de l'Instruction Publique of France. Joint-editor of new volumes (10th edition) of the *Encyclopaedia Britannica*. Author of *Russia*; *Egypt and the Egyptian Question*; *The Web of Empire*; &c.	**Giers; Gorchakov.**
E. A. F.	Edward Augustus Freeman, LL.D. See the biographical article, Freeman, E. A.	**Goths** (*in part*).
E. A. J.	E. Alfred Jones. Author of *Old English Gold Plate*; *Old Church Plate of the Isle of Man*; *Old Silver Sacramental Vessels of Foreign Protestant Churches in England*; *Illustrated Catalogue of Leopold de Rothschild's Collection of Old Plate*; *A Private Catalogue of The Royal Plate at Windsor Castle*; &c.	**Golden Rose** (*in part*).
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 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*.	**Hadrumetum.**
E. Br.	Ernest Barker, M.A. Fellow and Lecturer in Modern History at St John's College, Oxford. Formerly Fellow and Tutor of Merton College. Craven Scholar, 1895.	**Godfrey of Bouillon.**
E. C. B.	Rt. Rev. Edward Cuthbert Butler, O.S.B., M.A., D.Litt. (Dublin). Abbot of Downside Abbey, Bath. Author of "*The Lausaic History of Palladius*" in *Cambridge Texts and Studies*, vol. vi.	**Gilbert of Sempringham, St; Grandmontines; Groot.**
E. C. Sp.	Rev. Edward Clarke Spicer, M.A. New College, Oxford. Geographical Scholar, 1900.	**Glacier.**
E. F. G.	Edwin Francis Gay, Ph.D. Professor of Economics and Dean of the Graduate School of Business Administration, Harvard University.	**Hanseatic League.**

E. F. S. D.	Lady Dilke. See the biographical article, Dilke, Sir C. W., Bart.	**Greuze.**
E. G.	Edmund Gosse, LL.D. See the biographical article, Gosse, E.	**Gnome.**
E. H. P.	Edward Henry Palmer, M.A. See the biographical article, Palmer, E. H.	**Hāfiz.**
E. J. P.	Edward John Payne, M.A. (1844-1904). Formerly Fellow of University College, Oxford. Editor of the *Select Works of Burke*. Author of *History of European Colonies*; *History of the New World called America*; *The Colonies*, in the "British Citizen" Series; &c.	**Grey, 2nd Earl.**
Ed. M.	Eduard Meyer, Ph.D., D.Litt. (Oxon), LL.D. (Chicago). Professor of Ancient History in the University of Berlin. Author of *Geschichte des Alterthums*; *Geschichte des alten Aegyptens*; *Die Israeliten und ihre Nachbarstämme*.	**Gotarzes.**
E. M. W.	Rev. Edward Mewburn Walker, M.A. Fellow, Senior Tutor and Librarian of Queen's College, Oxford.	**Greece:** *History, Ancient, to 146 B.C.*
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*.	**Goitre; Haemorrhoids.**
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. Editor of *Letters of a Portuguese Nun*; *Azurara's Chronicle of Guinea*; &c.	**Goes, Damião De; Gonzaga.**
E. R.	Lord Lochee of Gowrie (Edmund Robertson), P.C., LL.D., K.C. Civil Lord of the Admiralty, 1892-1895. Secretary to the Admiralty, 1905-1908. M.P. for Dundee, 1885-1908. Fellow of Corpus Christi College, Oxford.	**Hallam, Henry.**
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F. G. M. B.	Frederick George Meeson Beck, M.A. Fellow and Lecturer in Classics, Clare College, Cambridge.	**Goths** (*in part*).
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F. H. D.	Rev. Frederick Homes Dudden, D.D. Fellow, Tutor and Lecturer in Theology, Lincoln College, Oxford. Author of *Gregory the Great, his Place in History and Thought*; &c.	**Gregory I.**
F. H. H.	Franklin Henry Hooper. Assistant Editor of the *Century Dictionary*.	**Hancock, Winfield Scott.**
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. Fellow of the British Academy. Author of Monographs on Roman History, especially Roman Britain; &c.	**Graham's Dyke.**

F. N.	Fridtjof Nansen. See the biographical article, Nansen, Fridtjof.	**Greenland.**
F. R. C.	Frank R. Cana. Author of *South Africa from the Great Trek to the Union*.	**Gold Coast.**
F. S. P.	Francis Samuel Philbrick, A.M., Ph.D. Formerly Scholar and Resident Fellow of Harvard University. Member of American Historical Association.	**Hamilton, Alexander.**
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.	**Gypsum; Haematite.**
G. A. Gr.	George Abraham Grierson, C.I.E., Ph.D., D.Litt. (Dublin). 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.	**Gujarati and Rajasthani.**
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G. C. W.	George Charles Williamson, Litt.D. Chevalier of the Legion of Honour. Author of *Portrait Miniatures*; *Life of Richard Cosway, R.A.*; *George Engleheart*; *Portrait Drawings*; &c. Editor of new edition of Bryan's *Dictionary of Painters and Engravers*.	**Greco, El.**
G. F. Z.	George Frederick Zimmer, A.M.Inst.CE. Author of *Mechanical Handling of Material*.	**Granaries.**
G. G.	Sir Alfred George Greenhill, M.A., F.R.S. Formerly Professor of Mathematics in the Ordnance College, Woolwich. Examiner in the University of Wales. Member of the Aeronautical Committee. Author of *Notes on Dynamics*; *Hydrostatics*; *Differential and Integral Calculus, with Applications*; &c.	**Gyroscope and Gyrostat.**
G. Sn.	Grant Showerman, A.M., Ph.D. Professor of Latin in the University of Wisconsin. Member of the Archaeological Institute of America. Member of American Philological Association. Author of *With the Professor*; *The Great Mother of the Gods*; &c.	**Great Mother of the Gods.**
G. S. C.	Sir George Sydenham Clarke, G.C.M.G., G.C.I.E., F.R.S. Governor of Bombay. Author of *Imperial Defence*; *Russia's Great Sea Power*; *The Last Great Naval War*; &c.	**Greco-Turkish War, 1897.**
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G. W. T.	Rev. Griffiths 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.	**Hājjī Khalīfā; Hamadhānī; Handānī; Hammād ar-Rāwiya; Harīrī.**
H. A. de C.	Henry Anselm de Colyar, K.C. Author of *The Law of Guarantees and of Principal and Surety*; &c.	**Guarantee.**
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.	**Haidinger, W. K.**
H. Ch.	Hugh Chisholm, M.A. Formerly Scholar of Corpus Christi College, Oxford.	**Goschen, 1st Viscount; Granville, 2nd Earl;**

	Editor of the 11th edition of the *Encyclopaedia Britannica*; co-editor of the 10th edition.	**Hamilton, Alexander** (*in part*); **Harcourt, Sir William.**
H. De.	Hippolyte Delehaye, S. J. Assistant in the compilation of the Bollandist publications: *Analecta Bollandiana* and *Acta sanctorum*.	**Giles, St; Hagiology.**
H. G. H.	Horatio Gordon Hutchinson. Amateur Golf Champion, 1886-1887. Author of *Hints on Golf*; *Golf* (Badminton Library); *Book of Golf and Golfers*; &c.	**Golf.**
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H. Lb.	Horace Lamb, M.A., LL.D., D.Sc, F.R.S. Professor of Mathematics, University of Manchester. Formerly Fellow and Assistant Tutor of Trinity College, Cambridge. Member of Council of Royal Society, 1894-1896. Royal Medallist, 1902. President of London Mathematical Society, 1902-1904. Author of *Hydrodynamics*; &c.	**Harmonic Analysis.**
H. L. H.	Harriet L. Hennessy, L.R.C.S.I., L.R.C.P.I., M.D.(Brux.)	**Gynaecology.**
H. M. C.	Hector Munro Chadwick, M.A. Librarian and Fellow of Clare College, Cambridge. Author of *Studies on Anglo-Saxon Institutions*.	**Goths:** *Gothic Language*.
H. M. Wo.	Harold Mellor Woodcock, D.Sc. Assistant to the Professor of Proto-Zoology, London University. Fellow of University College, London. Author of *Haemoflagellates* in Sir E. Ray Lankester's *Treatise of Zoology*, and of various scientific papers.	**Gregarines; Haemosporidia.**
H. R.	Henry Reeve, D.C.L. See the biographical article, Reeve, Henry.	**Guizot** (*in part*).
H. Sw.	Henry Sweet, M.A., Ph.D., LL.D. University Reader in Phonetics, Oxford. Member of the Academies of Munich, Berlin, Copenhagen and Helsingfors. Author of *A History of English Sounds since the Earliest Period*; *A Handbook of Phonetics*; &c.	**Grimm, J. L. C.;** **Grimm, Wilhelm Carl.**
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H. W. R.*	Rev. Henry Wheeler Robinson, M.A. Professor of Church History in Rawdon College, Leeds. Senior Kennicott Scholar, Oxford University, 1901. Author of *Hebrew Psychology in Relation to Pauline Anthropology* (in *Mansfield College Essays*); &c.	**Habakkuk.**
I. A.	Israel Abrahams, M.A. Reader in Talmudic and Rabbinic Literature, University of Cambridge. President, Jewish Historical Society of England. Author of *A Short History of Jewish Literature*; *Jewish Life in the Middle Ages*.	**Graetz; Habdala;** **Halakha; Halevi;** **Haptara; Harizi.**
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 new edition of Grove's *Dictionary of Music*; &c.	**Grove, Sir George.**
J. A. H.	John Allen Howe, B.Sc. Curator and Librarian of the Museum of Practical	**Glacial Period;**

	Geology, London. Author of *The Geology of Building Stones*.	**Greensand.**
J. A. S.	John Addington Symonds, LL.D. See the biographical article, Symonds, J. A.	**Guarini.**
J. Bl.	James Blyth, M.A., LL.D. Formerly Professor of Natural Philosophy, Glasgow and West of Scotland Technical College. Editor of Ferguson's *Electricity*.	**Graduation.**
J. Bt.	James Bartlett. Lecturer on Construction, Architecture, Sanitation, Quantities, &c., King's College, London. Member of Society of Architects, Institute of Junior Engineers, Quantity Surveyors' Association. Author of *Quantities*.	**Glazing.**
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.	**Greece:** *Geography and History: Modern*; **Greek Literature: III.** *Modern*.
J. E. S.*	John Edwin Sandys, M.A., Litt.D., LL.D. Public Orator in the University of Cambridge. Fellow of St John's College, Cambridge. Fellow of the British Academy. Author of *History of Classical Scholarship*; &c.	**Greek Law.**
J. Fi.	John Fiske. See the biographical article, Fiske, J.	**Grant, Ulysses S.**
J. G. C. A.	John George Clark Anderson, M.A. Censor and Tutor of Christ Church, Oxford. Formerly Fellow of Lincoln College. Craven Fellow (Oxford), 1896. Conington Prizeman, 1893.	**Gordium.**
J. G. R.	John George Robertson, M.A., Ph.D. Professor of German Language and Literature, University of London. Author of *History of German Literature*; *Schiller after a Century*; &c. Editor of the *Modern Language Journal*.	**Goethe; Grillparzer.**
J. H. F.	John Henry Freese, M.A. Formerly Fellow of St John's College, Cambridge.	**Gracchus; Gratian;** **Hadrian** (*in part*).
J. H. H.	John Henry Hessels, M.A. Author of *Gutenberg: an Historical Investigation*.	**Gloss; Gutenberg.**
J. H. P.	John Henry Poynting, D.Sc., F.R.S. Professor of Physics and Dean of the Faculty of Science in the University of Birmingham. Formerly Fellow of Trinity College, Cambridge. Joint-author of *Text-Book of Physics*.	**Gravitation** (*in part*).
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.	**Gourgaud, Baron.**
J. L. W.	Miss Jessie Laidlay Weston. Author of *Arthurian Romances unrepresented in Malory*.	**Grail, The Holy;** **Guenevere.**
J. M. M.	John Malcolm Mitchell. Sometime Scholar of Queen's College, Oxford. Lecturer in Classics, East London College (University of London). Joint-editor of Grote's *History of Greece*.	**Grote;** **Hamilton, Sir William, Bart,** (*in part*); **Harem.**
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.	**Glauconite; Gneiss;** **Granite; Granulite;** **Gravel; Greisen; Greywacke.**
J. T. Be.	John T. 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.	**Gobi.**

J. T. S.*	James Thomson Shotwell, Ph.D. Professor of History in Columbia University, New York City.	**Golden Rose** (*in part*); **Goliad;** **Guizot** (*in part*).
K. G. J.	Kingsley Garland Jayne. Sometime Scholar of Wadham College, Oxford. Matthew Arnold Prizeman, 1903. Author of *Vasco da Gama and his Successors*.	**Goa.**
K. Kr.	Karl Krumbacher. See the biographical article, Krumbacher, Carl.	**Greek Literature: II.** *Byzantine*.
K. S.	Miss Kathleen Schlesinger. Editor of the *Portfolio of Musical Archaeology*. Author of *The Instruments of the Orchestra*; &c.	**Glockenspiel; Gong;** **Guitar; Guitar Fiddle;** **Gusla; Harmonica;** **Harmonichord; Harmonium** (*in part*).
L. D.*	Louis Duchesne. See the biographical article, Duchesne, L. M. O.	**Gregory:** *Popes*, **II.-VI.**
L. F. D.	Lewis Foreman Day, F.S.A. (1845-1909). Formerly Vice-President of the Society of Arts. Past Master of the Art Workers' Gild. Author of *Windows, a book about Stained Glass*; &c.	**Glass, Stained.**
L. F. V.-H.	Leveson Francis Vernon-Harcourt, M.A., M.Inst.C.E. (1839-1907). Formerly Professor of Civil Engineering at University College, London. Author of *Rivers and Canals*; *Harbours and Docks*; *Civil Engineering as applied in Construction*; &c.	**Harbour.**
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*.	**Goniometer; Göthite;** **Graphite** (*in part*); **Greenockite.**
L. R. F.	Lewis Richard Farnell, M.A., Litt.D. Fellow and Senior Tutor of Exeter College, Oxford; University Lecturer in Classical Archaeology; Wilde Lecturer in Comparative Religion. Author of *Cults of the Greek States*; *Evolution of Religion*.	**Greek Religion.**
M.	Lord Macaulay. See the biographical article, Macaulay, T. B. M., Baron.	**Goldsmith, Oliver.**
M. G.	Moses Gaster, Ph.D. Chief Rabbi of the Sephardic Communities of England. Vice-President, Zionist Congress, 1898, 1899, 1900. Ilchester Lecturer at Oxford on Slavonic and Byzantine Literature, 1886 and 1891. President, Folklore Society of England. Vice-President, Anglo-Jewish Association. Author of *History of Rumanian Popular Literature*; &c.	**Gipsies.**
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 Today*; *Henriette Ronner*; &c.	**Gilbert, Alfred;** **Greenaway, Kate.**
M. Ja.	Morris Jastrow, Jun., Ph.D. Professor of Semitic Languages, University of Pennsylvania, U.S.A. Author of *Religion of the Babylonians and Assyrians*; &c.	**Gilgamesh, Epic of;** **Gula.**
M. M.	Max Arthur Macauliffe. Formerly Divisional Judge in the Punjab. Author of *The Sikh Religion, its Gurus, Sacred Writings and Authors*; &c. Editor of *Life of Guru Nanak*, in the Punjabi language.	**Granth.**
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*.	**Gythium**

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.	**Greece:** *History: 146 B.C. 1800 A.D.*; **Hamilcar Barca;** **Hannibal.**
M. P.	Mark Pattison. See the biographical article, Pattison, Mark.	**Grotius.**
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).	**Gouffier; Harcourt.**
O. Ba.	Oswald Barron, F.S.A. Editor of *The Ancestor*, 1902-1905. Hon. Genealogist to Standing Council of the Honourable Society of the Baronetage.	**Girdle.**
P. A.	Paul Daniel Alphandéry. Professor of the History of Dogma, École Pratique des Hautes Études, Sorbonne, Paris. Author of *Les Idées morales chez les hétérodoxes latines au début du XIII^e siècle*.	**Gonzalo de Berceo.**
P. A. A.	Philip A. Ashworth, M.A., Doc. Juris. New College, Oxford. Barrister-at-Law. Translator of H. R. von Gneist's *History of the English Constitution*.	**Gneist.**
P. C. Y.	Philip Chesney Yorke, M.A. Magdalen College, Oxford.	**Gunpowder Plot;** **Halifax, 1st Marquess of;** **Hamilton, 1st Duke of.**
P. G.	Percy Gardner, M.A. See the biographical article, Gardner, Percy.	**Greek Art.**
P. Gi.	Peter Giles, M.A., LL.D., Litt.D. Fellow and Classical Lecturer of Emmanuel College, Cambridge, and University Reader in Comparative Philology. Formerly Secretary of the Cambridge Philological Society. Author of *Manual of Comparative Philology*.	**Greek Language;** **H.**
P. G. K.	Paul George Konody. Art Critic of the *Observer* and the *Daily Mail*. Formerly Editor of *The Artist*. Author of *The Art of Walter Crane*; *Velasquez, Life and Work*; &c.	**Hals, Frans.**
P. G. T.	Peter Guthrie Tait, LL.D. See the biographical article, Tait, Peter Guthrie.	**Hamilton, Sir William Rowan.**
P. La.	Philip Lake, M.A., F.G.S. Lecturer on Physical and Regional Geography in Cambridge University. Formerly of the Geological Survey of India. Author of *Monograph of British Cambrian Trilobites*. Translator and Editor of Kayser's *Comparative Geology*.	**Greece:** *Geology*.
P. McC.	Primrose McConnell, F.G.S. Member of the Royal Agricultural Society. Author of *Diary of a Working Farmer*; &c.	**Grass and Grassland.**
R. A. W.	Colonel Robert Alexander Wahab, C.B., C.M.G., C.I.E. Formerly H. M. Commissioner, Aden Boundary Delimitation. Served with Tirah Expeditionary Force, 1897-1898, and on the Anglo-Russian Boundary Commission, Pamirs, 1895.	**Hadramut.**
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.	**Gilead; Gilgal;** **Goshen.**
R. C. J.	Sir Richard Claverhouse Jebb, L.L.D., D.C.L. See the biographical article, Jebb, Sir R. C.	**Greek Literature: I.** *Ancient*.
R. J. M.	Ronald John McNeill, M.A. Christ Church, Oxford. Barrister-at-Law. Formerly Editor of the *St James's Gazette*, London.	**Gowrie, 3rd Earl of;** **Gratton, Henry;** **Green Ribbon Club;** **Gymnastics;** **Harcourt, 1st Viscount;** **Hardwicke, 1st Earl of.**

R. L.*	Richard Lydekker, M.A., F.R.S., F.G.S., F.Z.S. Member of the Staff of the Geological Survey of India, 1874-1882. Author of *Catalogues of Fossil Mammals, Reptiles and Birds in British Museum*; *The Deer of all Lands*; *The Game Animals of Africa*; &c.	**Giraffe; Glutton; Glyptodon; Goat; Gorilla; Hamster; Hare.**
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 1469*; &c.	**Golitsuin, Boris, Dmitry, and Vasily; Golovin, Count; Golovkin, Count; Görtz, Baron von; Griffenfeldt, Count; Gustavus I., and IV.; Gyllenstjerna; Hall, C. C.**
R. S. T.	Ralph Stockman Tarr. Professor of Physical Geography, Cornell University.	**Grand Canyon.**
R. We.	Richard Webster, A.M. (Princeton). Formerly Fellow in Classics, Princeton University. Editor of *The Elegies of Maximianus*; &c.	**Great Awakening.**
S. A. C.	Stanley Arthur Cook, M.A. Editor for Palestine Exploration Fund. Lecturer in Hebrew and Syriac, and formerly Fellow, Gonville and Caius College, Cambridge. Examiner in Hebrew and Aramaic, London University, 1904-1908. Author of *Glossary of Aramaic Inscriptions*; *The Laws of Moses and the Code of Hammurabi*; *Critical Notes on Old Testament History*; *Religion of Ancient Palestine*; &c.	**Gideon.**
S. Bl.	Sigfus Blöndal. Librarian of the University of Copenhagen.	**Hallgrimsson.**
S. C.	Sidney Colvin, LL.D. See the biographical article, Colvin, Sidney.	**Giorgione; Giotto.**
St. C.	Viscount St. Cyres. See the biographical article, Iddesleigh, 1st Earl of.	**Guyon, Madame.**
S. N.	Simon Newcomb, LL.D., D.Sc. See the biographical article, Newcomb, Simon.	**Gravitation** (*in part*).
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.	**Girgenti; Gnatia; Grottaferrata; Grumentum; Gubbio; Hadria; Halaesa.**
T. A. J.	Thomas Athol Joyce, M.A. Assistant in Department of Ethnography, British Museum. Hon. Sec., Royal Anthropological Institute.	**Hamitic Races (I.).**
T. Ba.	Sir Thomas Barclay, M.P. Member of the Institute of International Law. Member of the Supreme Council of the Congo Free State. Officer of the Legion of Honour. Author of *Problems of International Practice and Diplomacy*; &c. M.P. for Blackburn, 1910.	**Guerrilla.**
T. E. H.	Thomas Erskine Holland, K.C., D.C.L., LL.D. Fellow of the British Academy. Fellow of All Souls College, Oxford. Professor of International Law in the University of Oxford, 1874-1910. Bencher of Lincoln's Inn. Author of *Studies in International Law*; *The Elements of Jurisprudence*; *Alberici Gentilis de jure belli*; *The Laws of War on Land*; *Neutral Duties in a Maritime War*; &c.	**Hall, William E.**
T. F. C.	Theodore Freylinghuysen Collier, Ph.D. Assistant Professor of History, Williams College, Williamstown, Mass., U.S.A.	**Gregory:** *Popes*, **XIII—XV.**
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 Persa-Beluch Boundary, 1896. Author of *The Indian*	**Gilgit; Hari-Rud.**

	Borderland; *The Gates of India*; &c.	
T. K.	Thomas Kirkup, M.A., LL.D. Author of *An Inquiry into Socialism*; *Primer of Socialism*; &c.	**Hadrian** (*in part*).
T. Se.	Thomas Seccombe, M.A. Lecturer in History, East London and Birkbeck Colleges, University of London. Stanhope Prizeman, Oxford, 1887. Formerly Assistant Editor of *Dictionary of National Biography*, 1891-1901. Author of *The Age of Johnson*; &c.; Joint-author of *The Bookman History of English Literature*.	**Gilbert, Sir W. S.**
V. H. S.	Rev. Vincent Henry Stanton, M.A., D.D. Ely Professor of Divinity in the University of Cambridge. Canon of Ely and Fellow of Trinity College, Cambridge. Author of *The Gospels as Historical Documents*; *The Jewish and the Christian Messiahs*; &c.	**Gospel.**
W. A. B. C.	Rev. William Augustus Brevoort Coolidge, M.A., F.R.G.S., Ph.D. (Bern). Fellow of Magdalen College, Oxford. Professor of English History, St David's College, Lampeter, 1880-1881. Author of *Guide du Haut Dauphiné*; *The Range of the Tödi*; *Guide to Grindelwald*; *Guide to Switzerland*; *The Alps in Nature and in History*; &c. Editor of *The Alpine Journal*, 1880-1889; &c.	**Glarus; Goldast Ab Haiminsfeld; Grasse; Grenoble; Grindelwald; Grisons; Gruner. G. S.; Gruyère.**
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.	**Girondists; Goethe:** *Descendants of*; **Greek Independence, War of.**
W. Bo.	Wilhelm Bousset, D.Th. Professor of New Testament Exegesis in the University of Göttingen. Author of *Das Wesen der Religion*; *The Antichrist Legend*; &c.	**Gnosticism.**
W. Bu.	William Burnside, M.A., D.Sc., LL.D., F.R.S. Professor of Mathematics, Royal Naval College, Greenwich. Hon. Fellow of Pembroke College, Cambridge. Author of *The Theory of Groups of Finite Order*.	**Groups, Theory of.**
W. F. C.	William Fellden Craies, M.A. Barrister-at-Law, Inner Temple. Lecturer on Criminal Law, King's College, London. Author of *Craies on Statute Law*. Editor of Archbold's *Criminal Pleading* (23rd edition).	**Habeas Corpus; Hanging.**
W. G. M.	Walter George McMillan, F.C.S., M.I.M.E. (d. 1904). Formerly Secretary of the Institute of Electrical Engineers and Lecturer on Metallurgy, Mason College, Birmingham. Author of *A Treatise on Electro-Metallurgy*.	**Graphite** (*in part*).
W. Hu.	Rev. William Hunt, M.A., Litt.D. President of Royal Historical Society, 1905-1909. Author of *History of English Church, 597-1906*; *The Church of England in the Middle Ages*; *Political History of England 1760-1801*.	**Green, J. R.**
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.	**Gomer; Ham.**
W. H. F.*	William Henry Fairbrother, M.A. Formerly Fellow and Lecturer, Lincoln College, Oxford. Author of *Philosophy of Thomas Hill Green*.	**Green, Thomas Hill.**
W. J. F.	William Justice Ford (d. 1904). Formerly Scholar of St John's College, Cambridge. Headmaster of Leamington College.	**Grace, W. G.**
W. McD.	William McDougall, M.A. Reader in Mental Philosophy in the University of Oxford. Author of *A Primer of Physiological*	**Hallucination.**

	Psychology; *An Introduction to Social Psychology*; &c.	
W. M. M.	W. Max Müller, Ph.D. Professor of Exegesis in the R.E. Seminary, Philadelphia. Author of *Asien und Europa nach den Aegyptischen Denkmälern*; &c.	**Hamitic Races: II.** *Languages.*
W. M. R.	William Michael Rossetti. See the biographical article, Rossetti, Dante G.	**Giulio Romano; Gozzoli; Guido Reni.**
W. P. A	Lieut.-Colonel William Patrick Anderson, M.Inst.C.E., F.R.G.S. Chief Engineer, Department of Marine and Fisheries of Canada. Member of the Geographic Board of Canada. Past President of Canadian Society of Civil Engineers.	**Great Lakes.**
W. P. R.	Hon. William Pember Reeves. Director of London School of Economics. Agent-General and High Commissioner for New Zealand, 1896-1909. Minister of Education, Labour and Justice, New Zealand, 1891-1896. Author of *The Long White Cloud: a History of New Zealand*; &c.	**Grey, Sir George.**
W. R.	Whitelaw Reid, LL.D. See the biographical article, Reid, Whitelaw.	**Greeley, Horace.**
W. Ri.	William Ridgeway, M.A., D.Sc. Professor of Archaeology, Cambridge University, and Brereton Reader in Classics. Fellow of Gonville and Caius College, Cambridge. Fellow of the British Academy. President of Royal Anthropological Institute, 1908. President of Anthropological Section, British Association, 1908. Author of *The Early Age of Greece*; &c.	**Hallstatt.**
W. Rn.	W. Rosenhain, D.Sc. Superintendent of the Metallurgical Department, National Physical Laboratory.	**Glass** (*in part*).
W. R. D.	Wyndham Rowland Dunstan, M.A., LL.D., F.R.S., F.C.S. Director of the Imperial Institute. President of the International Association of Tropical Agriculture. Member of the Advisory Committee for Tropical Agriculture, Colonial Office.	**Gutta-Percha.**
W. R. E. H.	William Richard Eaton Hodgkinson, Ph.D., F.R.S. (Edin.), F.C.S. Professor of Chemistry and Physics, Ordnance College, Woolwich. Formerly Professor of Chemistry and Physics, R.M.A., Woolwich. Part-author of Valentin-Hodgkinson's *Practical Chemistry*; &c.	**Gun Cotton; Gunpowder.**
W. R. S.	William Robertson Smith, LL.D. See the biographical article, Smith, William Robertson.	**Haggai** (*in part*).
W. R. S. R.	William Ralston Shedden-Ralston, M.A. Assistant in the Department of Printed Books, British Museum. Author of *Russian Folk Tales*; &c.	**Gogol.**
W. W. R.*	William Walker Rockwell, Lic.Theol. Assistant Professor of Church History, Union Theological Seminary, New York.	**Gregory XVI.**

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

PRINCIPAL UNSIGNED ARTICLES

Gilding.
Ginger.
Gironde.
Gladiators.
Glasgow.
Glastonbury.
Gloucestershire.
Gotland.
Gourd.
Government.
Grain Trade.
Granada.
Grasses.
Great Salt Lake.
Guillotine.
Guise, House of.
Gum.
Gwalior.
Haddingtonshire.
Hair.
Haiti.

GICHTEL, JOHANN GEORG (1638-1710), German mystic, was born at Regensburg, where his father was a member of senate, on the 14th of March 1638. Having acquired at school an acquaintance with Greek, Hebrew, Syriac and even Arabic, he proceeded to Strassburg to study theology; but finding the theological prelections of J. S. Schmidt and P. J. Spener distasteful, he entered the faculty of law. He was admitted an advocate, first at Spires, and then at Regensburg; but having become acquainted with the baron Justinianus von Weltz (1621-1668), a Hungarian nobleman who cherished schemes for the reunion of Christendom and the conversion of the world, and having himself become acquainted with another world in dreams and visions, he abandoned all interest in his profession, and became an energetic promoter of the "*Christerbauliche Jesusgesellschaft*," or Christian Edification Society of Jesus. The movement in its beginnings provoked at least no active hostility; but when Gichtel began to attack the teaching of the Lutheran clergy and church, especially upon the fundamental doctrine of justification by faith, he exposed himself to a prosecution which resulted in sentence of banishment and confiscation (1665). After many months of wandering and occasionally romantic adventure, he reached Holland in January 1667, and settled at Zwolle, where he co-operated with Friedrich Breckling (1629-1711), who shared his views and aspirations. Having become involved in the troubles of this friend, Gichtel, after a period of imprisonment, was banished for a term of years from Zwolle, but finally in 1668 found a home in Amsterdam, where he made the acquaintance of Antoinette Bourignon (1616-1680), and in a state of poverty (which, however, never became destitution) lived out his strange life of visions and day-dreams, of prophecy and prayer. He became an ardent disciple of Jakob Boehme, whose works he published in 1682 (Amsterdam, 2 vols.); but before the time of his death, on the 21st of January 1710, he had attracted to himself a small band of followers known as Gichtelians or Brethren of the Angels, who propagated certain views at which he had arrived independently of Boehme. Seeking ever to hear the authoritative voice of God within them, and endeavouring to attain to a life altogether free from carnal desires, like that of "the angels in heaven, who neither marry nor are given in marriage," they claimed to exercise a priesthood "after the order of Melchizedek," appeasing the wrath of God, and ransoming the souls of the lost by sufferings endured vicariously after the example of Christ. While, however, Boehme "desired to remain a faithful son of the Church," the Gichtelians became Separatists (cf. J. A. Dorner, *History of Protestant Theology*, ii. p. 185).

Gichtel's correspondence was published without his knowledge by Gottfried Arnold, a disciple, in 1701 (2 vols.), and again in 1708 (3 vols.). It has been frequently reprinted under the title *Theosophia practica*. The seventh volume of the Berlin edition (1768) contains a notice of Gichtel's life. See also G. C. A. von Harless, *Jakob Böhme und die Alchimisten* (1870, 2nd ed. 1882); article in *Allgemeine deutsche Biographie*.

GIDDINGS, JOSHUA REED (1795-1864), American statesman, prominent in the anti-slavery conflict, was born at Tioga Point, now Athens, Bradford county, Pennsylvania, on the 6th of October 1795. In 1806 his parents removed to Ashtabula county, Ohio, then sparsely settled and almost a wilderness. The son worked on his father's farm, and, though he received no systematic education, devoted much time to study and reading. For several years after 1814 he was a school teacher, but in February 1821 he was admitted to the Ohio bar and soon obtained a large practice, particularly in criminal cases. From 1831 to 1837 he was in partnership with Benjamin F. Wade. He served in the lower house of the state legislature in 1826-1828, and from December 1838 until March 1859 was a member of the national House of Representatives, first as a Whig, then as a Free-soiler, and finally as a Republican. Recognizing that slavery was a state institution, with which the Federal government had no authority to interfere, he contended that slavery could only exist by a specific state enactment, that therefore slavery in the District of Columbia and in the Territories was unlawful and should be abolished, that the coastwise slave-trade in vessels flying the national flag, like the international slave-trade, should be rigidly suppressed, and that Congress had no power to pass any act which in any way could be construed as a recognition of slavery as a national institution. His attitude in the so-called "Creole Case" attracted particular attention. In 1841 some slaves who were being carried in the brig "Creole" from Hampton Roads, Virginia, to New Orleans, revolted, killed the captain, gained possession of the vessel, and soon afterwards entered the British port of Nassau. Thereupon, according

to British law, they became free. The minority who had taken an active part in the revolt were arrested on a charge of murder, and the others were liberated. Efforts were made by the United States government to recover the slaves, Daniel Webster, then secretary of state, asserting that on an American ship they were under the jurisdiction of the United States and that they were legally property. On the 21st of March 1842, before the case was settled, Giddings introduced in the House of Representatives a series of resolutions, in which he asserted that "in resuming their natural rights of personal liberty" the slaves "violated no law of the United States." For offering these resolutions Giddings was attacked with rancour, and was formally censured by the House. Thereupon he resigned, appealed to his constituents, and was immediately re-elected by a large majority. In 1859 he was not renominated, and retired from Congress after a continuous service of more than twenty years. From 1861 until his death, at Montreal, on the 27th of May 1864, he was U.S. consul-general in Canada. Giddings published a series of political essays signed "Pacificus" (1843); *Speeches in Congress* (1853); *The Exiles of Florida* (1858); and a *History of the Rebellion: Its Authors and Causes* (1864).

See *The Life of Joshua R. Giddings* (Chicago, 1892), by his son-in-law, George Washington Julian (1817-1899), a Free-soil leader and a representative in Congress in 1849-1851, a Republican representative in Congress in 1861-1871, a Liberal Republican in the campaign of 1872, and afterwards a Democrat.

GIDEON (in Hebrew, perhaps "hewer" or "warrior"), liberator, reformer and "judge" of Israel, was the son of Joash, of the Manassite clan of Abiezer, and had his home at Ophrah near Shechem. His name occurs in Heb. xi. 32, in a list of those who became heroes by faith; but, except in Judges vi.-viii., is not to be met with elsewhere in the Old Testament. He lived at a time when the nomad tribes of the south and east made inroads upon Israel, destroying all that they could not carry away. Two accounts of his deeds are preserved (see JUDGES). According to one (Judges vi. 11-24) Yahweh appeared under the holy tree which was in the possession of Joash and summoned Gideon to undertake, in dependence on supernatural direction and help, the work of liberating his country from its long oppression, and, in token that he accepted the mission, he erected in Ophrah an altar which he called "Yahweh-Shalom" (Yahweh is peace). According to another account (vi. 25-32) Gideon was a great reformer who was commanded by Yahweh to destroy the altar of Baal belonging to his father and the *ashērah* or sacred post by its side. The townsmen discovered the sacrilege and demanded his death. His father, who, as guardian of the sacred place, was priest of Baal, enjoined the men not to take up Baal's quarrel, for "if Baal be a god, let him contend (*rīb*) for himself." Hence Gideon received the name Jerubbaal.[1] From this latter name appearing regularly in the older narrative (cf. ix.), and from the varying usage in vi.-viii., it has been held that stories of two distinct heroes (Gideon and Jerubbaal) have been fused in the complicated account which follows.[2]

The great gathering of the Midianites and their allies on the north side of the plain of Jezreel; the general muster first of Abiezer, then of all Manasseh, and lastly of the neighbouring tribes of Asher, Zebulun and Naphtali; the signs by which the wavering faith of Gideon was steadied; the methods by which an unwieldy mob was reduced to a small but trusty band of energetic and determined men; and the stratagem by which the vast army of Midian was surprised and routed by the handful of Israelites descending from "above Endor," are indicated fully in the narratives, and need not be detailed here. The difficulties in the account of the subsequent flight of the Midianites appear to have arisen from the composite character of the narratives, and there are signs that in one of them Gideon was accompanied only by his own clansmen (vi. 34). So, when the Midianites are put to flight, according to one representation, the Ephraimites are called out to intercept them, and the two chiefs, Ōrēb ("raven") and Zeēb ("wolf"), in making for the fords of the Jordan, are slain at "the raven's rock" and "the wolf's press" respectively. As the sequel of this we are told that the Ephraimites quarrelled with Gideon because their assistance had not been invoked earlier, and their anger was only appeased by his tactful reply (viii. 1-3; contrast xii. 1-6). The other narrative speaks of the pursuit of the Midianite chiefs Zebah and Zalmunna[3] across the northern end of Jordan, past Succoth and Penuel to the unidentified place Ḳarḳor. Having taken relentless vengeance on the men of Penuel and Succoth, who had shown a timid neutrality when the patriotic struggle was at its crisis, Gideon puts the two chiefs to death to avenge his brothers whom they had killed at Tabor.[4] The overthrow of Midian (cf. Is. ix. 4, x. 26; Ps. lxxxiii. 9-12) induced "Israel" to offer Gideon the kingdom. It was refused—out of religious scruples (viii. 22 seq.; cf. 1 Sam. viii. 7, x. 19, xii. 12, 17, 19), and the ephod idol which he set up at Ophrah in commemoration of the victory was regarded by a later editor (*v.* 27) as a cause of apostasy to the people and a snare to Gideon and his house; see, however, Ephod. Gideon's achievements would naturally give him a more than merely local authority, and after his death the attempt was made by one of his sons to set himself up as chief (see ABIMELECH).

See further JEWS, section 1; and the literature to the book of Judges.

(S. A. C.)

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1 "Baal contends" (or Jeru-baal, "Baal founds," cf. Jeru-el), but artificially explained in the narrative to mean "let Baal contend against him," or "let Baal contend for himself," v. 31. In 2 Sam. xi. 21 he is called Jerubbesheth, in accordance with the custom explained in the article BAAL.

2 See, on this, Cheyne, *Ency. Bib.* col. 1719 seq.; Ed. Meyer, *Die Israeliten*, pp. 482 seq.

3 The names are vocalized to suggest the fanciful interpretations “victim” and “protection withheld.”

4 As the account of this has been lost and the narrative is concerned not with the plain of Jezreel but rather with Shechem, it has been inferred that the episode implies the existence of a distinct story wherein Gideon’s pursuit is such an act of vengeance.

GIEBEL, CHRISTOPH GOTTFRIED ANDREAS (1820-1881), German zoologist and palaeontologist, was born on the 13th of September 1820 at Quedlinburg in Saxony, and educated at the university of Halle, where he graduated Ph.D. in 1845. In 1858 he became professor of zoology and director of the museum in the university of Halle. He died at Halle on the 14th of November 1881. His chief publications were *Paläozoologie* (1846); *Fauna der Vorwelt* (1847-1856); *Deutschlands Petrefacten* (1852); *Odontographie* (1855); *Lehrbuch der Zoologie* (1857); *Thesaurus ornithologiae* (1872-1877);

GIEN, a town of central France, capital of an arrondissement in the department of Loiret, situated on the right bank of the Loire, 39 m. E.S.E. of Orleans by rail. Pop. (1906) 6325. Gien is a picturesque and interesting town and has many curious old houses. The Loire is here crossed by a stone bridge of twelve arches, built by Anne de Beaujeu, daughter of Louis XI., about the end of the 15th century. Near it stands a statue of Vercingetorix. The principal building is the old castle used as a law-court, constructed of brick and stone arranged in geometrical patterns, and built in 1494 by Anne de Beaujeu. The church of St Pierre possesses a square tower dating from the end of the 15th century. Porcelain is manufactured.

GIERS, NICHOLAS KARLOVICH DE (1820-1895), Russian statesman, was born on the 21st of May 1820. Like his predecessor, Prince Gorchakov, he was educated at the lyceum of Tsarskoye Selo, near St Petersburg, but his career was much less rapid, because he had no influential protectors, and was handicapped by being a Protestant of Teutonic origin. At the age of eighteen he entered the service of the Eastern department of the ministry of foreign affairs, and spent more than twenty years in subordinate posts, chiefly in south-eastern Europe, until he was promoted in 1863 to the post of minister plenipotentiary in Persia. Here he remained for six years, and, after serving as a minister in Switzerland and Sweden, he was appointed in 1875 director of the Eastern department and assistant minister for foreign affairs under Prince Gorchakov, whose niece he had married. No sooner had he entered on his new duties than his great capacity for arduous work was put to a severe test. Besides events in central Asia, to which he had to devote much attention, the Herzegovinian insurrection had broken out, and he could perceive from secret official papers that the incident had far-reaching ramifications unknown to the general public. Soon this became apparent to all the world. While the Austrian officials in Dalmatia, with hardly a pretence of concealment, were assisting the insurgents, Russian volunteers were flocking to Servia with the connivance of the Russian and Austrian governments, and General Ignatiev, as ambassador in Constantinople, was urging his government to take advantage of the palpable weakness of Turkey for bringing about a radical solution of the Eastern question. Prince Gorchakov did not want a radical solution involving a great European war, but he was too fond of ephemeral popularity to stem the current of popular excitement. Alexander II., personally averse from war, was not insensible to the patriotic enthusiasm, and halted between two opinions. M. de Giers was one of the few who gauged the situation accurately. As an official and a man of non-Russian extraction he had to be extremely reticent, but to his intimate friends he condemned severely the ignorance and light-hearted recklessness of those around him. The event justified his sombre previsions, but did not cure the recklessness of the so-called patriots. They wished to defy Europe in order to maintain intact the treaty of San Stefano, and again M. de Giers found himself in an unpopular minority. He had to remain in the background, but all the influence he possessed was thrown into the scale of peace. His views, energetically supported by Count Shuvalov, finally prevailed, and the European congress assembled at Berlin. He was not present at the congress, and consequently escaped the popular odium for the concessions which Russia had to make to Great Britain and Austria. From that time he was practically minister of foreign affairs, for Prince Gorchakov was no longer capable of continued intellectual exertion, and lived mostly abroad. On the death of Alexander II. in 1881 it was generally expected that M. de Giers would be dismissed as deficient in Russian nationalist feeling, for Alexander III. was credited with strong anti-German Slavophil tendencies. In reality the

young tsar had no intention of embarking on wild political adventures, and was fully determined not to let his hand be forced by men less cautious than himself. What he wanted was a minister of foreign affairs who would be at once vigilant and prudent, active and obedient, and who would relieve him from the trouble and worry of routine work while allowing him to control the main lines, and occasionally the details, of the national policy. M. de Giers was exactly what he wanted, and accordingly the tsar not only appointed him minister of foreign affairs on the retirement of Prince Gorchakov in 1882, but retained him to the end of his reign in 1894. In accordance with the desire of his august master, M. de Giers followed systematically a pacific policy. Accepting as a *fait accompli* the existence of the triple alliance, created by Bismarck for the purpose of resisting any aggressive action on the part of Russia and France, he sought to establish more friendly relations with the cabinets of Berlin, Vienna and Rome. To the advances of the French government he at first turned a deaf ear, but when the *rapprochement* between the two countries was effected with little or no co-operation on his part, he utilized it for restraining France and promoting Russian interests. He died on the 26th of January 1895, soon after the accession of Nicholas II.

(D. M. W.)

GIESEBRECHT, WILHELM VON (1814-1889), German historian, was a son of Karl Giesebrecht (d. 1832), and a nephew of the poet Ludwig Giesebrecht (1792-1873). Born in Berlin on the 5th of March 1814, he studied under Leopold von Ranke, and his first important work, *Geschichte Ottos II.*, was contributed to Ranke's *Jahrbücher des deutschen Reichs unter dem sächsischen Hause* (Berlin, 1837-1840); In 1841 he published his *Jahrbücher des Klosters Altaich*, a reconstruction of the lost *Annales Altahenses*, a medieval source of which fragments only were known to be extant, and these were obscured in other chronicles. The brilliance of this performance was shown in 1867, when a copy of the original chronicle was found, and it was seen that Giesebrecht's text was substantially correct. In the meantime he had been appointed *Oberlehrer* in the Joachimsthaler Gymnasium in Berlin; had paid a visit to Italy, and as a result of his researches there had published *De litterarum studiis apud Italos primis medii aevi seculis* (Berlin, 1845), a study upon the survival of culture in Italian cities during the middle ages, and also several critical essays upon the sources for the early history of the popes. In 1851 appeared his translation of the *Historiae* of Gregory of Tours, which is the standard German translation. Four years later appeared the first volume of his great work, *Geschichte der deutschen Kaiserzeit*, the fifth volume of which was published in 1888. This work was the first in which the results of the scientific methods of research were thrown open to the world at large. Largeness of style and brilliance of portrayal were joined to an absolute mastery of the sources in a way hitherto unachieved by any German historian. Yet later German historians have severely criticized his glorification of the imperial era with its Italian entanglements, in which the interests of Germany were sacrificed for idle glory. Giesebrecht's history, however, appeared when the new German empire was in the making, and became popular owing both to its patriotic tone and its intrinsic merits. In 1857 he went to Königsberg as professor ordinarius, and in 1862 succeeded H. von Sybel as professor of history in the university of Munich. The Bavarian government honoured him in various ways, and he died at Munich on the 17th of December 1889. In addition to the works already mentioned, Giesebrecht published a good monograph on Arnold of Brescia (Munich, 1873), a collection of essays under the title *Deutsche Reden* (Munich, 1871), and was an active member of the group of scholars who took over the direction of the *Monumenta Germaniae historica* in 1875. In 1895 B. von Simson added a sixth volume to the *Geschichte der deutschen Kaiserzeit*, thus bringing the work down to the death of the emperor Frederick I. in 1190.

See S. Riezler, *Gedächtnisrede auf Wilhelm von Giesebrecht* (Munich, 1891); and Lord Acton in the *English Historical Review*, vol. v. (London, 1890).

GIESELER, JOHANN KARL LUDWIG (1792-1854), German writer on church history, was born on the 3rd of March 1792 at Petershagen, near Minden, where his father, Georg Christof Friedrich, was preacher. In his tenth year he entered the orphanage at Halle, whence he duly passed to the university, his studies being interrupted, however, from October 1813 till the peace of 1815 by a period of military service, during which he was enrolled as a volunteer in a regiment of chasseurs. On the conclusion of peace (1815) he returned to Halle, and, having in 1817 taken his degree in philosophy, he in the same year became assistant head master (*Conrector*) in the Minden gymnasium, and in 1818 was appointed director of the gymnasium at Cleves. Here he published his earliest work (*Historisch-kritischer Versuch über die Entstehung u. die frühesten Schicksale der schriftlichen Evangelien*), a treatise which had considerable influence on subsequent investigations as to the origin of the gospels. In 1819 Gieseler was appointed a professor ordinarius in theology in the newly founded university of Bonn, where, besides lecturing on church history, he made important contributions to the literature of that subject in Ernst Rosenmüller's *Repertorium*, K. F. Stäudlin and H. G. Tschirner's

Archiv, and in various university "programs." The first part of the first volume of his well-known *Church History* appeared in 1824. In 1831 he accepted a call to Göttingen as successor to J. G. Planck. He lectured on church history, the history of dogma, and dogmatic theology. In 1837 he was appointed a *Consistorialrath*, and shortly afterwards was created a knight of the Guelphic order. He died on the 8th of July 1854. The fourth and fifth volumes of the *Kirchengeschichte*, embracing the period subsequent to 1814, were published posthumously in 1855 by E. R. Redepenning (1810-1883); and they were followed in 1856 by a *Dogmengeschichte*, which is sometimes reckoned as the sixth volume of the *Church History*. Among church historians Gieseler continues to hold a high place. Less vivid and picturesque in style than Karl Hase, conspicuously deficient in Neander's deep and sympathetic insight into the more spiritual forces by which church life is pervaded, he excels these and all other contemporaries in the fulness and accuracy of his information. His *Lehrbuch der Kirchengeschichte*, with its copious references to original authorities, is of great value to the student: "Gieseler wished that each age should speak for itself, since only by this means can the peculiarity of its ideas be fully appreciated" (Otto Pfleiderer, *Development of Theology*, p. 284). The work, which has passed through several editions in Germany, has partially appeared also in two English translations. That published in New York (*Text Book of Ecclesiastical History*, 5 vols.) brings the work down to the peace of Westphalia, while that published in "Clark's Theological Library" (*Compendium of Ecclesiastical History*, Edinburgh, 5 vols.) closes with the beginning of the Reformation. Gieseler was not only a devoted student but also an energetic man of business. He frequently held the office of pro-rector of the university, and did much useful work as a member of several of its committees.

GIESSEN, a town of Germany, capital of the province of Upper Hesse, in the grand-duchy of Hesse-Darmstadt, is situated in a beautiful and fruitful valley at the confluence of the Wieseck with the Lahn, 41 m. N.N.W. of Frankfort-on-Main on the railway to Cassel; and at the junction of important lines to Cologne and Coblenz. Pop. (1885) 18,836; (1905) 29,149. In the old part of the town the streets are narrow and irregular. Besides the university, the principal buildings are the Stadtkirche, the provincial government offices, comprising a portion of the old castle dating from the 12th century, the arsenal (now barracks) and the town-hall (containing an historical collection). The university, founded in 1607 by Louis V, landgrave of Hesse, has a large and valuable library, a botanic garden, an observatory, medical schools, a museum of natural history, a chemical laboratory which was directed by Justus von Liebig, professor here from 1824 to 1852, and an agricultural college. The industries include the manufacture of woollen and cotton cloth of various kinds, machines, leather, candles, tobacco and beer.

Giessen, the name of which is probably derived from the streams which pour (*giessen*) their waters here into the Lahn, was formed in the 12th century out of the villages Selters, Aster and Kroppach, for whose protection Count William of Gleiberg built the castle of Giessen. Through marriage the town came, in 1203, into the possession of the count palatine, Rudolph of Tübingen, who sold it in 1265 to the landgrave Henry of Hesse. It was surrounded with fortifications in 1530, which were demolished in 1547, but rebuilt in 1560. In 1805 they were finally pulled down, and their site converted into promenades.

See O. Buchner, *Führer für Giessen und das Lahntal* (1891); and *Aus Glessens Vergangenheit* (1885).

GIFFARD, GODFREY (*c.* 1235-1302); chancellor of England and bishop of Worcester, was a son of Hugh Giffard of Boyton, Wiltshire. Having entered the church he speedily obtained valuable preferments owing to the influence of his brother Walter, who became chancellor of England in 1265. In 1266 Godfrey became chancellor of the exchequer, succeeding Walter as chancellor of England when, in the same year, the latter was made archbishop of York. In 1268 he was chosen bishop of Worcester, resigning the chancellorship shortly afterwards; and both before and after 1279, when he inherited the valuable property of his brother the archbishop, he was employed on public business by Edward I. His main energies, however, were devoted to the affairs of his see. He had one long dispute with the monks of Worcester, another with the abbot of Westminster, and was vigilant in guarding his material interests. The bishop died on the 26th of January 1302, and was buried in his cathedral. Giffard, although inclined to nepotism, was a benefactor to his cathedral, and completed and fortified the episcopal castle at Hartlebury.

See W. Thomas, *Survey of Worcester Cathedral*; *Episcopal Registers*; *Register of Bishop Godfrey Giffard*, edited by J. W. Willis-Bund (Oxford, 1898-1899); and the Annals of Worcester in the *Annales monastici*, vol. iv., edited by H. R. Luard (London, 1869).

GIFFARD, WALTER (d. 1279), chancellor of England and archbishop of York, was a son of Hugh Giffard of Boyton, Wiltshire, and after serving as canon and archdeacon of Wells, was chosen bishop of Bath and Wells in May 1264. In August 1265 Henry III. appointed him chancellor of England, and he was one of the arbitrators who drew up the *dictum de Kenilworth* in 1266. Later in this year Pope Clement IV. named him archbishop of York, and having resigned the chancellorship he was an able and diligent ruler of his see, although in spite of his great wealth he was frequently in pecuniary difficulties. When Henry III. died in November 1272 the archbishopric of Canterbury was vacant, and consequently the great seal was delivered to the archbishop of York, who was the chief of the three regents who successfully governed the kingdom until the return of Edward I. in August 1274. Having again acted in this capacity during the king's absence in 1275, Giffard died in April 1279, and was buried in his cathedral.

See *Fasti Eboracenses*, edited by J. Raine (London, 1863). Giffard's *Register* from 1266 to 1279 has been edited for the Surtees Society by W. Brown.

GIFFARD, WILLIAM (d. 1129), bishop of Winchester, was chancellor of William II. and received his see, in succession to Bishop Walkelin, from Henry I. (1100). He was one of the bishops elect whom Anselm refused to consecrate (1101) as having been nominated and invested by the lay power. During the investitures dispute Giffard was on friendly terms with Anselm, and drew upon himself a sentence of banishment through declining to accept consecration from the archbishop of York (1103). He was, however, one of the bishops who pressed Anselm, in 1106, to give way to the king. He was consecrated after the settlement of 1107. He became a close friend of Anselm, aided the first Cistercians to settle in England, and restored Winchester cathedral with great magnificence.

See Eadmer, *Historia novorum*, edited by M. Rule (London, 1884); and S. H. Cass, *Bishops of Winchester* (London, 1827).

GIFFEN, SIR ROBERT (1837-1910), British statistician and economist, was born at Strathaven, Lanarkshire. He entered a solicitor's office in Glasgow, and while in that city attended courses at the university. He drifted into journalism, and after working for the *Stirling Journal* he went to London in 1862 and joined the staff of the *Globe*. He also assisted Mr John (afterwards Lord) Morley, when the latter edited the *Fortnightly Review*. In 1868 he became Walter Bagehot's assistant-editor on the *Economist*; and his services were also secured in 1873 as city-editor of the *Daily News*, and later of *The Times*. His high reputation as a financial journalist and statistician, gained in these years, led to his appointment in 1876 as head of the statistical department in the Board of Trade, and subsequently he became assistant secretary (1882) and finally controller-general (1892), retiring in 1897. In connexion with his position as chief statistical adviser to the government, he was constantly employed in drawing up reports, giving evidence before commissions of inquiry, and acting as a government auditor, besides publishing a number of important essays on financial subjects. His principal publications were *Essays on Finance* (1879 and 1884), *The Progress of the Working Classes* (1884), *The Growth of Capital* (1890), *The Case against Bimetallism* (1892), and *Economic Inquiries and Studies* (1904). He was president of the Statistical Society (1882-1884); and after being made a C.B. in 1891 was created K.C.B. in 1895. In 1892 he was elected a Fellow of the Royal Society. Sir Robert Giffen continued in later years to take a leading part in all public controversies connected with finance and taxation, and his high authority and practical experience were universally recognized. He died somewhat suddenly in Scotland on the 12th of April 1910.

GIFFORD, ROBERT SWAIN (1840-1905), American marine and landscape painter, was born on Naushon Island, Massachusetts, on the 23rd of December 1840. He studied art with the Dutch marine painter Albert van Beest, who had a studio in New Bedford, and in 1864 he opened a studio for himself in Boston, subsequently settling in New York, where he was elected an associate of the National Academy of Design in 1867 and an academician in 1878. He was also a charter member of the American Water Color Society and the Society of American Artists. From 1878 until 1896 he was teacher of painting and chief master of the Woman's Art School of Cooper Union, New York, and from 1896 until his death he was director. Gifford painted longshore views, sand dunes and landscapes generally, with charm and poetry. He was an etcher of considerable reputation, a member of the Society of American Etchers, and an honorary member of the Society of Painter-Etchers of London. He

died in New York on the 13th of January 1905.

GIFFORD, SANDFORD ROBINSON (1823-1880), American landscape painter, was born at Greenfield, New York, on the 10th of July 1823. He studied (1842-1845) at Brown University, then went to New York, and entered the art schools of the National Academy of Design, of which organization he was elected an associate in 1851, and an academician in 1854. Subsequently he studied in Paris and Rome. He was one of the best known of the Hudson River school group, though it was at Lake George that he found most of his themes. In his day he enjoyed an enormous popularity, and his canvases are in many well-known American collections. He died in New York City on the 29th of August 1880.

GIFFORD, WILLIAM (1756-1826), English publicist and man of letters, was born at Ashburton, Devon, in April 1756. His father was a glazier of indifferent character, and before he was thirteen William had lost both parents. The business was seized by his godfather, on whom William and his brother, a child of two, became entirely dependent. For about three months William was allowed to remain at the free school of the town. He was then put to follow the plough, but after a day's trial he proved unequal to the task, and was sent to sea with the Brixham fishermen. After a year at sea his godfather, driven by the opinion of the townsfolk, put the boy to school once more. He made rapid progress, especially in mathematics, and began to assist the master. In 1772 he was apprenticed to a shoemaker, and when he wished to pursue his mathematical studies, he was obliged to work his problems with an awl on beaten leather. By the kindness of an Ashburton surgeon, William Cooksley, a subscription was raised to enable him to return to school. Ultimately he proceeded in his twenty-third year to Oxford, where he was appointed a Bible clerk in Exeter College. Leaving the university shortly after graduation in 1782, he found a generous patron in the first Earl Grosvenor, who undertook to provide for him, and sent him on two prolonged continental tours in the capacity of tutor to his son, Lord Belgrave. Settling in London, Gifford published in 1794 his first work, a clever satirical piece, after Persius, entitled the *Baviad*, aimed at a coterie of second-rate writers at Florence, then popularly known as the Della Cruscans, of which Mrs Piozzi was the leader. A second satire of a similar description, the *Maeviad*, directed against the corruptions of the drama, appeared in 1795. About this time Gifford became acquainted with Canning, with whose help he in August 1797 originated a weekly newspaper of Conservative politics entitled the *Anti-Jacobin*, which, however, in the following year ceased to be published. An English version of Juvenal, on which he had been for many years engaged, appeared in 1802; to this an autobiographical notice of the translator, reproduced in Nichol's *Illustrations of Literature*, was prefixed. Two years afterwards Gifford published an annotated edition of the plays of Massinger; and in 1809, when the *Quarterly Review* was projected, he was made editor. The success which attended the *Quarterly* from the outset was due in no small degree to the ability and tact with which Gifford discharged his editorial duties. He took, however, considerable liberties with the articles he inserted, and Southey, who was one of his regular contributors, said that Gifford looked on authors as Izaak Walton did on worms. His bitter opposition to Radicals and his onslaughts on new writers, conspicuous among which was the article on Keats's *Endymion*, called forth Hazlitt's *Letter to W. Gifford* in 1819. His connexion with the *Review* continued until within about two years of his death, which took place in London on the 31st of December 1826. Besides numerous contributions to the *Quarterly* during the last fifteen years of his life, he wrote a metrical translation of Persius, which appeared in 1821. Gifford also edited the dramas of Ben Jonson in 1816, and his edition of Ford appeared posthumously in 1827. His notes on Shirley were incorporated in Dyce's edition in 1833. His political services were acknowledged by the appointments of commissioner of the lottery and paymaster of the gentleman pensioners. He left a considerable fortune, the bulk of which went to the son of his first benefactor, William Cooksley.

GIFT (a common Teutonic word, cf. Ger. *die Gift*, gift, *das Gift*, poison, formed from the Teut. stem *gab-*, to give, cf. Dutch *geven*, Ger. *geben*; in O. Eng. the word appears with initial y, the guttural of later English is due to Scandinavian influence), a general English term for a present or thing bestowed, *i.e.* an alienation of property otherwise than for a legal consideration, although in law it is often used to signify alienation with or without consideration. By analogy the terms "gift" and "gifted" are also used to signify the natural endowment of some special ability, or a miraculous power, in a person, as being not acquired in the ordinary way. The legal effect of a gratuitous gift only need be considered here.

Formerly in English law property in land could be conveyed by one person to another by a verbal gift of the estate accompanied by delivery of possession. The Statute of Frauds required all such conveyances to be in writing, and a later statute (8 & 9 Vict. c. 106) requires them to be by deed. Personal property may be effectually transferred from one person to another by a simple verbal gift accompanied by delivery. If A delivers a chattel to B, saying or signifying that he does so by way of gift, the property passes, and the chattel belongs to B. But unless the actual thing is bodily handed over to the donee, the mere verbal expression of the donor's desire or intention has no legal effect whatever. The persons are in the position of parties to an agreement which is void as being without consideration. When the nature of the thing is such that it cannot be bodily handed over, it will be sufficient to put the donee in such a position as to enable him to deal with it as the owner. For example, when goods are in a warehouse, the delivery of the key will make a verbal gift of them effectual; but it seems that part delivery of goods which are capable of actual delivery will not validate a verbal gift of the part undelivered. So when goods are in the possession of a warehouseman, the handing over of a delivery order might, by special custom (but not otherwise, it appears), be sufficient to pass the property in the goods, although delivery of a bill of lading for goods at sea is equivalent to an actual delivery of the goods themselves.

GIFU (Imaïzumi), a city of Japan, capital of the *ken* (government) of Central Nippon, which comprises the two provinces of Mino and Hida. Pop. about 41,000. It lies E. by N. of Lake Biwa, on the Central railway, on a tributary of the river Kiso, which flows to the Bay of Miya Uro. Manufactures of silk and paper goods are carried on. The *ken* has an area of about 4000 sq. m. and is thickly peopled, the population exceeding 1,000,000. The whole district is subject to frequent earthquakes.

GIG, apparently an onomatopoeic word for any light whirling object, and so used of a top, as in Shakespeare's *Love's Labour's Lost*, v. i. 70 ("Goe whip thy gigge"), or of a revolving lure made of feathers for snaring birds. The word is now chiefly used of a light two-wheeled cart or carriage for one horse, and of a narrow, light, ship's boat for oars or sails, and also of a clinker-built rowing-boat used for rowing on the Thames. "Gig" is further applied, in mining, to a wooden chamber or box divided in the centre and used to draw miners up and down a pit or shaft, and to a textile machine, the "gig-mill" or "gigging machine," which raises the nap on cloth by means of teazels. A "gig" or "fish-gig" (properly "fiz-gig," possibly an adaptation of Span. *fisga*, harpoon) is an instrument used for spearing fish.

GIGLIO (anc. *Igilium*), an island of Italy, off the S.W. coast of Italy, in the province of Grosseto, 11 m. to the W. of Monte Argentario, the nearest point on the coast. It measures about 5 m. by 3 and its highest point is 1634 ft. above sea-level. Pop. (1901) 2062. It is partly composed of granite, which was quarried here by the Romans, and is still used; the island is fertile, and produces wine and fruit, the cultivation of which has taken the place of the forests of which Rutilius spoke (*Itin.* i. 325, "eminus Igilii silvosa cacumina miror"). Julius Caesar mentions its sailors in the fleet of Domitius Ahenobarbus. In Rutilius's time it served as a place of refuge from the barbarian invaders. Charlemagne gave it to the abbey of Tre Fontane at Rome. In the 14th century it belonged to Pisa, then to Florence, then, after being seized by the Spanish fleet, it was ceded to Antonio Piccolomini, nephew of Pius II. In 1558 it was sold to the wife of Cosimo I. of Florence.

See Archduke Ludwig Salvator, *Die Insel Giglio* (Prague, 1900).

GIJÓN, a seaport of northern Spain, in the province of Oviedo; on the Bay of Biscay, and at the terminus of railways from Avilés, Oviedo and Langreo. Pop. (1900) 47,544. The older parts of Gijón, which are partly enclosed by ancient walls, occupy the upper slopes of a peninsular headland, Santa Catalina Point; while its more modern suburbs extend along the shore to Cape Torres, on the west, and Cape San Lorenzo, on the east. These suburbs contain the town-hall, theatre, markets, and a bull-ring with seats for 12,000 spectators. Few of the buildings of Gijón are noteworthy for any architectural merit, except perhaps the 15th-century parish church of San Pedro, which has a triple raw of aisles on

each side, the palace of the marquesses of Revillajigedo (or Revilla Gigedo), and the Asturian Institute or Jovellanos Institute. The last named has a very fine collection of drawings by Spanish and other artists, a good library and classes for instruction in seamanship, mathematics and languages. It was founded in 1797 by the poet and statesman Gaspar Melchor de Jovellanos (1744-1811). Jovellanos, a native of Gijón, is buried in San Pedro.

The Bay of Gijón is the most important roadstead on the Spanish coast between Ferrol and Santander. Its first quay was constructed by means of a grant from Charles V. in 1552-1554; and its arsenal, added in the reign of Philip II. (1556-1598), was used in 1588 as a repairing station for the surviving ships of the Invincible Armada. A new quay was built in 1766-1768, and extended in 1859; the harbour was further improved in 1864, and after 1892, when the Musel harbour of refuge was created at the extremity of the bay. It was, however, the establishment of railway communication in 1884 which brought the town its modern prosperity, by rendering it the chief port of shipment for the products of Langreo and other mining centres in Oviedo. A rapid commercial development followed. Besides large tobacco, glass and porcelain factories, Gijón possesses iron foundries and petroleum refineries; while its minor industries include fisheries, and the manufacture of preserved foods, soap, chocolate, candles and liqueurs. In 1903 the harbour accommodated 2189 vessels of 358,375 tons. In the same year the imports, consisting chiefly of machinery, iron, wood and food-stuffs, were valued at £660,889; while the exports, comprising zinc, copper, iron and other minerals, with fish, nuts and farm produce, were valued at £100,941.

Gijón is usually identified with the *Gigia* of the Romans, which, however, occupied the site of the adjoining suburb of Cima de Villa. Early in the 8th century Gijón was captured and strengthened by the Moors, who used the stones of the Roman city for their fortifications, but were expelled by King Pelayo (720-737). In 844 Gijón successfully resisted a Norman raid; in 1395 it was burned down; but thenceforward it gradually rose to commercial importance.

GĪLĀN (Ghilan, Guilan), one of the three small but important Caspian provinces of Persia, lying along the south-western shore of the Caspian Sea between 48° 50′ and 50° 30′ E. with a breadth varying from 15 to 50 m. It has an area of about 5000 sq. m. and a population of about 250,000. It is separated from Russia by the little river Astara, which flows into the Caspian, and bounded W. by Azerbāïjān, S. by Kazvin and E. by Mazandaran. The greater portion of the province is a lowland region extending inland from the sea to the base of the mountains of the Elburz range and, though the Sefid Rūd (White river), which is called Kizil Uzain in its upper course and has its principal sources in the hills of Persian Kurdistan, is the only river of any size, the province is abundantly watered by many streams and an exceptionally great rainfall (in some years 50 in.).

The vegetation is very much like that of southern Europe, but in consequence of the great humidity and the mild climate almost tropically luxuriant, and the forests from the shore of the sea up to an altitude of nearly 5000 ft. on the mountain slopes facing the sea are as dense as an Indian jungle. The prevailing types of trees are the oak, maple, hornbeam, beech, ash and elm. The box tree comes to rare perfection, but in consequence of indiscriminate cutting for export during many years, is now becoming scarce. Of fruit trees the apple, pear, plum, cherry, medlar, pomegranate, fig, quince, as well as two kinds of vine, grow wild; oranges, sweet and bitter, and other Aurantiaceae thrive well in gardens and plantations. The fauna also is well represented, but tigers which once were frequently seen are now very scarce; panther, hyena, jackal, wild boar, deer (*Cervus maral*) are common; pheasant, woodcock, ducks, teal, geese and various waterfowl abound; the fisheries are very productive and are leased to a Russian firm. The ordinary cattle of the province is the small humped kind, *Bos indicus*, and forms an article of export to Russia, the humps, smoked, being much in demand as a delicacy. Rice of a kind not much appreciated in Persia, but much esteemed in Gīlān and Russia, is largely cultivated and a quantity valued at about £120,000 was exported to Russia during 1904-1905. Tea plantations, with seeds and plants from Assam, Ceylon and the Himalayas, were started in the early part of 1900 on the slopes of the hills south of Resht at an altitude of about 1000 ft. The results were excellent and very good tea was produced in 1904 and 1905, but the Persian government gave no support and the enterprise was neglected. The olive thrives well at Rúdbár and Manjíl in the Sefíd Rúd valley and the oil extracted from it by a Provençal for some years until 1896, when he was murdered, was of very good quality and found a ready market at Baku. Since then the oil has been, as before, only used for the manufacture of soap. Tobacco from Turkish seed, cultivated since 1875, grows well, and a considerable quantity of it is exported. The most valuable produce of the province is silk. In 1866 it was valued at £743,000 and about two-thirds of it was exported. The silkworm disease appeared in 1864 and the crops decreased in consequence until 1893 when the value of the silk exported was no more than £6500. Since then there has been a steady improvement, and in 1905-1906 the value of the produce was estimated at £300,000 and that of the quantity exported at £200,000. The eggs of the silk-worms, formerly obtained from Japan, are now imported principally from Brusa by Greeks under French protection and from France.

There is only one good road in the province, that from Enzeli to Kazvin by way of Resht; in other parts communication is by narrow and frequently impassable lanes through the thick forest, or by

intricate pathways through the dense undergrowth.

The province is divided into the following administrative districts: Resht (with the capital and its immediate neighbourhood), Fumen (with Tulam and Mesula, where are iron mines), Gesker, Talish (with Shandarman, Kerganrud, Asalim, Gil-Dulab, Talish-Dulab), Enzeli (the port of Resht), Sheft, Manjíl (with Rahmetabad and Amarlu), Lahijan (with Langarud, Rúdsar and Ranehkuh), Dilman and Lashtnisha. The revenue derived from taxes and customs is about £80,000. The crown lands have been much neglected and the revenue from them amounts to hardly £3000 per annum. The value of the exports and imports from and into Gīlān, much of them in transit, is close upon £2,000,000.

Gīlān was an independent khanate until 1567 when Khan Ahmed, the last of the Kargia dynasty, which had reigned 205 years, was deposed by Tahmasp I., the second Safawid shah of Persia (1524-1576). It was occupied by a Russian force in the early part of 1723; and Tahmasp III., the tenth Safawid shah (1722-1731); then without a throne and his country occupied by the Afghans, ceded it, together with Mazandaran and Astarabad, to Peter the Great by a treaty of the 12th of September of the same year. Russian troops remained in Gīlān until 1734, when they were compelled to evacuate it.

The derivation of the name Gīlān from the modern Persian word *gil* meaning mud (hence “land of mud”) is incorrect. It probably means “land of the Gīl,” an ancient tribe which classical writers mention as the Gelae.

(A. H.-S.)

GILBART, JAMES WILLIAM (1794-1863), English writer on banking, was born in London on the 21st of March 1794. From 1813 to 1825 he was clerk in a London bank. After a two years’ residence in Birmingham, he was appointed manager of the Kilkenny branch of the Provincial Bank of Ireland, and in 1829 he was promoted to the Waterford branch. In 1834 he became manager of the London and Westminster Bank; and he did much to develop the system of joint-stock banking. On more than one occasion he rendered valuable services to the joint-stock banks by his evidence before committees of the House of Commons; and, on the renewal of the bank charter in 1844, he procured the insertion of a clause granting to joint-stock banks the power of suing by their public officer, and also the right of accepting bills at less than six months’ date. In 1846 he was elected a fellow of the Royal Society. He died in London on the 8th of August 1863. The Gilbart lectures on banking at King’s College are called after him.

The following are his principal works on banking, most of which have passed through more than one edition: *Practical Treatise on Banking* (1827); *The History and Principles of Banking* (1834); *The History of Banking in America* (1837); *Lectures on the History and Principles of Ancient Commerce* (1847); *Logic for the Million* (1851); and *Logic of Banking* (1857).

GILBERT, ALFRED (1854-), British sculptor and goldsmith, born in London, was the son of Alfred Gilbert, musician. He received his education mainly in Paris (École des Beaux-Arts, under Cavelier), and studied in Rome and Florence where the significance of the Renaissance made a lasting impression upon him and his art. He also worked in the studio of Sir J. Edgar Boehm, R.A. His first work of importance was the charming group of the “Mother and Child,” then “The Kiss of Victory,” followed by “Perseus Arming” (1883), produced directly under the influence of the Florentine masterpieces he had studied. Its success was great, and Lord Leighton forthwith commissioned “Icarus,” which was exhibited at the Royal Academy in 1884, along with a remarkable “Study of a Head,” and was received with general applause. Then followed “The Enchanted Chair,” which, along with many other works deemed by the artist incomplete or unworthy of his powers, was ultimately broken by the sculptor’s own hand. The next year Mr Gilbert was occupied with the Shaftesbury Memorial Fountain, in Piccadilly, London, a work of great originality and beauty, yet shorn of some of the intended effect through restrictions put upon the artist. In 1888 was produced the statue of H.M. Queen Victoria, set up at Winchester, in its main design and in the details of its ornamentation the most remarkable work of its kind produced in Great Britain, and perhaps, it may be added, in any other country in modern times. Other statues of great beauty, at once novel in treatment and fine in design, are those set up to Lord Reay in Bombay, and John Howard at Bedford (1898); the highly original pedestal of which did much to direct into a better channel what are apt to be the eccentricities of what is called the “New Art” School. The sculptor rose to the full height of his powers in his “Memorial to the Duke of Clarence,” and his fast developing fancy and imagination, which are the main characteristics of all his work, are seen in his “Memorial Candelabrum to Lord Arthur Russell” and “Memorial Font to the son of the 4th Marquess of Bath.” Gilbert’s sense of decoration is paramount in all he does, and although in addition to the work already cited he produced busts of extraordinary excellence of Cyril Flower, John R. Clayton (since broken up by the artist—the fate of much of his admirable work), G. F. Watts, Sir Henry Tate, Sir George Birdwood, Sir Richard Owen, Sir George

Grove and various others, it is on his goldsmithery that the artist would rest his reputation; on his mayoral chain for Preston, the epergne for Queen Victoria, the figurines of “Victory” (a statuette designed for the orb in the hand of the Winchester statue), “St Michael” and “St George,” as well as smaller objects such as seals, keys and the like. Mr Gilbert was chosen associate of the Royal Academy in 1887, full member in 1892 (resigned 1909), and professor of sculpture (afterwards resigned) in 1900. In 1889 he won the *Grand Prix* at the Paris International Exhibition. He was created a member of the Victorian Order in 1897. (See SCULPTURE.)

See *The Life and Work of Alfred Gilbert, R.A., M.V.O., D.C.L.*, by Joseph Hatton (*Art Journal* Office, 1903).

(M. H. S.)

GILBERT, ANN (1821-1904), American actress, was born at Rochdale, Lancashire, on the 21st of October 1821, her maiden name being Hartley. At fifteen she was a pupil at the ballet school connected with the Haymarket theatre, conducted by Paul Taglioni, and became a dancer on the stage. In 1846 she married George H. Gilbert (d. 1866), a performer in the company of which she was a member. Together they filled many engagements in English theatres, moving to America in 1849. Mrs Gilbert’s first success in a speaking part was in 1857 as Wichavenda in Brougham’s *Pocahontas*. In 1869 she joined Daly’s company, playing for many years wives to James Lewis’s husbands, and old women’s parts, in which she had no equal. Mrs. Gilbert held a unique position on the American stage, on account of the admiration, esteem and affection which she enjoyed both in front and behind the footlights. She died at Chicago on the 2nd of December 1904.

See *Mrs Gilbert’s Stage Reminiscences* (1901).

GILBERT, GROVE KARL (1843-), American geologist, was born at Rochester, N.Y., on the 6th of May 1843. In 1869 he was attached to the Geological Survey of Ohio and in 1879 he became a member of the United States Geological Survey, being engaged on parts of the Rocky Mountains, in Nevada, Utah, California and Arizona. He is distinguished for his researches on mountain-structure and on the Great Lakes, as well as on glacial phenomena, recent earth movements, and on topographic features generally. His report on the *Geology of the Henry Mountains* (1877), in which the volcanic structure known as a laccolite was first described; his *History of the Niagara River* (1890) and *Lake Bonneville* (1891—the first of the Monographs issued by the United States Geological Survey) are specially important. He was awarded the Wollaston medal by the Geological Society of London in 1900.

GILBERT, SIR HUMPHREY (*c.* 1539-1583), English soldier, navigator and pioneer colonist in America, was the second son of Otho Gilbert, of Compton, near Dartmouth, Devon, and step-brother of Sir Walter Raleigh. He was educated at Eton and Oxford; intended for the law; introduced at court by Raleigh’s aunt, Catherine Ashley, and appointed (July 1566) captain in the army of Ireland under Sir Henry Sidney. In April 1566 he had already joined with Antony Jenkinson in a petition to Elizabeth for the discovery of the North-East Passage; in November following he presented an independent petition for the “discovering of a passage by the north to go to Cataia.” In October 1569 he became governor of Munster; on the 1st of January 1570 he was knighted; in 1571 he was returned M.P. for Plymouth; in 1572 he campaigned in the Netherlands against Spain without much success; from 1573 to 1578 he lived in retirement at Limehouse, devoting himself especially to the advocacy of a North-West Passage (his famous *Discourse* on this subject was published in 1576). Gilbert’s arguments, widely circulated even before 1575, were apparently of weight in promoting the Frobisher enterprises of 1576-1578. On the 11th of June 1578, Sir Humphrey obtained his long-coveted charter for North-Western discovery and colonization, authorizing him, his heirs and assigns, to discover, occupy and possess such remote “heathen lands not actually possessed of any Christian prince or people, as should seem good to him or them.” Disposing not only of his patrimony but also of the estates in Kent which he had through his wife, daughter of John Aucher of Ollerden, he fitted out an expedition which left Dartmouth on the 23rd of September 1578, and returned in May 1579, having accomplished nothing. In 1579 Gilbert aided the government in Ireland; and in 1583, after many struggles—illustrated by his appeal to Walsingham on the 11th of July 1582, for the payment of moneys due to him from government, and by his agreement with the Southampton venturers—he succeeded in equipping another fleet for “Western Planting.” On the 11th of June 1583, he sailed from Plymouth with five ships and the queen’s blessing; on the 13th of July the “Ark Raleigh,” built and manned at his brother’s expense, deserted the fleet; on the 30th of

July he was off the north coast of Newfoundland; on the 3rd of August he arrived off the present St John's, and selected this site as the centre of his operations; on the 5th of August he began the plantation of the first English colony in North America. Proceeding southwards with three vessels, exploring and prospecting, he lost the largest near Cape Breton (29th of August); immediately after (31st of August) he started to return to England with the "Golden Hind" and the "Squirrel," of forty and ten tons respectively. Obstinately refusing to leave the "frigate" and sail in his "great ship," he shared the former's fate in a tempest off the Azores. "Monday the 9th of September," reports Hayes, the captain of the "Hind," "the frigate was near cast away, ... yet at that time recovered; and, giving forth signs of joy, the general, sitting abaft with a book in his hand, cried out unto us in the 'Hind,' 'We are as near to heaven by sea as by land.'.... The same Monday night, about twelve, the frigate being ahead of us in the 'Golden Hind,' suddenly her lights were out, ... in that moment the frigate was devoured and swallowed up of the sea."

See Hakluyt, *Principal Navigations* (1599); vol. iii. pp. 135-181; Gilbert's *Discourse of a Discovery for a New Passage to Cataia*, published by George Gascoigne in 1576, with additions, probably without Gilbert's authority; Hooker's *Supplement* to Holinshed's *Irish Chronicle*; Roger Williams, *The Actions of the Low Countries* (1618); *State Papers, Domestic* (1577-1583); Wood's *Athenae Oxonienses*; *North British Review*, No. 45; Fox Bourne's *English Seamen under the Tudors*; Carlos Slafter, *Sir H. Gylberte and his Enterprise* (Boston, 1903), with all important documents. Gilbert's interesting writings on the need of a university for London, anticipating in many ways not only the modern London University but also the British Museum library and its compulsory sustenance through the provisions of the Copyright Act, have been printed by Furnivall (*Queen Elizabeth's Achademy*) in the Early English Text Society Publications, extra series, No. viii.

GILBERT, JOHN (1810-1889); American actor, whose real name was Gibbs, was born in Boston, Massachusetts, on the 27th of February 1810, and made his first appearance there as Jaffier in *Venice Preserved*. He soon found that his true vein was in comedy, particularly in old-men parts. When in London in 1847 he was well received both by press and public, and played with Macready. He was the leading actor at Wallack's from 1861-1888. He died on the 17th of June 1889.

See William Winter's *Life of John Gilbert* (New York, 1890).

GILBERT, SIR JOHN (1817-1897), English painter and illustrator, one of the eight children of George Felix Gilbert, a member of a Derbyshire family, was born at Blackheath on the 21st of July 1817. He went to school there, and even in childhood displayed an extraordinary fondness for drawing and painting. Nevertheless, his father's lack of means compelled him to accept employment for the boy in the office of Messrs Dickson & Bell, estate agents, in Charlotte Row, London. Yielding, however, to his natural bent, his parents agreed that he should take up art in his own way, which included but little advice from others, his only teacher being Haydon's pupil, George Lance, the fruit painter. This artist gave him brief instructions in the use of colour. In 1836 Gilbert appeared in public for the first time. This was at the gallery of the Society of British Artists, where he sent drawings, the subjects of which were characteristic, being "The Arrest of Lord Hastings," from Shakespeare, and "Abbot Boniface," from *The Monastery* of Scott. "Inez de Castro" was in the same gallery in the next year; it was the first of a long series of works in the same medium, representing similar themes, and was accompanied, from 1837, by a still greater number of works in oil which were exhibited at the British Institution. These included "Don Quixote giving advice to Sancho Panza," 1841; "Brunette and Phillis," from *The Spectator*, 1844; "The King's Artillery at Marston Moor," 1860; and "Don Quixote comes back for the last time to his Home and Family," 1867. In that year the Institution was finally closed. Gilbert exhibited at the Royal Academy from 1838, beginning with the "Portrait of a Gentleman," and continuing, except between 1851 and 1867, till his death to exhibit there many of his best and more ambitious works. These included such capital instances as "Holbein painting the Portrait of Anne Boleyn," "Don Quixote's first Interview with the Duke and Duchess," 1842, "Charlemagne visiting the Schools," 1846. "Touchstone and the Shepherd," and "Rembrandt," a very fine piece, were both there in 1867; and in 1873 "Naseby," one of his finest and most picturesque designs, was also at the Royal Academy. Gilbert was elected A.R.A. 29th January 1872, and R.A. 29th June 1876. Besides these mostly large and powerful works, the artist's true arena of display was undoubtedly the gallery of the Old Water Colour Society, to which from 1852, when he was elected an Associate exhibitor, till he died forty-five years later, he contributed not fewer than 270 drawings, most of them admirable because of the largeness of their style, massive coloration, broad chiaroscuro, and the surpassing vigour of their designs. These qualities induced the leading critics to claim for him opportunities for painting mural pictures of great historic themes as decorations of national buildings. "The Trumpeter," "The Standard-Bearer," "Richard II. resigning his Crown" (now at Liverpool), "The Drug Bazaar at Constantinople," "The Merchant of Venice" and "The Turkish Water-Carrier" are but examples of that wealth of art

which added to the attractions of the gallery in Pall Mall. There Gilbert was elected a full Member in 1855, and president of the Society in 1871, shortly after which he was knighted. As an illustrator of books, magazines and periodicals of every kind he was most prolific. To the success of the *Illustrated London News* his designs lent powerful aid, and he was eminently serviceable in illustrating the *Shakespeare* of Mr Howard Staunton. He died on the 6th of October 1897.

(F. G. S.)

GILBERT, SIR JOSEPH HENRY (1817-1901); English chemist, was born at Hull on the 1st of August 1817. He studied chemistry first at Glasgow under Thomas Thomson; then at University College, London, in the laboratory of A. T. Thomson (1778-1849), the professor of medical jurisprudence, also attending Thomas Graham's lectures; and finally at Giessen under Liebig. On his return to England from Germany he acted for a year or so as assistant to his old master A. T. Thomson at University College, and in 1843, after spending a short time in the study of calico dyeing and printing near Manchester, accepted the directorship of the chemical laboratory at the famous experimental station established by Sir J. B. Lawes at Rothamsted, near St Albans, for the systematic and scientific study of agriculture. This position he held for fifty-eight years, until his death on the 23rd of December 1901. The work which he carried out during that long period in collaboration with Lawes was of a most comprehensive character, involving the application of many branches of science, such as chemistry, meteorology, botany, animal and vegetable physiology, and geology; and its influence in improving the methods of practical agriculture extended all over the civilized world. Gilbert was chosen a fellow of the Royal Society in 1860, and in 1867 was awarded a royal medal jointly with Lawes. In 1880 he presided over the Chemical Section of the British Association at its meeting at Swansea, and in 1882 he was president of the London Chemical Society, of which he had been a member almost from its foundation in 1841. For six years from 1884 he filled the Sibthorpian chair of rural economy at Oxford, and he was also an honorary professor at the Royal Agricultural College, Cirencester. He was knighted in 1893, the year in which the jubilee of the Rothamsted experiments was celebrated.

GILBERT, MARIE DOLORES ELIZA ROSANNA ["LOLA MONTEZ"] (1818-1861), dancer and adventuress, the daughter of a British army officer, was born at Limerick, Ireland, in 1818. Her father dying in India when she was seven years old, and her mother marrying again, the child was sent to Europe to be educated, subsequently joining her mother at Bath. In 1837 she made a runaway match with a Captain James of the Indian army, and accompanied him to India. In 1842 she returned to England, and shortly afterwards her husband obtained a decree *nisi* for divorce. She then studied dancing, making an unsuccessful first appearance at Her Majesty's theatre, London, in 1843, billed as "Lola Montez, Spanish dancer." Subsequently she appeared with considerable success in Germany, Poland and Russia. Thence she went to Paris, and in 1847 appeared at Munich, where she became the mistress of the old king of Bavaria, Ludwig I.; she was naturalized, created comtesse de Landsfeld, and given an income of £2000 a year. She soon proved herself the real ruler of Bavaria, adopting a liberal and anti-Jesuit policy. Her political opponents proved, however, too strong for her, and in 1848 she was banished. In 1849 she came to England, and in the same year was married to George Heald, a young officer in the Guards. Her husband's guardian instituted a prosecution for bigamy against her on the ground that her divorce from Captain James had not been made absolute, and she fled with Heald to Spain. In 1851 she appeared at the Broadway theatre, New York, and in the following year at the Walnut Street theatre, Philadelphia. In 1853 Heald was drowned at Lisbon, and in the same year she married the proprietor of a San Francisco newspaper, but did not live long with him. Subsequently she appeared in Australia, but returned, in 1857, to act in America, and to lecture on gallantry. Her health having broken down, she devoted the rest of her life to visiting the outcasts of her own sex in New York, where, stricken with paralysis, she died on the 17th of January 1861.

See E. B. D'Auvergne, *Lola Montez* (New York, 1909).

GILBERT, NICOLAS JOSEPH LAURENT (1751-1780), French poet, was born at Fontenay-le-Château in Lorraine in 1751. Having completed his education at the college of Dôle, he devoted himself for a time to a half-scholastic, half-literary life at Nancy, but in 1774 he found his way to the capital. As an opponent of the Encyclopaedists and a panegyrist of Louis XV., he received considerable pensions. He died in Paris on the 12th of November 1780 from the results of a fall from his horse. The satiric

force of one or two of his pieces, as *Mon Apologie* (1778) and *Le Dix-huitième Siècle* (1775), would alone be sufficient to preserve his reputation, which has been further increased by modern writers, who, like Alfred de Vigny in his *Stello* (chaps. 7-13), considered him a victim to the spite of his philosophic opponents. His best-known verses are the *Ode imitée de plusieurs psaumes*, usually entitled Adieux à la vie.

Among his other works may be mentioned *Les Familles de Darius et d'Éridame, histoire persane* (1770), *Le Carnaval des auteurs* (1773), *Odes nouvelles et patriotiques* (1775). Gilbert's *Œuvres complètes* were first published in 1788, and they have since been edited by Mastrella (Paris, 1823), by Charles Nodier (1817 or 1825), and by M. de Lescure (1882).

GILBERT (or Gylberde), **WILLIAM** (1544-1603), the most distinguished man of science in England during the reign of Queen Elizabeth, and the father of electric and magnetic science, was a member of an ancient Suffolk family, long resident in Clare, and was born on the 24th of May 1544 at Colchester, where his father, Hierome Gilbert, became recorder. Educated at Colchester school, he entered St John's College, Cambridge, in 1558, and after taking the degrees of B.A. and M.A. in due course, graduated M.D. in 1569, in which year he was elected a senior fellow of his college. Soon afterwards he left Cambridge, and after spending three years in Italy and other parts of Europe, settled in 1573 in London, where he practised as a physician with "great success and applause." He was admitted to the College of Physicians probably about 1576, and from 1581 to 1590 was one of the censors. In 1587 he became treasurer, holding the office till 1592, and in 1589 he was one of the committee appointed to superintend the preparation of the *Pharmacopoeia Londinensis* which the college in that year decided to issue, but which did not actually appear till 1618. In 1597 he was again chosen treasurer, becoming at the same time consiliarius, and in 1599 he succeeded to the presidency. Two years later he was appointed physician to Queen Elizabeth, with the usual emolument of £100 a year. After this time he seems to have removed to the court, vacating his residence, Wingfield House, which was on Peter's Hill, between Upper Thames Street and Little Knightrider Street, and close to the house of the College of Physicians. On the death of the queen in 1603 he was reappointed by her successor; but he did not long enjoy the honour, for he died, probably of the plague, on the 30th of November (10th of December, N.S.) 1603, either in London or in Colchester. He was buried in the latter town, in the chancel of Holy Trinity church, where a monument was erected to his memory. To the College of Physicians he left his books, globes, instruments and minerals, but they were destroyed in the great fire of London.

Gilbert's principal work is his treatise on magnetism, entitled *De magnete, magneticisque corporibus, et de magno magnete tellure* (London, 1600; later editions—Stettin, 1628, 1633; Frankfort, 1629, 1638). This work, which embodied the results of many years' research, was distinguished by its strict adherence to the scientific method of investigation by experiment, and by the originality of its matter, containing, as it does, an account of the author's experiments on magnets and magnetical bodies and on electrical attractions, and also his great conception that the earth is nothing but a large magnet, and that it is this which explains, not only the direction of the magnetic needle north and south, but also the variation and dipping or inclination of the needle. Gilbert's is therefore not merely the first, but the most important, systematic contribution to the sciences of electricity and magnetism. A posthumous work of Gilbert's was edited by his brother, also called William, from two MSS. in the possession of Sir William Boswell; its title is *De mundo nostro sublunari philosophia nova* (Amsterdam, 1651). He is the reputed inventor besides of two instruments to enable sailors "to find out the latitude without seeing of sun, moon or stars," an account of which is given in Thomas Blondeville's *Theoriques of the Planets* (London, 1602). He was also the first advocate of Copernican views in England, and he concluded that the fixed stars are not all at the same distance from the earth.

It is a matter of great regret for the historian of chemistry that Gilbert left nothing on that branch of science, to which he was deeply devoted, "attaining to great exactness therein." So at least says Thomas Fuller, who in his *Worthies of England* prophesied truly how he would be afterwards known: "Mahomet's tomb at Mecca," he says, "is said strangely to hang up, attracted by some invisible loadstone; but the memory of this doctor will never fall to the ground, which his incomparable book *De magnete* will support to eternity."

An English translation of the *De magnete* was published by P. F. Mottelay in 1893, and another, with notes by S. P. Thompson, was issued by the Gilbert Club of London in 1900.

GILBERT, SIR WILLIAM SCHWENK (1836-), English playwright and humorist, son of William Gilbert (a descendant of Sir Humphrey Gilbert), was born in London on the 18th of November 1836. His father was the author of a number of novels, the best-known of which were *Shirley Hall Asylum* (1863) and *Dr Austin's Guests* (1866). Several of these novels—which were characterized by a singular

acuteness and lucidity of style, by a dry, subacid humour, by a fund of humanitarian feeling and by a considerable medical knowledge, especially in regard to the psychology of lunatics and monomaniacs—were illustrated by his son, who developed a talent for whimsical draughtsmanship. W. S. Gilbert was educated at Boulogne, at Ealing and at King's College, graduating B.A. from the university of London in 1856. The termination of the Crimean War was fatal to his project of competing for a commission in the Royal Artillery, but he obtained a post in the education department of the privy council office (1857-1861). Disliking the routine work, he left the Civil Service, entered the Inner Temple, was called to the bar in November 1864, and joined the northern circuit. His practice was inconsiderable, and his military and legal ambitions were eventually satisfied by a captaincy in the volunteers and appointment as a magistrate for Middlesex (June 1891). In 1861 the comic journal *Fun* was started by H. J. Byron, and Gilbert became from the first a valued contributor. Failing to obtain an *entrée to Punch*, he continued sending excellent comic verse to *Fun*, with humorous illustrations, the work of his own pen, over the signature of "Bab." A collection of these lyrics, in which deft craftsmanship unites a titillating satire on the deceptiveness of appearances with the irrepressible nonsense of a Lewis Carroll, was issued separately in 1869 under the title of *Bab Ballads*, and was followed by *More Bab Ballads*. The two collections and *Songs of a Savoyard* were united in a volume issued in 1898, with many new illustrations. The best of the old cuts, such as those depicting the "Bishop of Rum-ti-Foo" and the "Discontented Sugar Broker," were preserved intact.

While remaining a staunch supporter of *Fun*, Gilbert was soon immersed in other journalistic work, and his position as dramatic critic to the *Illustrated Times* turned his attention to the stage. He had not to wait long for an opportunity. Early in December 1866 T. W. Robertson was asked by Miss Herbert, lessee of the St James's theatre, to find some one who could turn out a bright Christmas piece in a fortnight, and suggested Gilbert; the latter promptly produced *Dulcamara*, a burlesque of *L'Elisire d'amore*, written in ten days, rehearsed in a week, and duly performed at Christmas. He sold the piece outright for £30, a piece of rashness which he had cause to regret, for it turned out a commercial success. In 1870 he was commissioned by Buckstone to write a blank verse fairy comedy, based upon *Le Palais de la vérité*, the novel by Madame de Genlis. The result was *The Palace of Truth*, a fairy drama, poor in structure but clever in workmanship, which served the purpose of Mr and Mrs Kendal in 1870 at the Haymarket. This was followed in 1871 by *Pygmalion and Galatea*, another three-act "mythological comedy," a clever and effective but artificial piece. Another fairy comedy, *The Wicked World*, written for Buckstone and the Kendals, was followed in March 1873 by a burlesque version, in collaboration with Gilbert à Beckett, entitled *The Happy Land*. Gilbert's next dramatic ventures inclined more to the conventional pattern, combining sentiment and a cynical humour in a manner strongly reminiscent of his father's style. Of these pieces, *Sweethearts* was given at the Prince of Wales's theatre, 7th November 1874; *Tom Cobb* at the St James's, 24th April 1875; *Broken Hearts* at the Court, 9th December 1875; *Dan'l Druce* (a drama in darker vein, suggested to some extent by *Silas Marner*) at the Haymarket, 11th September 1876; and *Engaged* at the Haymarket, 3rd October 1877. The first and last of these proved decidedly popular. *Gretchen*, a verse drama in four acts, appeared in 1879. A one-act piece, called *Comedy and Tragedy*, was produced at the Lyceum, 26th January, 1884. Two dramatic trifles of later date were *Foggerty's Fairy* and *Rozenkrantz and Guildenstern*, a travesty of *Hamlet*, performed at the Vaudeville in June 1891. Several of these dramas were based upon short stories by Gilbert, a number of which had appeared from time to time in the Christmas numbers of various periodicals. The best of them have been collected in the volume entitled *Foggerty's Fairy, and other Stories*. In the autumn of 1871 Gilbert commenced his memorable collaboration (which lasted over twenty years) with Sir Arthur Sullivan. The first two comic operas, *Thespis; or The Gods grown Old* (26th September 1871) and *Trial by Jury* (Royalty, 25th March 1875) were merely essays. Like one or two of their successors, they were, as regards plot, little more than extended "Bab Ballads." Later (especially in the *Yeomen of the Guard*), much more elaboration was attempted. The next piece was produced at the Opera Comique (17th November 1877) as *The Sorcerer*. At the same theatre were successfully given *H.M.S. Pinafore* (25th May 1878), *The Pirates of Penzance; or The Slave of Duty* (3rd April 1880), and *Patience; or Bunthorne's Bride* (23rd April 1881). In October 1881 the successful *Patience* was removed to a new theatre, the Savoy, specially built for the Gilbert and Sullivan operas by Richard D'Oyly Carte. *Patience* was followed, on 25th November 1882, by *Iolanthe; or The Peer and the Peri*; and then came, on 5th January 1884, *Princess Ida; or Castle Adamant*, a re-cast of a charming and witty fantasia which Gilbert had written some years previously, and had then described as a "respectful perversion of Mr. Tennyson's exquisite poem." The impulse reached its fullest development in the operas that followed next in order—*The Mikado; or The Town of Titipu* (14th March 1885); *Ruddigore* (22nd January 1887); *The Yeomen of the Guard* (3rd October 1888); and *The Gondoliers* (7th December 1889). After the appearance of *The Gondoliers* a coolness occurred between the composer and librettist, owing to Gilbert's considering that Sullivan had not supported him in a business disagreement with D'Oyly Carte. But the estrangement was only temporary. Gilbert wrote several more librettos, and of these *Utopia Limited* (1893) and the exceptionally witty *Grand Duke* (1896) were written in conjunction with Sullivan. As a master of metre Gilbert had shown himself consummate, as a dealer in quips and paradoxes and ludicrous dilemmas, unrivalled. Even for the music of the operas he deserves some credit, for the rhythms were frequently his own (as in "I have a Song to Sing, O"), and the metres were in many cases invented by himself. One or two of his librettos, such as that of *Patience*, are virtually flawless. Enthusiasts are divided only as to the comparative merit of the operas. *Princess Ida* and *Patience* are in some respects the daintiest. There is a genuine vein of poetry in *The Yeomen of the Guard*. Some of the drollest songs are in *Pinafore* and *Ruddigore*. The *Gondoliers* shows the most charming lightness of touch, while with the general public *The Mikado* proved the favourite. The enduring popularity of the Gilbert and Sullivan operas was abundantly

proved by later revivals. Among the birthday honours in June 1907 Gilbert was given a knighthood. In 1909 his *Fallen Fairies* (music by Edward German) was produced at the Savoy.

(T. Se.)

GILBERT DE LA PORRÉE, frequently known as Gilbertus Porretanus or Pictaviensis (1070-1154); scholastic logician and theologian, was born at Poitiers. He was educated under Bernard of Chartres and Anselm of Laon. After teaching for about twenty years in Chartres, he lectured on dialectics and theology in Paris (from 1137), and in 1141 returned to Poitiers, being elected bishop in the following year. His heterodox opinions regarding the doctrine of the Trinity drew upon his works the condemnation of the church. The synod of Reims in 1148 procured papal sanction for four propositions opposed to certain of Gilbert's tenets, and his works were condemned until they should be corrected in accordance with the principles of the church. Gilbert seems to have submitted quietly to this judgment; he yielded assent to the four propositions, and remained on friendly terms with his antagonists till his death on the 4th of September 1154. Gilbert is almost the only logician of the 12th century who is quoted by the greater scholastics of the succeeding age. His chief logical work, the treatise *De sex principiis*, was regarded with a reverence almost equal to that paid to Aristotle, and furnished matter for numerous commentators, amongst them Albertus Magnus. Owing to the fame of this work, he is mentioned by Dante as the *Magister sex principiorum*. The treatise itself is a discussion of the Aristotelian categories, specially of the six subordinate modes. Gilbert distinguishes in the ten categories two classes, one essential, the other derivative. Essential or inhering (*formae inhaerentes*) in the objects themselves are only *substance*, *quantity*, *quality* and *relation* in the stricter sense of that term. The remaining six, *when*, *where*, *action*, *passion*, *position* and *habit*, are relative and subordinate (*formae assistentes*). This suggestion has some interest, but is of no great value, either in logic or in the theory of knowledge. More important in the history of scholasticism are the theological consequences to which Gilbert's realism led him. In the commentary on the treatise *De Trinitate* (erroneously attributed to Boëtius) he proceeds from the metaphysical notion that pure or abstract being is prior in nature to that which is. This pure being is God, and must be distinguished from the triune God as known to us. God is incomprehensible, and the categories cannot be applied to determine his existence. In God there is no distinction or difference, whereas in all substances or things there is duality, arising from the element of matter. Between pure being and substances stand the ideas or forms, which subsist, though they are not substances. These forms, when materialized, are called *formae substantiales* or *formae nativae*; they are the essences of things, and in themselves have no relation to the accidents of things. Things are temporal, the ideas perpetual, God eternal. The pure form of existence, that by which God is God, must be distinguished from the three persons who are God by participation in this form. The form or essence is one, the persons or substances three. It was this distinction between Deitas or Divinitas and Deus that led to the condemnation of Gilbert's doctrine.

De sex principiis and commentary on the *De Trinitate* in Migne, *Patrologia Latina*, lxiv. 1255 and clxxxviii. 1257; see also Abbé Berthaud, *Gilbert de la Porrée* (Poitiers, 1892); B. Hauréau, *De la philosophie scolastique*, pp. 294-318; R. Schmid's article "Gilbert Porretanus" in Herzog-Hauck, *Realencyk. f. protest. Theol.* (vol. 6, 1899); Prantl, *Geschichte d. Logik*, ii. 215; Bach, *Dogmengeschichte*, ii. 133; article Scholasticism.

GILBERT OF SEMPRINGHAM, ST, founder of the Gilbertines, the only religious order of English origin, was born at Sempringham in Lincolnshire, c. 1083-1089. He was educated in France, and ordained in 1123, being presented by his father to the living of Sempringham. About 1135 he established there a convent for nuns; and to perform the heavy work and cultivate the fields he formed a number of labourers into a society of lay brothers attached to the convent. Similar establishments were founded elsewhere, and in 1147 Gilbert tried to get them incorporated in the Cistercian order. Failing in this, he proceeded to form communities of priests and clerics to perform the spiritual ministrations needed by the nuns. The women lived according to the Benedictine rule as interpreted by the Cistercians; the men according to the rule of St Augustine, and were canons regular. The special constitutions of the order were largely taken from those of the Premonstratensian canons and of the Cistercians. Like Fontevrault (*q.v.*) it was a double order, the communities of men and women living side by side; but, though the property all belonged to the nuns, the superior of the canons was the head of the whole establishment, and the general superior was a canon, called "Master of Sempringham." The general chapter was a mixed assembly composed of two canons and two nuns from each house; the nuns had to travel to the chapter in closed carts. The office was celebrated together in the church, a high stone screen separating the two choirs of canons and nuns. The order received papal approbation in 1148. By Gilbert's death (1189) there were nine double monasteries and four of canons only, containing about 700 canons and 1000 nuns in all. At the dissolution there were some 25 monasteries, whereof 4 ranked among the greater monasteries (see list in F. A. Gasquet's

English Monastic Life). The order never spread beyond England. The habit of the Gilbertines was black, with a white cloak.

See Bollandists' *Acta Sanctorum* (4th of Feb.); William Dugdale, *Monasticon* (1846); Helyot, *Hist. des ordres religieux* (1714); ii. c. 29. The best modern account is *St Gilbert of Sempringham, and the Gilbertines*, by Rose Graham (1901). The art. in *Dictionary of National Biography* gives abundant information on St Gilbert, but is unsatisfactory on the order, as it might easily convey the impression that the canons and nuns lived together, whereas they were most carefully separated; and altogether undue prominence is given to a single scandal. Miss Graham declares that the reputation of the order was good until the end.

(E. C. B.)

GILBERT FOLIOT (d. 1187), bishop of Hereford, and of London, is first mentioned as a monk of Cluny, whence he was called in 1136 to plead the cause of the empress Matilda against Stephen at the Roman court. Shortly afterwards he became prior of Cluny; then prior of Abbéville, a house dependent upon Cluny. In 1139 he was elected abbot of Gloucester. The appointment was confirmed by Stephen, and from the ecclesiastical point of view was unexceptionable. But the new abbot proved himself a valuable ally of the empress, and her ablest controversialist. Gilbert's reputation grew rapidly. He was respected at Rome; and he acted as the representative of the primate, Theobald, in the supervision of the Welsh church. In 1148, on being nominated by the pope to the see of Hereford, Gilbert with characteristic wariness sought confirmation both from Henry of Anjou and from Stephen. But he was an Angevin at heart, and after 1154 was treated by Henry II. with every mark of consideration. He was Becket's rival for the primacy, and the only bishop who protested against the king's choice. Becket, with rare forbearance, endeavoured to win his friendship by procuring for him the see of London (1163). But Gilbert evaded the customary profession of obedience to the primate, and apparently aspired to make his see independent of Canterbury. On the questions raised by the Constitutions of Clarendon he sided with the king, whose confessor he had now become. He urged Becket to yield, and, when this advice was rejected, encouraged his fellow-bishops to repudiate the authority of the archbishop. In the years of controversy which followed Becket's flight the king depended much upon the bishop's skill as a disputant and diplomatist. Gilbert was twice excommunicated by Becket, but both on these and on other occasions he showed great dexterity in detaching the pope from the cause of the exile. To him it was chiefly due that Henry avoided an open conflict with Rome of the kind which John afterwards provoked. Gilbert was one of the bishops whose excommunication in 1170 provoked the king's knights to murder Becket; but he cannot be reproached with any share in the crime. His later years were uneventful, though he enjoyed great influence with the king and among his fellow bishops. Scholarly, dignified, ascetic in his private life, devoted to the service of the Church, he was nevertheless more respected than loved. His nature was cold; he made few friends; and the taint of a calculating ambition runs through his whole career. He died in the spring of 1187.

See Gilbert's *Letters*, ed. J. A. Giles (Oxford, 1845); *Materials for the History of Thomas Becket*, ed. J. C. Robertson (Rolls series, 1875-1885); and Miss K. Norgate's *England under the Angevin Kings* (1887).

(H. W. C. D.)

GILBERT (KINGSMILL) **ISLANDS**, an extensive archipelago belonging to Great Britain in the mid-western Pacific Ocean, lying N. and S. of the equator, and between 170° and 180° E. There are sixteen islands, all coral reefs or atolls, extending in crescent form over about five degrees of latitude. The principal is Taputenea or Drummond Island. The soil, mostly of coral sand, is productive of little else than the coco-nut palm, and the chief source of food supply is the sea. The population of these islands presents a remarkable phenomenon; in spite of adverse conditions of environment and complete barbarism it is exceedingly dense, in strong contradistinction to that of many other more favoured islands. The land area of the group is only 166 m., yet the population is about 30,000. The Gilbert islanders are a dark and coarse type of the Polynesian race, and show signs of much crossing. They are tall and stout, with an average height of 5 ft. 8 in., and are of a vigorous, energetic temperament. They are nearly always naked, but wear a conical hat of pandanus leaf. In war they have an armour of plaited coco-nut fibres. They are fierce fighters, their chief weapon being a sword armed with sharks' teeth. Their canoes are well made of coco-nut wood boards sewn neatly together and fastened on frames. British and American missionary work has been prosecuted with some success. The large population led to the introduction of natives from these islands into Hawaii as labourers in 1878-1884, but they were not found satisfactory. The islands were discovered by John Byron in 1765 (one of them bearing his name); Captains Gilbert and Marshall visited them in 1788; and they were annexed by Great Britain in 1892.

GILBEY, SIR WALTER, 1ST BART. (1831-), English wine-merchant, was born at Bishop Stortford, Hertfordshire, in 1831. His father, the owner and frequently the driver of the daily coach between Bishop Stortford and London, died when he was eleven years old, and young Gilbey was shortly afterwards placed in the office of an estate agent at Tring, subsequently obtaining a clerkship in a firm of parliamentary agents in London. On the outbreak of the Crimean War, Walter Gilbey and his younger brother, Alfred, volunteered for civilian service at the front, and were employed at a convalescent hospital on the Dardanelles. Returning to London on the declaration of peace, Walter and Alfred Gilbey, on the advice of their eldest brother, Henry Gilbey, a wholesale wine-merchant, started in the retail wine and spirit trade. The heavy duty then levied by the British government on French, Portuguese and Spanish wines was prohibitive of a sale among the English middle classes, and especially lower middle classes, whose usual alcoholic beverage was accordingly beer. Henry Gilbey was of opinion that these classes would gladly drink wine if they could get it at a moderate price, and by his advice Walter and Alfred determined to push the sales of colonial, and particularly of Cape, wines, on which the duty was comparatively light. Backed by capital obtained through Henry Gilbey, they accordingly opened in 1857 a small retail business in a basement in Oxford Street, London. The Cape wines proved popular, and within three years the brothers had 20,000 customers on their books. The creation of the off-licence system by Mr Gladstone, then chancellor of the exchequer, in 1860, followed by the large reduction in the duty on French wines effected by the commercial treaty between England and France in 1861, revolutionized their trade and laid the foundation of their fortunes. Three provincial grocers, who had been granted the new off-licence, applied to be appointed the Gilbeys' agents in their respective districts, and many similar applications followed. These were granted, and before very long a leading local grocer was acting as the firm's agents in every district in England. The grocer who dealt in the Gilbeys' wines and spirits was not allowed to sell those of any other firm, and the Gilbeys in return handed over to him all their existing customers in his district. This arrangement was of mutual advantage, and the Gilbeys' business increased so rapidly that in 1864 Henry Gilbey abandoned his own undertaking to join his brothers. In 1867 the three brothers secured the old Pantheon theatre and concert hall in Oxford Street for their headquarters. In 1875 the firm purchased a large claret-producing estate in Médôc, on the banks of the Gironde, and became also the proprietors of two large whisky-distilleries in Scotland. In 1893 the business was converted, for family reasons, into a private limited liability company, of which Walter Gilbey, who in the same year was created a baronet, was chairman. Sir Walter Gilbey also became well known as a breeder of shire horses, and he did much to improve the breed of English horses (other than race-horses) generally, and wrote extensively on the subject. He became president of the Shire Horse Society, of the Hackney Horse Society, and of the Hunters' Improvement Society, and he was the founder and chairman of the London Cart Horse Parade Society. He was also a practical agriculturist, and president of the Royal Agricultural Society.

GILDAS, or GILDUS (*c.* 516-570), the earliest of British historians (see CELT: *Literature*, "Welsh"), surnamed by some Sapiens, and by others Badonicus, seems to have been born in the year 516. Regarding him little certain is known, beyond some isolated particulars that may be gathered from hints dropped in the course of his work. Two short treatises exist, purporting to be lives of Gildas, and ascribed respectively to the 11th and 12th centuries; but the writers of both are believed to have confounded two, if not more, persons that had borne the name. It is from an incidental remark of his own, namely, that the year of the siege of Mount Badon—one of the battles fought between the Saxons and the Britons—was also the year of his own nativity, that the date of his birth has been derived; the place, however, is not mentioned. His assertion that he was moved to undertake his task mainly by "zeal for God's house and for His holy law," and the very free use he has made of quotations from the Bible, leave scarcely a doubt that he was an ecclesiastic of some order or other. In addition, we learn that he went abroad, probably to France, in his thirty-fourth year, where, after 10 years of hesitation and preparation, he composed, about 560, the work bearing his name. His materials, he tells us, were collected from foreign rather than native sources, the latter of which had been put beyond his reach by circumstances. The *Cambrian Annals* give 570 as the year of his death.

The writings of Gildas have come down to us under the title of *Gildae Sapientis de excidio Britanniae liber querulus*. Though at first written consecutively, the work is now usually divided into three portions,—a preface, the history proper, and an epistle,—the last, which is largely made up of passages and texts of Scripture brought together for the purpose of condemning the vices of his countrymen and their rulers, being the least important, though by far the longest of the three. In the second he passes in brief review the history of Britain from its invasion by the Romans till his own times. Among other matters reference is made to the introduction of Christianity in the reign of Tiberius; the persecution under Diocletian; the spread of the Arian heresy; the election of Maximus as emperor by the legions in Britain, and his subsequent death at Aquileia; the incursions of the Picts and Scots into the southern part of the island; the temporary assistance rendered to the harassed Britons by the Romans; the final abandonment of the island by the latter; the coming of the Saxons and their reception by Guortigern (Vortigern); and, finally, the conflicts between the Britons, led by a noble Roman, Ambrosius Aurelianus, and the new invaders. Unfortunately, on almost every point on which he touches, the statements of Gildas are vague and obscure. With one exception already alluded to, no dates are given,

and events are not always taken up in the order of their occurrence. These faults are of less importance during the period when Greek and Roman writers notice the affairs of Britain; but they become more serious when, as is the case from nearly the beginning of the 5th century to the date of his death, Gildas's brief narrative is our only authority for most of what passes current as the history of our island during those years. Thus it is on his sole, though in this instance perhaps trustworthy, testimony that the famous letter rests, said to have been sent to Rome in 446 by the despairing Britons, commencing:—"To Agitius (Aetius), consul for the third time, the groans of the Britons."

Gildas's treatise was first published in 1525 by Polydore Vergil, but with many avowed alterations and omissions. In 1568 John Josseline, secretary to Archbishop Parker, issued a new edition of it more in conformity with manuscript authority; and in 1691 a still more carefully revised edition appeared at Oxford by Thomas Gale. It was frequently reprinted on the Continent during the 16th century, and once or twice since. The next English edition, described by Potthast as *editio pessima*, was that published by the English Historical Society in 1838, and edited by the Rev. J. Stevenson. The text of Gildas founded on Gale's edition collated with two other MSS., with elaborate introductions, is included in the *Monumenta historica Britannica*, edited by Petrie and Sharpe (London, 1848). Another edition is in A. W. Haddan and W. Stubbs, *Councils and Eccles. Documents* relating to Great Britain (Oxford, 1869); the latest edition is that by Theodor Mommsen in *Monum. Germ. hist. auct. antiq.* xiii. (Chronica min. iii.), 1894.

GILDER, RICHARD WATSON (1844-1909), American editor and poet, was born in Bordentown, New Jersey, on the 8th of February 1844, a brother of William Henry Gilder (1838-1900), the Arctic explorer. He was educated at Bellevue Seminary, an institution conducted by his father, the Rev. William Henry Gilder (1812-1864), in Flushing, Long Island. After three years (1865-1868) on the Newark, New Jersey, *Daily Advertiser*, he founded, with Newton Crane, the Newark *Morning Register*. In 1869 he became editor of *Hours at Home*, and in 1870 assistant editor of *Scribner's Monthly* (eleven years later re-named *The Century Magazine*), of which he became editor in 1881. He was one of the founders of the Free Art League, of the International Copyright League, and of the Authors' Club; was chairman of the New York Tenement House Commission in 1894; and was a prominent member of the National Institute of Arts and Letters, of the Council of the National Civil Service Reform League, and of the executive committee of the Citizens' Union of New York City. His poems, which are essentially lyrical, have been collected in various volumes, including *Five Books of Song* (1894), *In Palestine and other Poems* (1898), *Poems and Inscriptions* (1901), and *In the Heights* (1905). A complete edition of his poems was published in 1908. He also edited *"Sonnets from the Portuguese" and other Poems by Elizabeth Barrett Browning*; *"One Word More" and other Poems by Robert Browning* (1905). He died in New York on the 18th of November 1909. His wife, Helena de Kay, a grand-daughter of Joseph Rodman Drake, assisted, with Saint Gaudens and others, in founding the Society of American Artists, now merged in the National Academy, and the Art Students' League of New York. She translated Sensier's biography of Millet, and painted, before her marriage in 1874, studies in flowers and ideal heads, much admired for their feeling and delicate colouring.

GILDERSLEEVE, BASIL LANNEAU (1831-), American classical scholar, was born in Charleston, South Carolina, on the 23rd of October 1831, son of Benjamin Gildersleeve (1791-1875), a Presbyterian evangelist, and editor of the Charleston *Christian Observer* in 1826-1845, of the Richmond (Va.) *Watchman and Observer* in 1845-1856, and of *The Central Presbyterian* in 1856-1860. The son graduated at Princeton in 1849, studied under Franz in Berlin, under Friedrich Ritschl at Bonn and under Schneidewin at Göttingen, where he received his doctor's degree in 1853. From 1856 to 1876 he was professor of Greek in the University of Virginia, holding the chair of Latin also in 1861-1866; and in 1876 he became professor of Greek in the newly founded Johns Hopkins University. In 1880 *The American Journal of Philology*, a quarterly published by the Johns Hopkins University, was established under his editorial charge, and his strong personality was expressed in the department of the *Journal* headed "Brief Report" or "Lanx Satura," and in the earliest years of its publication every petty detail was in his hands. His style in it, as elsewhere, is in striking contrast to that of the typical classical scholar, and accords with his conviction that the true aim of scholarship is "that which is." He published a *Latin Grammar* (1867; revised with the co-operation of Gonzalez B. Lodge, 1894 and 1899) and a Latin Series for use in secondary schools (1875), both marked by lucidity of order and mastery of grammatical theory and methods. His edition of *Persius* (1875) is of great value. But his bent was rather toward Greek than Latin. His special interest in Christian Greek was partly the cause of his editing in 1877 *The Apologies of Justin Martyr*; "which" (to use his own words) "I used unblushingly as a repository for my syntactical formulae." Gildersleeve's studies under Franz had no doubt quickened his interest in Greek syntax, and his logic, untrammelled by previous categories, and his marvellous sympathy with the language were displayed in this most unlikely of places. His *Syntax of Classic Greek*

(Part I., 1900, with C. W. E. Miller) collects these formulae. Gildersleeve edited in 1885 *The Olympian and Pythian Odes of Pindar*, with a brilliant and valuable introduction. His views on the function of grammar were summarized in a paper on *The Spiritual Rights of Minute Research* delivered at Bryn Mawr on the 16th of June 1895. His collected contributions to literary periodicals appeared in 1890 under the title *Essays and Studies Educational and Literary*.

GILDING, the art of spreading gold, either by mechanical or by chemical means, over the surface of a body for the purpose of ornament. The art of gilding was known to the ancients. According to Herodotus, the Egyptians were accustomed to gild wood and metals; and gilding by means of gold plates is frequently mentioned in the Old Testament. Pliny informs us that the first gilding seen at Rome was after the destruction of Carthage, under the censorship of Lucius Mummius, when the Romans began to gild the ceilings of their temples and palaces, the Capitol being the first place on which this enrichment was bestowed. But he adds that luxury advanced on them so rapidly that in a little time you might see all, even private and poor persons, gild the walls, vaults, and other parts of their dwellings. Owing to the comparative thickness of the gold-leaf used in ancient gilding, the traces of it which yet remain are remarkably brilliant and solid. Gilding has in all times occupied an important place in the ornamental arts of Oriental countries; and the native processes pursued in India at the present day may be taken as typical of the arts as practised from the earliest periods. For the gilding of copper, employed in the decoration of temple domes and other large works, the following is an outline of the processes employed. The metal surface is thoroughly scraped, cleaned and polished, and next heated in a fire sufficiently to remove any traces of grease or other impurity which may remain from the operation of polishing. It is then dipped in an acid solution prepared from dried unripe apricots, and rubbed with pumice or brick powder. Next, the surface is rubbed over with mercury which forms a superficial amalgam with the copper, after which it is left some hours in clean water, again washed with the acid solution, and dried. It is now ready for receiving the gold, which is laid on in leaf, and, on adhering, assumes a grey appearance from combining with the mercury, but on the application of heat the latter metal volatilizes, leaving the gold a dull greyish hue. The colour is brought up by means of rubbing with agate burnishers. The weight of mercury used in this process is double that of the gold laid on, and the thickness of the gilding is regulated by the circumstances or necessities of the case. For the gilding of iron or steel, the surface is first scratched over with chequered lines, then washed in a hot solution of green apricots, dried and heated just short of red-heat. The gold-leaf is then laid on, and rubbed in with agate burnishers, when it adheres by catching into the prepared scratched surface.

Modern gilding is applied to numerous and diverse surfaces and by various distinct processes, so that the art is prosecuted in many ways, and is part of widely different ornamental and useful arts. It forms an important and essential part of frame-making (see Carving and Gilding); it is largely employed in connexion with cabinet-work, decorative painting and house ornamentation; and it also bulks largely in bookbinding and ornamental leather work. Further, gilding is much employed for coating baser metals, as in button-making, in the gilt toy trade, in electro-gilt reproductions and in electro-plating; and it is also a characteristic feature in the decoration of pottery, porcelain and glass. The various processes fall under one or other of two heads—mechanical gilding and gilding by chemical agency.

Mechanical Gilding embraces all the operations by which gold-leaf is prepared (see Goldbeating), and the several processes by which it is mechanically attached to the surfaces it is intended to cover. It thus embraces the burnish or water-gilding and the oil-gilding of the carver and gilder, and the gilding operations of the house decorator, the sign-painter, the bookbinder, the paper-stainer and several others. Polished iron, steel and other metals are gilt mechanically by applying gold-leaf to the metallic surface at a temperature just under red-heat, pressing the leaf on with a burnisher and reheating, when additional leaf may be laid on. The process is completed by cold burnishing.

Chemical Gilding embraces those processes in which the gold used is at some stage in a state of chemical combination. Of these the following are the principal:—

Cold Gilding.—In this process the gold is obtained in a state of extremely fine division, and applied by mechanical means. Cold gilding on silver is performed by a solution of gold in aqua-regia, applied by dipping a linen rag into the solution, burning it, and rubbing the black and heavy ashes on the silver with the finger or a piece of leather or cork. *Wet gilding* is effected by means of a dilute solution of chloride of gold with twice its quantity of ether. The liquids are agitated and allowed to rest, when the ether separates and floats on the surface of the acid. The whole mixture is then poured into a funnel with a small aperture, and allowed to rest for some time, when the acid is run off and the ether separated. The ether will be found to have taken up all the gold from the acid, and may be used for gilding iron or steel, for which purpose the metal is polished with the finest emery and spirits of wine. The ether is then applied with a small brush, and as it evaporates it deposits the gold, which can now be heated and polished. For small delicate figures a pen or a fine brush may be used for laying on the ether solution. *Fire-gilding* or *Wash-gilding* is a process by which an amalgam of gold is applied to metallic surfaces, the mercury being subsequently volatilized, leaving a film of gold or an amalgam containing from 13 to 16% of mercury. In the preparation of the amalgam the gold must first be reduced to thin plates or grains, which are heated red hot, and thrown into mercury previously heated, till it begins to smoke. Upon stirring the mercury with an iron rod, the gold totally disappears. The proportion of mercury to gold is generally as six or eight to one. When the amalgam is cold it is

squeezed through chamois leather for the purpose of separating the superfluous mercury; the gold, with about twice its weight of mercury, remains behind, forming a yellowish silvery mass of the consistence of butter. When the metal to be gilt is wrought or chased, it ought to be covered with mercury before the amalgam is applied, that this may be more easily spread; but when the surface of the metal is plain, the amalgam may be applied to it direct. When no such preparation is applied, the surface to be gilded is simply bitten and cleaned with nitric acid. A deposit of mercury is obtained on a metallic surface by means of "quicksilver water," a solution of nitrate of mercury,—the nitric acid attacking the metal to which it is applied, and thus leaving a film of free metallic mercury. The amalgam being equally spread over the prepared surface of the metal, the mercury is then sublimed by a heat just sufficient for that purpose; for, if it is too great, part of the gold may be driven off, or it may run together and leave some of the surface of the metal bare. When the mercury has evaporated, which is known by the surface having entirely become of a dull yellow colour, the metal must undergo other operations, by which the fine gold colour is given to it. First, the gilded surface is rubbed with a scratch brush of brass wire, until its surface be smooth; then it is covered over with a composition called "gilding wax," and again exposed to the fire until the wax is burnt off. This wax is composed of beeswax mixed with some of the following substances, viz. red ochre, verdigris, copper scales, alum, vitriol, borax. By this operation the colour of the gilding is heightened; and the effect seems to be produced by a perfect dissipation of some mercury remaining after the former operation. The dissipation is well effected by this equable application of heat. The gilt surface is then covered over with nitre, alum or other salts, ground together, and mixed up into a paste with water or weak ammonia. The piece of metal thus covered is exposed to a certain degree of heat, and then quenched in water. By this method its colour is further improved and brought nearer to that of gold, probably by removing any particles of copper that may have been on the gilt surface. This process, when skilfully carried out, produces gilding of great solidity and beauty; but owing to the exposure of the workmen to mercurial fumes, it is very unhealthy, and further there is much loss of mercury. Numerous contrivances have been introduced to obviate these serious evils. Gilt brass buttons used for uniforms are gilt by this process, and there is an act of parliament (1796) yet unrepealed which prescribes 5 grains of gold as the smallest quantity that may be used for the gilding of 12 dozen of buttons 1 in. in diameter.

Gilding of Pottery and Porcelain.—The quantity of gold consumed for these purposes is very large. The gold used is dissolved in aqua-regia, and the acid is driven off by heat, or the gold may be precipitated by means of sulphate of iron. In this pulverulent state the gold is mixed with $\frac{1}{12}$th of its weight of oxide of bismuth, together with a small quantity of borax and gum water. The mixture is applied to the articles with a camel's hair pencil, and after passing through the fire the gold is of a dingy colour, but the lustre is brought out by burnishing with agate and bloodstone, and afterwards cleaning with vinegar or white-lead.

GILDS, or Guilds. Medieval gilds were voluntary associations formed for the mutual aid and protection of their members. Among the gildsmen there was a strong spirit of fraternal co-operation or Christian brotherhood, with a mixture of worldly and religious ideals—the support of the body and the salvation of the soul. Early meanings of the root *gild* or *geld* were expiation, penalty, sacrifice or worship, feast or banquet, and contribution or payment; it is difficult to determine which is the earliest meaning, and we are not certain whether the gildsmen were originally those who contributed to a common fund or those who worshipped or feasted together. Their fraternities or societies may be divided into three classes: religious or benevolent, merchant and craft gilds. The last two categories, which do not become prominent anywhere in Europe until the 12th century, had, like all gilds, a religious tinge, but their aims were primarily worldly, and their functions were mainly of an economic character.

1. *Origin.*—Various theories have been advanced concerning the origin of gilds. Some writers regard them as a continuation of the Roman *collegia* and *sodalitates*, but there is little evidence to prove the unbroken continuity of existence of the Roman and Germanic fraternities. A more widely accepted theory derives gilds wholly or in part from the early Germanic or Scandinavian sacrificial banquets. Much influence is ascribed to this heathen element by Lujo Brentano, Karl Hegel, W. E. Wilda and other writers. This view does not seem to be tenable, for the old sacrificial carousals lack two of the essential elements of the gilds, namely corporative solidarity or permanent association and the spirit of Christian brotherhood. Dr Max Pappenheim has ascribed the origin of Germanic gilds to the northern "foster-brotherhood" or "sworn-brotherhood," which was an artificial bond of union between two or more persons. After intermingling their blood in the earth and performing other peculiar ceremonies, the two contracting parties with grasped hands swore to avenge any injury done to either of them. The objections to this theory are fully stated by Hegel (*Städte und Gilden*, i. 250-253). The foster-brotherhood seems to have been unknown to the Franks and the Anglo-Saxons, the nations in which medieval gilds first appear; and hence Dr Pappenheim's conclusions, if tenable at all, apply only to Denmark or Scandinavia.

No theory on this subject can be satisfactory which wholly ignores the influence of the Christian church. Imbued with the idea of the brotherhood of man, the church naturally fostered the early growth of gilds and tried to make them displace the old heathen banquets. The work of the church was, however, directive rather than creative. Gilds were a natural manifestation of the associative spirit

which is inherent in mankind. The same needs produce in different ages associations which have striking resemblances, but those of each age have peculiarities which indicate a spontaneous growth. It is not necessary to seek the germ of gilds in any antecedent age or institution. When the old kin-bond or *maegth* was beginning to weaken or dissolve, and the state did not yet afford adequate protection to its citizens, individuals naturally united for mutual help.

Gilds are first mentioned in the Carolingian capitularies of 779 and 789, and in the enactments made by the synod of Nantes early in the 9th century, the text of which has been preserved in the ecclesiastical ordinances of Hincmar of Rheims (A.D. 852). The capitularies of 805 and 821 also contain vague references to sworn unions of some sort, and a capitulary of 884 prohibits villeins from forming associations "vulgarly called gilds" against those who have despoiled them. The Carolingians evidently regarded such "conjurations" as "conspirations" dangerous to the state. The gilds of Norway, Denmark and Sweden are first mentioned in the 11th, 12th and 14th centuries respectively; those of France and the Netherlands in the 11th.

Many writers believe that the earliest references to gilds come from England. The laws of Ine speak of *gegildan* who help each other pay the *wergeld*, but it is not entirely certain that they were members of gild fraternities in the later sense. These are more clearly referred to in England in the second half of the 9th century, though we have little information concerning them before the 11th century. To the first half of that century belong the statutes of the fraternities of Cambridge, Abbotsbury and Exeter. They are important because they form the oldest body of gild ordinances extant in Europe. The thanes' gild at Cambridge afforded help in blood-feuds, and provided for the payment of the *wergeld* in case a member killed any one. The religious element was more prominent in Orcy's gild at Abbotsbury and in the fraternity at Exeter; their ordinances exhibit much solicitude for the salvation of the brethren's souls. The Exeter gild also gave assistance when property was destroyed by fire. Prayers for the dead, attendance at funerals of gildsmen, periodical banquets, the solemn entrance oath, fines for neglect of duty and for improper conduct, contributions to a common purse, mutual assistance in distress, periodical meetings in the gildhall,—in short, all the characteristic features of the later gilds already appear in the statutes of these Anglo-Saxon fraternities. Some continental writers, in dealing with the origin of municipal government throughout western Europe, have, however, ascribed too much importance to the Anglo-Saxon gilds, exaggerating their prevalence and contending that they form the germ of medieval municipal government. This view rests almost entirely on conjecture; there is no good evidence to show that there was any organic connexion between gilds and municipal government in England before the coming of the Normans. It should also be noted that there is no trace of the existence of either craft or merchant gilds in England before the Norman Conquest. Commerce and industry were not yet sufficiently developed to call for the creation of such associations.

2. *Religious Gilds after the Norman Conquest.*—Though we have not much information concerning the religious gilds in the 12th century, they doubtless flourished under the Anglo-Norman kings, and we know that they were numerous, especially in the boroughs, from the 13th century onward. In 1388 parliament ordered that every sheriff in England should call upon the masters and wardens of all gilds and brotherhoods to send to the king's council in Chancery, before the 2nd of February 1389, full returns regarding their foundation, ordinances and property. Many of these returns were edited by J. Toulmin Smith (1816-1869), and they throw much light on the functions of the gilds. Their ordinances are similar to those of the above-mentioned Anglo-Saxon fraternities. Each member took an oath of admission, paid an entrance-fee, and made a small annual contribution to the common fund. The brethren were aided in old age, sickness and poverty, often also in cases of loss by robbery, shipwreck and conflagration; for example, any member of the gild of St Catherine, Aldersgate, was to be assisted if he "fall into poverty or be injured through age, or through fire or water, thieves or sickness." Alms were often given even to non-gildsmen; lights were supported at certain altars; feasts and processions were held periodically; the funerals of brethren were attended; and masses for the dead were provided from the common purse or from special contributions made by the gildsmen. Some of the religious gilds supported schools, or helped to maintain roads, bridges and town-walls, or even came, in course of time, to be closely connected with the government of the borough; but, as a rule, they were simply private societies with a limited sphere of activity. They are important because they played a prominent rôle in the social life of England, especially as eleemosynary institutions, down to the time of their suppression in 1547. Religious gilds, closely resembling those of England, also flourished on the continent during the middle ages.

3. *The Gild Merchant.*—The merchant and craft fraternities are particularly interesting to students of economic and municipal history. The gild merchant came into existence in England soon after the Norman Conquest, as a result of the increasing importance of trade, and it may have been transplanted from Normandy. Until clearer evidence of foreign influence is found, it may, however, be safer to regard it simply as a new application of the old gild principle, though this new application may have been stimulated by continental example. The evidence seems to indicate the pre-existence of the gild merchant in Normandy, but it is not mentioned anywhere on the continent before the 11th century. It spread rapidly in England, and from the reign of John onward we have evidence of its existence in many English boroughs. But in some prominent towns, notably London, Colchester, Norwich and the Cinque Ports, it seems never to have been adopted. In fact it played a more conspicuous rôle in the small boroughs than in the large ones. It was regarded by the townsmen as one of their most important privileges. Its chief function was to regulate the trade monopoly conveyed to the borough by the royal grant of *gilda mercatoria*. A grant of this sort implied that the gildsmen had the right to trade freely in the town, and to impose payments and restrictions upon others who desired to exercise that privilege. The ordinances of a gild merchant thus aim to protect the brethren from the commercial competition of

strangers or non-gildsmen. More freedom of trade was allowed at all times in the selling of wares by wholesale, and also in retail dealings during the time of markets and fairs. The ordinances were enforced by an alderman with the assistance of two or more deputies, or by one or two masters, wardens or keepers. The *Morwenspeches* were periodical meetings at which the brethren feasted, revised their ordinances, admitted new members, elected officers and transacted other business.

It has often been asserted that the gild merchant and the borough were identical, and that the former was the basis of the whole municipal constitution. But recent research has discredited this theory both in England and on the continent. Much evidence has been produced to show that gild and borough, gildsmen and burgesses, were originally distinct conceptions, and that they continued to be discriminated in most towns throughout the middle ages. Admission to the gild was not restricted to burgesses; nor did the brethren form an aristocratic body having control over the whole municipal polity. No good evidence has, moreover, been advanced to prove that this or any other kind of gild was the germ of the municipal constitution. On the other hand, the gild merchant was certainly an official organ or department of the borough administration, and it exerted considerable influence upon the economic and corporative growth of the English municipalities.

Historians have expressed divergent views regarding the early relations of the craftsmen and their fraternities to the gild merchant. One of the main questions in dispute is whether artisans were excluded from the gild merchant. Many of them seem to have been admitted to membership. They were regarded as merchants, for they bought raw material and sold the manufactured commodity; no sharp line of demarcation was drawn between the two classes in the 12th and 13th centuries. Separate societies of craftsmen were formed in England soon after the gild merchant came into existence; but at first they were few in number. The gild merchant did not give birth to craft fraternities or have anything to do with their origin; nor did it delegate its authority to them. In fact, there seems to have been little or no organic connexion between the two classes of gilds. As has already been intimated, however, many artisans probably belonged both to their own craft fraternity and to the gild merchant, and the latter, owing to its great power in the town, may have exercised some sort of supervision over the craftsmen and their societies. When the king bestowed upon the tanners or weavers or any other body of artisans the right to have a gild, they secured the monopoly of working and trading in their branch of industry. Thus with every creation of a craft fraternity the gild merchant was weakened and its sphere of activity was diminished, though the new bodies were subsidiary to the older and larger fraternity. The greater the commercial and industrial prosperity of a town, the more rapid was the multiplication of craft gilds, which was a natural result of the ever-increasing division of labour. The old gild merchant remained longest intact and powerful in the smaller boroughs, in which, owing to the predominance of agriculture, few or no craft gilds were formed. In some of the larger towns the crafts were prominent already in the 13th century, but they became much more prominent in the first half of the 14th century. Their increase in number and power was particularly rapid in the time of Edward III., whose reign marks an era of industrial progress. Many master craftsmen now became wealthy employers of labour, dealing extensively in the wares which they produced. The class of dealers or merchants, as distinguished from trading artisans, also greatly increased and established separate fraternities. When these various unions of dealers and of craftsmen embraced all the trades and branches of production in the town, little or no vitality remained in the old gild merchant; it ceased to have an independent sphere of activity. The tendency was for the single organization, with a general monopoly of trade, to be replaced by a number of separate organizations representing the various trades and handicrafts. In short, the function of guarding and supervising the trade monopoly split up into various fragments, the aggregate of the crafts superseding the old general gild merchant. This transference of the authority of the latter to a number of distinct bodies and the consequent disintegration of the old organization was a gradual spontaneous movement,—a process of slow displacement, or natural growth and decay, due to the play of economic forces,—which, generally speaking, may be assigned to the 14th and 15th centuries, the very period in which the craft gilds attained the zenith of their power. While in most towns the name and the old organization of the gild merchant thus disappeared and the institution was displaced by the aggregate of the crafts towards the close of the middle ages, in some places it survived long after the 15th century either as a religious fraternity, shorn of its old functions, or as a periodical feast, or as a vague term applied to the whole municipal corporation.

On the continent of Europe the medieval gild merchant played a less important rôle than in England. In Germany, France and the Netherlands it occupies a less prominent place in the town charters and in the municipal polity, and often corresponds to the later fraternities of English dealers established either to carry on foreign commerce or to regulate a particular part of the local trade monopoly.

4. *Craft Gilds.*—A craft gild usually comprised all the artisans in a single branch of industry in a particular town. Such a fraternity was commonly called a “mistery” or “company” in the 15th and 16th centuries, though the old term “gild” was not yet obsolete. “Gild” was also a common designation in north Germany, while the corresponding term in south Germany was *Zunft*, and in France *métier*. These societies are not clearly visible in England or on the continent before the early part of the 12th century. With the expansion of trade and industry the number of artisans increased, and they banded together for mutual protection. Some German writers have maintained that these craft organizations emanated from manorial groups of workmen, but strong arguments have been advanced against the validity of this theory (notably by F. Keutgen). It is unnecessary to elaborate any profound theory regarding the origin of the craft gilds. The union of men of the same occupation was a natural tendency of the age. In the 13th century the trade of England continued to expand and the number of craft gilds increased. In the 14th century they were fully developed and in a flourishing condition; by

that time each branch of industry in every large town had its gild. The development of these societies was even more rapid on the continent than in England.

Their organization and aims were in general the same throughout western Europe. Officers, commonly called wardens in England, were elected by the members, and their chief function was to supervise the quality of the wares produced, so as to secure good and honest workmanship. Therefore, ordinances were made regulating the hours of labour and the terms of admission to the gild, including apprenticeship. Other ordinances required members to make periodical payments to a common fund, and to participate in certain common religious observances, festivities and pageants. But the regulation of industry was always paramount to social and religious aims; the chief object of the craft gild was to supervise the processes of manufacture and to control the monopoly of working and dealing in a particular branch of industry.

We have already called attention to the gradual displacement of the gild merchant by the craft organizations. The relations of the former to the latter must now be considered more in detail. There was at no time a general struggle in England between the gild merchant and the craft gilds, though in a few towns there seems to have been some friction between merchants and artisans. There is no exact parallel in England to the conflict between these two classes in Scotland in the 16th century, or to the great continental revolution of the 13th and 14th centuries, by which the crafts threw off the yoke of patrician government and secured more independence in the management of their own affairs and more participation in the civic administration. The main causes of these conflicts on the continent were the monopoly of power by the patricians, acts of violence committed by them, their bad management of the finances and their partisan administration of justice. In some towns the victory of the artisans in the 14th century was so complete that the whole civic constitution was remodelled with the craft fraternities as a basis. A widespread movement of this sort would scarcely be found in England, where trade and industry were less developed than on the continent, and where the motives of a class conflict between merchants and craftsmen were less potent. Moreover, borough government in England seems to have been mainly democratic until the 14th or 15th century; there was no oligarchy to be depressed or suppressed. Even if there had been motives for uprisings of artisans such as took place in Germany and the Netherlands, the English kings would probably have intervened. True, there were popular uprisings in England, but they were usually conflicts between the poor and the rich; the crafts as such seldom took part in these tumults. While many continental municipalities were becoming more democratic in the 14th century, those of England were drifting towards oligarchy, towards government by a close “select body.” As a rule the craft gilds secured no dominant influence in the boroughs of England, but remained subordinate to the town government. Whatever power they did secure, whether as potent subsidiary organs of the municipal polity for the regulation of trade, or as the chief or sole medium for the acquisition of citizenship, or as integral parts of the common council, was, generally speaking, the logical sequence of a gradual economic development, and not the outgrowth of a revolutionary movement by which oppressed craftsmen endeavoured to throw off the yoke of an arrogant patrician gild merchant.

Two new kinds of craft fraternities appear in the 14th century and become more prominent In the 15th, namely, the merchants’ and the journeymen’s companies. The misteries or companies of merchants traded in one or more kinds of wares. They were pre-eminently dealers, who sold what others produced. Hence they should not be confused with the old gild merchant, which originally comprised both merchants and artisans, and had the whole monopoly of the trade of the town. In most cases, the company of merchants was merely one of the craft organizations which superseded the gild merchant.

In the 14th century the journeymen or yeomen began to set up fraternities in defence of their rights. The formation of these societies marks a cleft within the ranks of some particular class of artisans—a conflict between employers, or master artisans, and workmen. The journeymen combined to protect their special interests, notably as regards hours of work and rates of wages, and they fought with the masters over the labour question in all its aspects. The resulting struggle of organized bodies of masters and journeymen was widespread throughout western Europe, but it was more prominent in Germany than in France or England. This conflict was indeed one of the main features of German industrial life in the 15th century. In England the fraternities of journeymen, after struggling a while for complete independence, seem to have fallen under the supervision and control of the masters’ gilds; in other words, they became subsidiary or affiliated organs of the older craft fraternities.

An interesting phenomenon in connexion with the organization of crafts is their tendency to amalgamate, which is occasionally visible in England in the 15th century, and more frequently in the 16th and 17th. A similar tendency is visible in the Netherlands and in some other parts of the continent already in the 14th century. Several fraternities—old gilds or new companies, with their respective cognate or heterogeneous branches of industry and trade—were fused into one body. In some towns all the crafts were thus consolidated into a single fraternity; in this case a body was reproduced which regulated the whole trade monopoly of the borough, and hence bore some resemblance to the old gild merchant.

In dealing briefly with the modern history of craft gilds, we may confine our attention to England. In the Tudor period the policy of the crown was to bring them under public or national control. Laws were passed, for example in 1503, requiring that new ordinances of “fellowships of crafts or misteries” should be approved by the royal justices or by other crown officers; and the authority of the companies to fix the price of wares was thus restricted. The statute of 5 Elizabeth, c. 4, also curtailed their

jurisdiction over journeymen and apprentices (see Apprenticeship).

The craft fraternities were not suppressed by the statute of 1547 (1 Edward VI.). They were indeed expressly exempted from its general operation. Such portions of their revenues as were devoted to definite religious observances were, however, appropriated by the crown. The revenues confiscated were those used for "the finding, maintaining or sustentation of any priest or of any anniversary, or obit, lamp, light or other such things." This has been aptly called "the disendowment of the religion of the misteries." Edward VI.'s statute marks no break of continuity in the life of the craft organizations. Even before the Reformation, however, signs of decay had already begun to appear, and these multiplied in the 16th and 17th centuries. The old gild system was breaking down under the action of new economic forces. Its dissolution was due especially to the introduction of new industries, organized on a more modern basis, and to the extension of the domestic system of manufacture. Thus the companies gradually lost control over the regulation of industry, though they still retained their old monopoly in the 17th century, and in many cases even in the 18th. In fact, many craft fraternities still survived in the second half of the 18th century, but their usefulness had disappeared. The medieval form of association was incompatible with the new ideas of individual liberty and free competition, with the greater separation of capital and industry, employers and workmen, and with the introduction of the factory system. Intent only on promoting their own interests and disregarding the welfare of the community, the old companies had become an unmitigated evil. Attempts have been made to find in them the progenitors of the trades unions, but there seems to be no immediate connexion between the latter and the craft gilds. The privileges of the old fraternities were not formally abolished until 1835; and the substantial remains or spectral forms of some are still visible in other towns besides London.

Bibliography.—W. E. Wilda, *Das Gildenwesen im Mittelalter* (Halle, 1831); E. Levasseur; *Histoire des classes ouvrières en France* (2 vols., Paris, 1859, new ed. 1900); Gustav von Schönberg, "Zur wirtschaftlichen Bedeutung des deutschen Zunftwesens im Mittelalter," in *Jahrbücher für Nationalökonomie und Statistik*, ed. B. Hildebrand, vol. ix. pp. 1-72, 97-169 (Jena, 1867); Joshua Toulmin Smith, *English Gilds*, with Lujo Brentano's introductory essay on the *History and Development of Gilds* (London, 1870); Max Pappenheim, *Die altdänischen Schutzgilden* (Breslau, 1885); W. J. Ashley, *Introduction to English Economic History* (2 vols., London, 1888-1893; 3rd ed. of vol. i., 1894); C. Gross, *The Gild Merchant* (2 vols., Oxford, 1890); Karl Hegel, *Städte und Gilden der germanischen Völker* (2 vols., Leipzig, 1891); J. Malet Lambert, *Two Thousand Years of Gild Life* (Hull, 1891); Alfred Doren, *Untersuchungen zur Geschichte der Kaufmannsgilden* (Leipzig, 1893); H. Vander Linden, *Les Gildes marchandes dans les Pays-Bas au moyen âge* (Ghent, 1896); E. Martin Saint-Léon, *Histoire des corporations de métiers* (Paris, 1897); C. Nyrop, *Danmarks Gilde- og Lavsskraaer fra middelalderen* (2 vols., Copenhagen, 1899-1904); F. Keutgen, *Ämter und Zünfte* (Jena, 1903); George Unwin, *Industrial Organization in the Sixteenth and Seventeenth Centuries* (Oxford, 1904). For bibliographies of gilds, see H. Blanc, *Bibliographie des corporations ouvrières* (Paris, 1885); G. Gonetta, *Bibliografia delle corporazioni d' arti e mestieri* (Rome, 1891); C. Gross, *Bibliography of British Municipal History*, including Gilds (New York, 1897); W. Stieda, in *Handwörterbuch der Staatswissenschaften*, ed. J. Conrad (2nd ed., Jena, 1901, under "Zunftwesen").

(C. Gr.)

GILEAD (*i.e.* "hard" or "rugged," a name sometimes used, both in earlier and in later writers, to denote the whole of the territory occupied by the Israelites eastward of Jordan, extending from the Arnon to the southern base of Hermon (Deut. xxxiv. 1; Judg. xx. 1; Jos. *Ant.* xii. 8. 3, 4). More precisely, however, it was the usual name of that picturesque hill country which is bounded on the N. by the Hieromax (Yarmuk), on the W. by the Jordan, on the S. by the Arnon, and on the E. by a line which may be said to follow the meridian of Ammān (Philadelphia or Rabbath-Ammon). It thus lies wholly within 31° 25′ and 32° 42′ N. lat. and 35° 34′ and 36° E. long., and is cut in two by the Jabbok. Excluding the narrow strip of low-lying plain along the Jordan, it has an average elevation of 2500 ft. above the Mediterranean; but, as seen from the west, the relative height is very much increased by the depression of the Jordan valley. The range from the same point of view presents a singularly uniform outline, having the appearance of an unbroken wall; in reality, however, it is traversed by a number of deep ravines (wadis), of which the most important are the Yābis, the Ajlūn, the Rājib, the Zerka (Jabbok), the Hesban, and the Zerka Ma'īn. The great mass of the Gilead range is formed of Jura limestone, the base slopes being sandstone partly covered by white marls. The eastern slopes are comparatively bare of trees; but the western are well supplied with oak, terebinth and pine. The pastures are everywhere luxuriant, and the wooded heights and winding glens, in which the tangled shrubbery is here and there broken up by open glades and flat meadows of green turf, exhibit a beauty of vegetation such as is hardly to be seen in any other district of Palestine.

The first biblical mention of "Mount Gilead" occurs in connexion with the reconcilement of Jacob and Laban (Genesis xxxi.). The composite nature of the story makes an identification of the exact site difficult, but one of the narrators (E) seems to have in mind the ridge of what is now known as Jebel Ajlūn, probably not far from Maḥneh (Mahanaim), near the head of the wadi Yābis. Some investigators incline to Sūf, or to the Jebel Kafkafa. At the period of the Israelite conquest the portion of Gilead northward of the Jabbok (Zerka) belonged to the dominions of Og, king of Bashan, while the southern half was ruled by Sihon, king of the Amorites, having been at an earlier date wrested from Moab

(Numb. xxi. 24; Deut. iii. 12-16). These two sections were allotted respectively to Manasseh and to Reuben and Gad, both districts being peculiarly suited to the pastoral and nomadic character of these tribes. A somewhat wild Bedouin disposition, fostered by their surroundings, was retained by the Israelite inhabitants of Gilead to a late period of their history, and seems to be to some extent discernible in what we read alike of Jephthah, of David's Gadites, and of the prophet Elijah. As the eastern frontier of Palestine, Gilead bore the first brunt of Syrian and Assyrian attacks.

After the close of the Old Testament history the word Gilead seldom occurs. It seems to have soon passed out of use as a precise geographical designation; for though occasionally mentioned by Apocryphal writers, by Josephus, and by Eusebius, the allusions are all vague, and show that those who made them had no definite knowledge of Gilead proper. In Josephus and the New Testament the name Peraea or πέραν τοῦ Ἰορδάνου is most frequently used; and the country is sometimes spoken of by Josephus as divided into small provinces called after the capitals in which Greek colonists had established themselves during the reign of the Seleucidae. At present Gilead south of the Jabbok alone is known by the name of Jebel Jilad (Mount Gilead), the northern portion between the Jabbok and the Yarmuk being called Jebel Ajlūn. Jebel Jilad includes Jebel Osha, and has for its capital the town of Es-Salt. The cities of Gilead expressly mentioned in the Old Testament are Ramoth, Jabesh and Jazer. The first of these has been variously identified with Es-Salt, with Reimun, with Jerash or Gerasa, with er-Remtha, and with Ṣalḥad. Opinions are also divided on the question of its identity with Mizpeh-Gilead (see *Encyc. Biblica*, art. "Ramoth-Gilead"). Jabesh is perhaps to be found at Meriamin, less probably at ed-Deir; Jazer, at Yajuz near Jogbehah, rather than at Sar. The city named Gilead (Judg. x. 17, xii. 7; Hos. vi. 8, xii. 11) has hardly been satisfactorily explained; perhaps the text has suffered.

The "balm" (Heb. *ṣori*) for which Gilead was so noted (Gen. xlvii. 11; Jer. viii. 22, xlvi. 11; Ezek. xxvii. 17), is probably to be identified with mastic (Gen. xxxvii. 25, R.V. marg.) *i.e.* the resin yielded by the *Pistachia Lentiscus*. The modern "balm of Gilead" or "Mecca balsam," an aromatic gum produced by the *Balsamodendron opobalsamum*, is more likely the Hebrew *mōr*, which the English Bible wrongly renders "myrrh."

See G. A. Smith, *Hist. Geog.* xxiv. foll.

(R. A. S. M.)

GILES (Gil, Gilles), **ST,** the name given to an abbot whose festival is celebrated on the 1st of September. According to the legend, he was an Athenian (Λἰγίδιος, Aegidius) of royal descent. After the death of his parents he distributed his possessions among the poor, took ship, and landed at Marseilles. Thence he went to Arles, where he remained for two years with St Caesarius. He then retired into a neighbouring desert, where he lived upon herbs and upon the milk of a hind which came to him at stated hours. He was discovered there one day by Flavius, the king of the Goths, who built a monastery on the place, of which he was the first abbot. Scholars are very much divided as to the date of his life, some holding that he lived in the 6th century, others in the 7th or 8th. It may be regarded as certain that St Giles was buried in the hermitage which he had founded in a spot which was afterwards the town of St-Gilles (diocese of Nîmes, department of Gard). His reputation for sanctity attracted many pilgrims. Important gifts were made to the church which contained his body, and a monastery grew up hard by. It is probable that the Visigothic princes who were in possession of the country protected and enriched this monastery, and that it was destroyed by the Saracens at the time of their invasion in 721. But there are no authentic data before the 9th century concerning his history. In 808 Charlemagne took the abbey of St-Gilles under his protection, and it is mentioned among the monasteries from which only prayers for the prince and the state were due. In the 12th century the pilgrimages to St-Gilles are cited as among the most celebrated of the time. The cult of the saint, who came to be regarded as the special patron of lepers, beggars and cripples, spread very extensively over Europe, especially in England, Scotland, France, Belgium and Germany. The church of St Giles, Cripplegate, London, was built about 1090, while the hospital for lepers at St Giles-in-the-Fields (near New Oxford Street) was founded by Queen Matilda in 1117. In England alone there are about 150 churches dedicated to this saint. In Edinburgh the church of St Giles could boast the possession of an arm-bone of its patron. Representations of St Giles are very frequently met with in early French and German art, but are much less common in Italy and Spain.

See *Acta Sanctorum* (September), i. 284-299; Devic and Vaissete, *Histoire générale de Languedoc*, pp. 514-522 (Toulouse, 1876); E. Rembry, *Saint Gilles, sa vie, ses reliques, son culte en Belgique et dans le nord de la France* (Bruges, 1881); F. Arnold-Forster, *Studies in Church Dedications, or England's Patron Saints*, ii. 46-51, iii. 15, 363-365 (1899); A. Jameson, *Sacred and Legendary Art*, 768-770 (1896); A. Bell, *Lives and Legends of the English Bishops and Kings, Medieval Monks, and other later Saints*, pp. 61, 70, 74-78, 84, 197 (1904).

(H. De.)

GILFILLAN, GEORGE (1813-1878), Scottish author, was born on the 30th of January 1813, at Comrie, Perthshire, where his father, the Rev. Samuel Gilfillan, the author of some theological works, was for many years minister of a Secession congregation. After an education at Glasgow University, in March 1836 he was ordained pastor of a Secession congregation in Dundee. He published a volume of his discourses in 1839, and shortly afterwards another sermon on "Hades," which brought him under the scrutiny of his co-presbyters, and was ultimately withdrawn from circulation. Gilfillan next contributed a series of sketches of celebrated contemporary authors to the *Dumfries Herald*, then edited by Thomas Aird; and these, with several new ones, formed his first *Gallery of Literary Portraits*, which appeared in 1846, and had a wide circulation. It was quickly followed by a *Second* and a *Third Gallery*. In 1851 his most successful work, the *Bards of the Bible*, appeared. His aim was that it should be "a poem on the Bible"; and it was far more rhapsodical than critical. His *Martyrs and Heroes of the Scottish Covenant* appeared in 1832, and in 1856 he produced a partly autobiographical, partly fabulous, *History of a Man*. For thirty years he was engaged upon a long poem, on *Night*, which was published in 1867, but its theme was too vast, vague and unmanageable, and the result was a failure. He also edited an edition of the *British Poets*. As a lecturer and as a preacher he drew large crowds, but his literary reputation has not proved permanent. He died on the 13th of August 1878. He had just finished a new life of Burns designed to accompany a new edition of the works of that poet.

GILGAL (Heb. for "circle" of sacred stones), the name of several places in Palestine, mentioned in the Old Testament. The name is not found east of the Jordan.

1. The first and most important was situated "in the east border of Jericho" (Josh. iv. 19), on the border between Judah and Benjamin (Josh. xv. 7). Josephus (Ant. v. 1. 4) places it 50 stadia from Jordan and 10 from Jericho (the New Testament site). Jerome (*Onomasticon*, s.v. "Galgal") places Gilgal 2 Roman miles from Jericho, and speaks of it as a deserted place held in wonderful veneration ("miro cultu") by the natives. This site, which in the middle ages appears to have been lost—Gilgal being shown farther north—was in 1865 recovered by a German traveller (Hermann Zschokke), and fixed by the English survey party, though not beyond dispute. It is about 2 m. east of the site of Byzantine Jericho, and 1 m. from modern er-Riha. A fine tamarisk, traces of a church (which is mentioned in the 8th century), and a large reservoir, now filled up with mud, remain. The place is called Jiljūlieh, and its position north of the valley of Achor (Wadì Kelt) and east of Jericho agrees well with the biblical indications above mentioned. A tradition connected with the fall of Jericho is attached to the site (see C. R. Conder, *Tent Work*, 203 ff.). This sanctuary and camp of Israel held a high place in the national regard, and is often mentioned in Judges and Samuel. But whether this is the Gilgal spoken of by Amos and Hosea in connexion with Bethel is by no means certain [see (3) below].

2. Gilgal, mentioned in Josh. xii. 23 in connexion with Dor, appears to have been situated in the maritime plain. Jerome (*Onomasticon*, s.v. "Gelgel") speaks of a town of the name 6 Roman miles north of Antipatris (Ras el 'Ain). This is apparently the modern Kalkilia, but about 4 m. north of Antipatris is a large village called Jiljūlieh, which is more probably the biblical town.

3. The third Gilgal (2 Kings iv. 38) was in the mountains (compare 1 Sam. vii. 16, 2 Kings ii. 1-3) near Bethel. Jerome mentions this place also (*Onomasticon*, s.v. "Galgala"). It appears to be the present village of Jiljilia, about 7 English miles north of Beitin (Bethel). It may have absorbed the old shrine of Shiloh and been the sanctuary famous in the days of Amos and Hosea.

4. Deut. xi. 30 seems to imply a Gilgal near Gerizim, and there is still a place called Juleijil on the plain of Makhna, 2½ m. S.E. of Shechem. This may have been Amos's Gilgal and was almost certainly that of 1 Macc. ix. 2.

5. The Gilgal described in Josh. xv. 7 is the same as the Beth-Gilgal of Neh. xii. 29; its site is not known.

(R. A. S. M.)

GILGAMESH, EPIC OF, the title given to one of the most important literary products of Babylonia, from the name of the chief personage in the series of tales of which it is composed.

Though the Gilgamesh Epic is known to us chiefly from the fragments found in the royal collection of tablets made by Assur-bani-pal, the king of Assyria (668-626 B.C.) for his palace at Nineveh, internal evidence points to the high antiquity of at least some portions of it, and the discovery of a fragment of the epic in the older form of the Babylonian script, which can be dated as 2000 B.C., confirms this view. Equally certain is a second observation of a general character that the epic originating as the greater portion of the literature in Assur-bani-pal's collection in Babylonia is a composite product, that is to say, it consists of a number of independent stories or myths originating at different times, and united to form a continuous narrative with Gilgamesh as the central figure. This view naturally raises the

question whether the independent stories were all told of Gilgamesh or, as almost always happens in the case of ancient tales, were transferred to Gilgamesh as a favourite popular hero. Internal evidence again comes to our aid to lend its weight to the latter theory.

While the existence of such a personage as Gilgamesh may be admitted, he belongs to an age that could only have preserved a dim recollection of his achievements and adventures through oral traditions. The name[1] is not Babylonian, and what evidence as to his origin there is points to his having come from Elam, to the east of Babylonia. He may have belonged to the people known as the Kassites who at the beginning of the 18th century B.C. entered Babylonia from Elam, and obtained control of the Euphrates valley. Why and how he came to be a popular hero in Babylonia cannot with our present material be determined, but the epic indicates that he came as a conqueror and established himself at Erech. In so far we have embodied in the first part of the epic dim recollections of actual events, but we soon leave the solid ground of fact and find ourselves soaring to the heights of genuine myth. Gilgamesh becomes a god, and in certain portions of the epic clearly plays the part of the sun-god of the spring-time, taking the place apparently of Tammuz or Adonis, the youthful sun-god, though the story shows traits that differentiate it from the ordinary Tammuz myths. A separate stratum in the Gilgamesh epic is formed by the story of Eabani—introduced as the friend of Gilgamesh, who joins him in his adventures. There can be no doubt that Eabani, who symbolizes primeval man, was a figure originally entirely independent of Gilgamesh, but his story was incorporated into the epic by that natural process to be observed in the national epics of other peoples, which tends to connect the favourite hero with all kinds of tales that for one reason or the other become embedded in the popular mind. Another stratum is represented by the story of a favourite of the gods known as Ut-Napishtim, who is saved from a destructive storm and flood that destroys his fellow-citizens of Shurippak. Gilgamesh is artificially brought into contact with Ut-Napishtim, to whom he pays a visit for the purpose of learning the secret of immortal life and perpetual youth which he enjoys. During the visit Ut-Napishtim tells Gilgamesh the story of the flood and of his miraculous escape. Nature myths have been entwined with other episodes in the epic and finally the theologians took up the combined stories and made them the medium for illustrating the truth and force of certain doctrines of the Babylonian religion. In its final form, the outcome of an extended and complicated literary process, the Gilgamesh Epic covered twelve tablets, each tablet devoted to one adventure in which the hero plays a direct or indirect part, and the whole covering according to the most plausible estimate about 3000 lines. Of all twelve tablets portions have been found among the remains of Assur-bani-pal's library, but some of the tablets are so incomplete as to leave even their general contents in some doubt. The fragments do not all belong to one copy. Of some tablets portions of two, and of some tablets portions of as many as four, copies have turned up, pointing therefore to the great popularity of the production. The best preserved are Tablets VI. and XI., and of the total about 1500 lines are now known, wholly or in part, while of those partially preserved quite a number can be restored. A brief summary of the contents of the twelve may be indicated as follows:

In the 1st tablet, after a general survey of the adventures of Gilgamesh, his rule at Erech is described, where he enlists the services of all the young able-bodied men in the building of the great wall of the city. The people sigh under the burden imposed, and call upon the goddess Aruru to create a being who might act as a rival to Gilgamesh, curb his strength, and dispute his tyrannous control. The goddess consents, and creates Eabani, who is described as a wild man, living with the gazelles and the beasts of the field. Eabani, whose name, signifying "Ea creates," points to the tradition which made Ea (*q.v.*) the creator of humanity, symbolizes primeval man. Through a hunter, Eabani and Gilgamesh are brought together, but instead of becoming rivals, they are joined in friendship. Eabani is induced by the snares of a maiden to abandon his life with the animals and to proceed to Erech, where Gilgamesh, who has been told in several dreams of the coming of Eabani, awaits him. Together they proceed upon several adventures, which are related in the following four tablets. At first, indeed, Eabani curses the fate which led him away from his former life, and Gilgamesh is represented as bewailing Eabani's dissatisfaction. The sun-god Shamash calls upon Eabani to remain with Gilgamesh, who pays him all honours in his palace at Erech. With the decision of the two friends to proceed to the forest of cedars in which the goddess Irnina—a form of Ishtar—dwells, and which is guarded by Khumbaba, the 2nd tablet ends. In the 3rd tablet, very imperfectly preserved, Gilgamesh appeals through a Shamash priestess Rimat-Belit to the sun-god Shamash for his aid in the proposed undertaking. The 4th tablet contains a description of the formidable Khumbaba, the guardian of the cedar forest. In the 5th tablet Gilgamesh and Eabani reach the forest. Encouraged by dreams, they proceed against Khumbaba, and despatch him near a specially high cedar over which he held guard. This adventure against Khumbaba belongs to the Eabani stratum of the epic, into which Gilgamesh is artificially introduced. The basis of the 6th tablet is the familiar nature-myth of the change of seasons, in which Gilgamesh plays the part of the youthful solar god of the springtime, who is wooed by the goddess of fertility, Ishtar. Gilgamesh, recalling to the goddess the sad fate of those who fall a victim to her charms, rejects the offer. In the course of his recital snatches of other myths are referred to, including he famous Tammuz-Adonis tale, in which Tammuz, the youthful bridegroom, is slain by his consort Ishtar. The goddess, enraged at the insult, asks her father Anu to avenge her. A divine bull is sent to wage a contest against Gilgamesh, who is assisted by his friend Eabani. This scene of the fight with the bull is often depicted on seal cylinders. The two friends by their united force succeed in killing the bull, and then after performing certain votive and purification rites return to Erech, where they are hailed with joy. In this adventure it is clearly Eabani who is artificially introduced in order to maintain the association with Gilgamesh. The 7th tablet continues the Eabani stratum. The hero is smitten with sore disease, but the fragmentary condition of this and the succeeding tablet is such as to envelop in doubt the accompanying circumstances, including the cause and nature of his disease. The 8th tablet

records the death of Eabani. The 9th and 10th tablets, exclusively devoted to Gilgamesh, describe his wanderings in quest of Ut-Napishtim, from whom he hopes to learn how he may escape the fate that has overtaken his friend Eabani. He goes through mountain passes and encounters lions. At the entrance to the mountain Mashu, scorpion-men stand guard, from one of whom he receives advice as to how to pass through the Mashu district. He succeeds in doing so, and finds himself in a wonderful park, which lies along the sea coast. In the 10th tablet the goddess Sabitu, who, as guardian of the sea, first bolts her gate against Gilgamesh, after learning of his quest, helps him to pass in a ship across the sea to the "waters of death." The ferry-man of Ut-Napishtim brings him safely through these waters, despite the difficulties and dangers of the voyage, and at last the hero finds himself face to face with Ut-Napishtim. In the 11th tablet, Ut-Napishtim tells the famous story of the Babylonian flood, which is so patently attached to Gilgamesh in a most artificial manner. Ut-Napishtim and his wife are anxious to help Gilgamesh to new life. He is sent to a place where he washes himself clean from impurity. He is told of a weed which restores youth to the one grown old. Scarcely has he obtained the weed when it is snatched away from him, and the tablet closes somewhat obscurely with the prediction of the destruction of Erech. In the 12th tablet Gilgamesh succeeds in obtaining a view of Eabani's shade, and learns through him of the sad fate endured by the dead. With this description, in which care of the dead is inculcated as the only means of making their existence in Aralu, where the dead are gathered, bearable, the epic, so far as we have it, closes.

The reason why the flood episode and the interview with the dead Eabani are introduced is quite clear. Both are intended as illustrations of doctrines taught in the schools of Babylonia; the former to explain that only the favourites of the gods can hope under exceptional circumstances to enjoy life everlasting; the latter to emphasize the impossibility for ordinary mortals to escape from the inactive shadowy existence led by the dead, and to inculcate the duty of proper care for the dead. That the astro-theological system is also introduced into the epic is clear from the division into twelve tablets, which correspond to the yearly course of the sun, while throughout there are indications that all the adventures of Gilgamesh and Eabani, including those which have an historical background, have been submitted to the influence of this system and projected on to the heavens. This interpretation of the popular tales, according to which the career of the hero can be followed in its entirety and in detail in the movements in the heavens, in time, with the growing predominance of the astral-mythological system, overshadowed the other factors involved, and it is in this form, as an astral myth, that it passes through the ancient world and leaves its traces in the folk-tales and myths of Hebrews, Phoenicians, Syrians, Greeks and Romans throughout Asia Minor and even in India.

BIBLIOGRAPHY.—The complete edition of the Gilgamesh Epic by Paul Haupt under the title *Das babylonische Nimrodepos* (Leipzig, 1884-1891), with the 12th tablet in the *Beiträge zur Assyriologie*, i. 48-79; German translation by Peter Jensen in vol. vi. of Schrader's *Keilinschriftliche Bibliothek* (Berlin, 1900), pp. 116-273. See also the same author's comprehensive work, *Das Gilgamesch-Epos in der Weltliteratur* (vol. i. 1906, vol. ii. to follow). An English translation of the chief portions in Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898), ch. xxiii.

(M. JA.)

1 The name of the hero, written always ideographically, was for a long time provisionally read *Izdubar*; but a tablet discovered by T. G. Pinches gave the equivalent *Gilgamesh* (see Jastrow, *Religion of Babylonia and Assyria*, p. 468).

GILGIT, an outlying province in the extreme north-west of India, over which Kashmir has reasserted her sovereignty. Only a part of the basin of the river Gilgit is included within its political boundaries. There is an intervening width of mountainous country, represented chiefly by glaciers and ice-fields, and intersected by narrow sterile valleys, measuring some 100 to 150 m. in width, to the north and north-east, which separates the province of Gilgit from the Chinese frontier beyond the Muztagh and Karakoram. This part of the Kashmir borderland includes Kanjut (or Hunza) and Ladakh. To the north-west, beyond the sources of the Yasin and Ghazar in the Shandur range (the two most westerly tributaries of the Gilgit river) is the deep valley of the Yarkhun or Chitral. Since the formation of the North-West Frontier Province in 1901, the political charge of Chitral, Dir and Swat, which was formerly included within the Gilgit agency, has been transferred to the chief commissioner of the new province, with his capital at Peshawar. Gilgit proper now forms a *wazarat* of the Kashmir state, administered by a *wazir*. Gilgit is also the headquarters of a British political agent, who exercises some supervision over the *wazir*, and is directly responsible to the government of India for the administration of the outlying districts or petty states of Hunza, Nagar, Ashkuman, Yasin and Ghizar, the little republic of Chilas, &c. These states acknowledge the suzerainty of Kashmir, paying an annual tribute in gold or grain, but they form no part of its territory.

Within the wider limits of the former Gilgit agency are many mixed races, speaking different languages, which have all been usually classed together under the name Dard. The Dard, however, is unknown beyond the limits of the Kohistan district of the Indus valley to the south of the Hindu Koh, the rest of the inhabitants of the Indus valley belonging to Shin republics, or Chilas. The great mass of the Chitral population are Kho (speaking Khowar), and they may be accepted as representing the aboriginal population of the Chitral valley. (See HINDU KUSH.) Between Chitral and the Indus the

"Dards" of Dardistan are chiefly Yeshkuns and Shins, and it would appear from the proportions in which these people occupy the country that they must have primarily moved up from the valley of the Indus in successive waves of conquest, first the Yeshkuns, and then the Shins. No one can put a date to these invasions, but Biddulph is inclined to class the Yeshkuns with the Yuechi who conquered the Bactrian kingdom about 120 B.C. The Shins are obviously a Hindu race (as is testified by their veneration for the cow), who spread themselves northwards and eastwards as far as Baltistan, where they collided with the aboriginal Tatar of the Asiatic highlands. But the ethnography of "Dardistan," or the Gilgit agency (for the two are, roughly speaking, synonymous), requires further investigation, and it would be premature to attempt to frame anything like an ethnographical history of these regions until the neighbouring provinces of Tangir and Darel have been more fully examined. The *wazarat* of Gilgit contains a population (1901) of 60,885, all Mahommedans, mostly of the Shiah sect, but not fanatical. The dominant race is that of the Shins, whose language is universally spoken. This is one of the so-called Pisacha languages, an archaic Aryan group intermediate between the Iranian and the Sanskritic.

In general appearance and dress all the mountain-bred peoples extending through these northern districts are very similar. Thick felt coats reaching below the knee, loose "pyjamas" with cloth "putties" and boots (often of English make) are almost universal, the distinguishing feature in their costume being the felt cap worn close to the head and rolled up round the edges. They are on the whole a light-hearted, cheerful race of people, but it has been observed that their temperament varies much with their habitat—those who live on the shadowed sides of mountains being distinctly more morose and more serious in disposition than the dwellers in valleys which catch the winter sunlight. They are, at the same time, bloodthirsty and treacherous to a degree which would appear incredible to a casual observer of their happy and genial manners, exhibiting a strange combination (as has been observed by a careful student of their ways) of "the monkey and the tiger." Addicted to sport of every kind, they pursue no manufacturing industries whatsoever, but they are excellent agriculturists, and show great ingenuity in their local irrigation works and in their efforts to bring every available acre of cultivable soil within the irrigated area. Gold washing is more or less carried on in most of the valleys north of the river Gilgit, and gold dust (contained in small packets formed with the petals of a cup-shaped flower) is an invariable item in their official presents and offerings. Gold dust still constitutes part of the annual tribute which, strangely enough, is paid by Hunza to China, as well as to Kashmir.

Routes in the Gilgit Agency.—One of the oldest recorded routes through this country is that which connects Mastuj in the Chitral valley with Gilgit, passing across the Shandur range (12,250). It now forms the high-road between Gilgit and Chitral, and has been engineered into a passable route. From the north three great glacier-bred affluents make their way to the river of Gilgit, joining it at almost equal intervals, and each of them affords opportunity for a rough passage northwards. (1) The Yasin river, which follows a fairly straight course from north to south for about 40 m. from the foot of the Darkôt pass across the Shandur range (15,000) to its junction with the river Gilgit, close to the little fort of Gupis, on the Gilgit-Mastuj road. Much of this valley is cultivated and extremely picturesque. At the head of it is a grand group of glaciers, one of which leads up to the well-known pass of Darkôt. (2) 25 m. (by map measurement) below Gupis the Gilgit receives the Ashkuman affluent from the north. The little Lake of Karumbar is held to be its source, as it lies at the head of the river. The same lake is sometimes called the source of the river Yarkhun or Chitral; and it seems possible that a part of its waters may be deflected in each direction. The Karumbar, or Ashkuman, is nearly twice the length of the Yasin, and the upper half of the valley is encompassed by glaciers, rendering the route along it uncertain and difficult. (3) 40 m. or so below the Ashkuman junction, and nearly opposite the little station of Gilgit, the river receives certain further contributions from the north which are collected in the Hunza and Nagar basins. These basins include a system of glaciers of such gigantic proportions that they are probably unrivalled in any part of the world. The glacial head of the Hunza is not far from that of the Karumbar, and, like the Karumbar, the river commences with a wide sweep eastwards, following a course roughly parallel to the crest of the Hindu Kush (under whose southern slopes it lies close) for about 40 m. Then striking south for another 40 m., it twists amidst the barren feet of gigantic rock-bound spurs which reach upwards to the Muztagh peaks on the east and to a mass of glaciers and snow-fields on the west, hidden amidst the upper folds of mountains towering to an average of 25,000 ft. The next great bend is again to the west for 30 m., before a final change of direction to the south at the historical position of Chalt and a comparatively straight run of 25 m. to a junction with the Gilgit. The valley of Hunza lies some 10 m. from the point of this westerly bend, and 20 (as the crow flies) from Chalt. Much has been written of the magnificence of Hunza valley scenery, surrounded as it is by a stupendous ring of snow-capped peaks and brightened with all the radiant beauty that cultivation adds to these mountain valleys; but such scenery must be regarded as exceptional in these northern regions.

Glaciers and Mountains.—Conway and Godwin Austen have described the glaciers of Nagar which, enclosed between the Muztagh spurs on the north-east and the frontier peaks of Kashmir (terminating with Rakapushi) on the south-west, and massing themselves in an almost uninterrupted series from the Hunza valley to the base of those gigantic peaks which stand about Mount Godwin Austen, seem to be set like an ice-sea to define the farthest bounds of the Himalaya. From its uttermost head to the foot of the Hispar, overhanging the valley above Nagar, the length of the glacial ice-bed known under the name of Biafo is said to measure about 90 m. Throughout the mountain region of Kanjut (or Hunza) and Nagar the valleys are deeply sunk between mountain ranges, which are nowhere less than 15,000 ft. in altitude, and which must average above 20,000 ft. As a rule, these valleys are bare of vegetation. Where the summits of the loftier ranges are not buried beneath snow and ice they are bare, bleak and splintered, and the nakedness of the rock scenery extends down their rugged spurs to the very base of them. On the lower slopes of tumbled débris the sun in summer beats with an intensity which is

unmitigated by the cloud drifts which form in the moister atmosphere of the monsoon-swept summits of the Himalaya. Sun-baked in summer and frost-riven in winter, the mountain sides are but immense ramps of loose rock débris, only awaiting the yearly melting of the upper snow-fields, or the advent of a casual rainstorm, to be swept downwards in an avalanche of mud and stones into the gorges below. Here it becomes piled and massed together, till the pressure of accumulation forces it out into the main valleys, where it spreads in alluvial fans and silts up the plains. This formation is especially marked throughout the high level valleys of the Gilgit basin.

Passes.—Each of these northern affluents of the main stream is headed by a pass, or a group of passes, leading either to the Pamir region direct, or into the upper Yarkhun valley from which a Pamir route diverges. The Yasin valley is headed by the Darkôt pass (15,000 ft.), which drops into the Yarkhun not far from the foot of the Baroghil group over the main Hindu Kush watershed. The Ashkuman is headed by the Gazar and Kora Bohrt passes, leading to the valley of the Ab-i-Punja; and the Hunza by the Kilik and Mintaka, the connecting links between the Taghdumbash Pamir and the Gilgit basin. They are all about the same height—15,000 ft. All are passable at certain times of the year to small parties, and all are uncertain. In no case do they present insuperable difficulties in themselves, glaciers and snow-fields and mountain staircases being common to all; but the gorges and precipices which distinguish the approaches to them from the south, the slippery sides of shelving spurs whose feet are washed by raging torrents, the perpetual weary monotony of ascent and descent over successive ridges multiplying the gradient indefinitely—these form the real obstacles blocking the way to these northern passes.

Gilgit Station.—The pretty little station of Gilgit (4890 ft. above sea) spreads itself in terraces above the right bank of the river nearly opposite the opening leading to Hunza, almost nestling under the cliffs of the Hindu Koh, which separates it on the south from the savage mountain wilderness of Darel and Kohistan. It includes a residency for the British political officer, with about half a dozen homes for the accommodation of officials, barracks suitable for a battalion of Kashmir troops, and a hospital. Evidences of Buddhist occupation are not wanting in Gilgit, though they are few and unimportant. Such as they are, they appear to prove that Gilgit was once a Buddhist centre, and that the old Buddhist route between Gilgit and the Peshawar plain passed through the gorges and clefts of the unexplored Darel valley to Thakot under the northern spurs of the Black Mountain.

Connexion with India.—The Gilgit river joins the Indus a few miles above the little post of Bunji, where an excellent suspension bridge spans the river. The valley is low and hot, and the scenery between Gilgit and Bunji is monotonous; but the road is now maintained in excellent condition. A little below Bunji the Astor river joins the Indus from the south-east, and this deep pine-clad valley indicates the continuation of the highroad from Gilgit to Kashmir via the Tragbal and Burzil passes. Another well-known route connecting Gilgit with the Abbottabad frontier of the Punjab lies across the Babusar pass (13,000 ft.), linking the lovely Hazara valley of Kaghan to Chilas; Chilas (4150 ft.) being on the Indus, some 50 m. below Bunji. This is a more direct connexion between Gilgit and the plains of the Punjab than that afforded by the Kashmir route via Gurais and Astor, which latter route involves two considerable passes—the Tragbal (11,400) and the Burzil (13,500); but the intervening strip of absolutely independent territory (independent alike of Kashmir and the Punjab), which includes the hills bordering the road from the Babusar pass to Chilas, renders it a risky route for travellers unprotected by a military escort. Like the Kashmir route, it is now defined by a good military road.

History.—The Dards are located by Ptolemy with surprising accuracy (*Daradae*) on the west of the Upper Indus, beyond the head-waters of the Swat river (*Soastus*), and north of the *Gandarae*, *i.e.* the Gandharis, who occupied Peshawar and the country north of it. The *Dardas* and *Chinas* also appear in many of the old Pauranic lists of peoples, the latter probably representing the *Shin* branch of the Dards. This region was traversed by two of the Chinese pilgrims of the early centuries of our era, who have left records of their journeys, viz. Fahien, coming from the north, c. 400, and Hsüan Tsang, ascending from Swat, *c.* 631. The latter says: “Perilous were the roads, and dark the gorges. Sometimes the pilgrim had to pass by loose cords, sometimes by light stretched iron chains. Here there were ledges hanging in mid-air; there flying bridges across abysses; elsewhere paths cut with the chisel, or footings to climb by.” Yet even in these inaccessible regions were found great convents, and miraculous images of Buddha. How old the name of *Gilgit* is we do not know, but it occurs in the writings of the great Mahommedan savant al-Biruni, in his notices of Indian geography. Speaking of Kashmir, he says: “Leaving the ravine by which you enter Kashmir and entering the plateau, then you have for a march of two more days on your left the mountains of Bolor and Shamilan, Turkish tribes who are called *Bhattavaryan*. Their king has the title Bhatta-Shah. Their towns are *Gilgit*, Aswira and Shiltash, and their language is the Turkish. Kashmir suffers much from their inroads” (Trs. Sachau, i. 207). There are difficult matters for discussion here. It is impossible to say what ground the writer had for calling the people *Turks*. But it is curious that the *Shins* say they are all of the same race as the Moguls of India, whatever they may mean by that. Gilgit, as far back as tradition goes, was ruled by rajas of a family called Trakane. When this family became extinct the valley was desolated by successive invasions of neighbouring rajas, and in the 20 or 30 years ending with 1842 there had been five dynastic revolutions. The most prominent character in the history was a certain Gaur Rahman or Gauhar Aman, chief of Yasin, a cruel savage and man-seller, of whom many evil deeds are told. Being remonstrated with for selling a *mullah*, he said, “Why not? The Koran, the word of God, is sold; why not sell the expounder thereof?” The Sikhs entered Gilgit about 1842, and kept a garrison there. When Kashmir was made over to Maharaja Gulab Singh of Jammu in 1846, by Lord Hardinge, the Gilgit claims were transferred with it. And when a commission was sent to lay down boundaries of the tracts made over, Mr Vans Agnew (afterwards murdered at Multan) and Lieut. Ralph Young of the Engineers visited Gilgit, the first Englishmen who did so. The Dogras (Gulab Singh’s race) had much ado to hold

their ground, and in 1852 a catastrophe occurred, parallel on a smaller scale to that of the English troops at Kabul. Nearly 2000 men of theirs were exterminated by Gaur Rahman and a combination of the Dards; only one person, a soldier's wife, escaped, and the Dogras were driven away for eight years. Gulab Singh would not again cross the Indus, but after his death (in 1857) Maharaja Ranbir Singh longed to recover lost prestige. In 1860 he sent a force into Gilgit. Gaur Rahman just then died, and there was little resistance. The Dogras after that took Yasin twice, but did not hold it. They also, in 1866, invaded Darel, one of the most secluded Dard states, to the south of the Gilgit basin, but withdrew again. In 1889, in order to guard against the advance of Russia, the British government, acting as the suzerain power of Kashmir, established the Gilgit agency; in 1901, on the formation of the North-West Frontier province, the rearrangement was made as stated above.

AUTHORITIES.—Biddulph, *The Tribes of the Hindu Kush* (Calcutta, 1880); W. Lawrence, *The Kashmir Valley* (London, 1895); Tanner, "Our Present Knowledge of the Himalaya," *Proc. R.G.S.* vol. xiii., 1891; Durand, *Making a Frontier* (London, 1899); *Report of Lockhart's Mission* (Calcutta, 1886); E. F. Knight, *Where Three Empires Meet* (London, 1892); F. Younghusband, "Journeys in the Pamirs and Adjacent Countries," *Proc. R.G.S.* vol. xiv., 1892; Curzon, "Pamirs," *Jour. R.G.S.* vol. viii., 1896; Leitnér, *Dardistan* (1877).

(T. H. H.*)

GILL, JOHN (1697-1771), English Nonconformist divine, was born at Kettering, Northamptonshire. His parents were poor and he owed his education chiefly to his own perseverance. In November 1716 he was baptized and began to preach at Higham Ferrers and Kettering, until the beginning of 1719, when he became pastor of the Baptist congregation at Horsleydown in Southwark. There he continued till 1757, when he removed to a chapel near London Bridge. From 1729 to 1756 he was Wednesday evening lecturer in Great Eastcheap. In 1748 he received the degree of D.D. from the university of Aberdeen. He died at Camberwell on the 14th of October 1771. Gill was a great Hebrew scholar, and in his theology a sturdy Calvinist.

His principal works are *Exposition of the Song of Solomon* (1728); *The Prophecies of the Old Testament respecting the Messiah* (1728); *The Doctrine of the Trinity* (1731); *The Cause of God and Truth* (4 vols., 1731); *Exposition of the Bible*, in 10 vols. (1746-1766), in preparing which he formed a large collection of Hebrew and Rabbinical books and MSS.; *The Antiquity of the Hebrew Language—Letters, Vowel Points, and Accents* (1767); *A Body of Doctrinal Divinity* (1767); *A Body of Practical Divinity* (1770); and *Sermons and Tracts*, with a memoir of his life (1773). An edition of his *Exposition of the Bible* appeared in 1816 with a memoir by John Rippon, which has also appeared separately.

GILL. (1) One of the *branchiae* which form the breathing apparatus of fishes and other animals that live in the water. The word is also applied to the *branchiae* of some kinds of worm and arachnids, and by transference to objects resembling the *branchiae* of fishes, such as the wattles of a fowl, or the radiating films on the under side of fungi. The word is of obscure origin. Danish has *giaelle*, and Swedish *gäl* with the same meaning. The root which appears in "yawn," "chasm," has been suggested. If this be correct, the word will be in origin the same as "gill," often spelled "ghyll," meaning a glen or ravine, common in northern English dialects and also in Kent and Surrey. The *g* in both these words is hard. (2) A liquid measure usually holding one-fourth of a pint. The word comes through the O. Fr. *gelle*, from Low Lat. *gello* or *gillo*, a measure for wine. It is thus connected with "gallon." The *g* is soft. (3) An abbreviation of the feminine name Gillian, also often spelled Jill, as it is pronounced. Like Jack for a boy, with which it is often coupled, as in the nursery rhyme, it is used as a homely generic name for a girl.

GILLES DE ROYE, or EGIDIUS DE ROYA (d. 1478), Flemish chronicler, was born probably at Montdidier, and became a Cistercian monk. He was afterwards professor of theology in Paris and abbot of the monastery of Royaumont at Asnières-sur-Oise, retiring about 1458 to the convent of Notre Dame des Dunes, near Furnes, and devoting his time to study. Gilles wrote the *Chronicon Dunense* or *Annales Belgici*, a résumé and continuation of the work of another monk, Jean Brandon (d. 1428), which deals with the history of Flanders, and also with events in Germany, Italy and England from 792 to 1478.

The Chronicle was published by F. R. Sweert in the *Rerum Belgicarum annales* (Frankfort, 1620); and the earlier part of it by C. B. Kervyn de Lettenhove in the *Chroniques relatives à l'histoire de la*

Belgique (Brussels, 1870).

GILLES LI MUISIS, or Le Muiset (*c.* 1272-1352), French chronicler, was born probably at Tournai, and in 1289 entered the Benedictine abbey of St Martin in his native city, becoming prior of this house in 1327, and abbot four years later. He only secured the latter position after a contest with a competitor, but he appears to have been a wise ruler of the abbey. Gilles wrote two Latin chronicles, *Chronicon majus* and *Chronicon minus*, dealing with the history of the world from the creation until 1349. This work, which was continued by another writer to 1352, is valuable for the history of northern France, and Flanders during the first half of the 14th century. It is published by J. J. de Senet in the *Corpus chronicorum Flandriae*, tome ii. (Brussels, 1841); Gilles also wrote some French poems, and these *Poésies de Gilles li Muisis* have been published by Baron Kervyn de Lettenhove (Louvain, 1882).

See A. Molinier, *Les Sources de l'histoire de France*, tome iii. (Paris, 1903).

GILLESPIE, GEORGE (1613-1648), Scottish divine, was born at Kirkcaldy, where his father, John Gillespie, was parish minister, on the 21st of January 1613, and entered the university of St Andrews as a "presbytery bursar" in 1629. On the completion of a brilliant student career, he became domestic chaplain to John Gordon, 1st Viscount Kenmure (d. 1634), and afterwards to John Kennedy, earl of Cassillis, his conscience not permitting him to accept the episcopal ordination which was at that time in Scotland an indispensable condition of induction to a parish. While with the earl of Cassillis he wrote his first work, *A Dispute against the English Popish Ceremonies obtruded upon the Church of Scotland*, which, opportunely published shortly after the "Jenny Geddes" incident (but without the author's name) in the summer of 1637, attracted considerable attention, and within a few months had been found by the privy council to be so damaging that by their orders all available copies were called in and burnt. In April 1638, soon after the authority of the bishops had been set aside by the nation, Gillespie was ordained minister of Wemyss (Fife) by the presbytery of Kirkcaldy, and in the same year was a member of the famous Glasgow Assembly, before which he preached (November 21st) a sermon against royal interference in matters ecclesiastical so pronounced, as to call for some remonstrance on the part of Argyll, the lord high commissioner. In 1642 Gillespie was translated to Edinburgh; but the brief remainder of his life was chiefly spent in the conduct of public business in London. Already, in 1640, he had accompanied the commissioners of the peace to England as one of their chaplains; and in 1643 he was appointed by the Scottish Church one of the four commissioners to the Westminster Assembly. Here, though the youngest member of the Assembly, he took a prominent part in almost all the protracted discussions on church government, discipline and worship, supporting Presbyterianism by numerous controversial writings, as well as by an unusual fluency and readiness in debate. Tradition long preserved and probably enhanced the record of his victories in debate, and especially of his encounter, with John Selden on Matt. xviii. 15-17. In 1645 he returned to Scotland, and is said to have drawn the act of assembly sanctioning the directory of public worship. On his return to London he had a hand in drafting the Westminster confession of faith, especially chap. i. Gillespie was elected moderator of the Assembly in 1648, but the laborious duties of that office (the court continued to sit from the 12th of July to the 12th of August) told fatally on an overtaxed constitution; he fell into consumption, and, after many weeks of great weakness, he died at Kirkcaldy on the 17th of December 1648. In acknowledgment of his great public services, a sum of £1000 Scots was voted, though destined never to be paid, to his widow and children by the committee of estates. A simple tombstone, which had been erected to his memory in Kirkcaldy parish church, was in 1661 publicly broken at the cross by the hand of the common hangman, but was restored in 1746.

His principal publications were controversial and chiefly against Erastianism: Three sermons against Thomas Coleman; *A Sermon before the House of Lords* (August 27th), on Matt. iii. 2, *Nihil Respondem* and *Male Audis*; *Aaron's Rod Blossoming, or the Divine Ordinance of Church-government vindicated* (1646), which is deservedly regarded as a really able statement of the case for an exclusive spiritual jurisdiction in the church; *One Hundred and Eleven Propositions concerning the Ministry and Government of the Church* (Edinburgh, 1647). The following were posthumously published by his brother: *A Treatise of Miscellany Questions* (1649); *The Ark of the New Testament* (2 vols., 1661-1667); *Notes of Debates and Proceedings of the Assembly of Divines at Westminster, from February 1644 to January 1645*. See *Works*, with memoir, published by Hetherington (Edinburgh, 1843-1846).

GILLESPIE, THOMAS (1708-1774), Scottish divine, was born at Clearburn, in the parish of

Duddingston, Midlothian, in 1708. He was educated at the university of Edinburgh, and studied divinity first at a small theological seminary at Perth, and afterwards for a brief period under Philip Doddridge at Northampton, where he received ordination in January 1741. In September of the same year he was admitted minister of the parish of Carnock, Fife, the presbytery of Dunfermline agreeing not only to sustain as valid the ordination he had received in England, but also to allow a qualification of his subscription to the church's doctrinal symbol, so far as it had reference to the sphere of the civil magistrate in matters of religion. Having on conscientious grounds persistently absented himself from the meetings of presbytery held for the purpose of ordaining one Andrew Richardson, an unacceptable presentee, as minister of Inverkeithing, he was, after an unobtrusive but useful ministry of ten years, deposed by the Assembly of 1752 for maintaining that the refusal of the local presbytery to act in this case was justified. He continued, however, to preach, first at Carnock, and afterwards in Dunfermline, where a large congregation gathered round him. His conduct under the sentence of deposition produced a reaction in his favour, and an effort was made to have him reinstated; this he declined unless the policy of the church were reversed. In 1761, in conjunction with Thomas Boston of Jedburgh and Collier of Colinsburgh, he formed a distinct communion under the name of "The Presbytery of Relief,"—relief, that is to say, "from the yoke of patronage and the tyranny of the church courts." The Relief Church eventually became one of the communions combining to form the United Presbyterian Church. He died on the 19th of January 1774. His only literary efforts were an *Essay on the Continuation of Immediate Revelations in the Church, and a Practical Treatise on Temptation*. Both works appeared posthumously (1774). In the former he argues that immediate revelations are no longer vouchsafed to the church, in the latter he traces temptation to the work of a personal devil.

See Lindsay's *Life and Times of the Rev. Thomas Gillespie*; Smithers's *History of the Relief Church*; for the Relief Church see United Presbyterian Church.

GILLIE (from the Gael. *gille*, Irish *gille* or *giolla*, a servant or boy), an attendant on a Gaelic chieftain; in this sense its use, save historically, is rare. The name is now applied in the Highlands of Scotland to the man-servant who attends a sportsman in shooting or fishing. A *gillie-wetfoot*, a term now obsolete (a translation of *gillie-casfliuch*, from the Gaelic *cas*, foot, and *fliuch*, wet), was the gillie whose duty it was to carry his master over streams. It became a term of contempt among the Lowlanders for the "tail" (as his attendants were called) of a Highland chief.

GILLIES, JOHN (1747-1836), Scottish historian and classical scholar, was born at Brechin, in Forfarshire, on the 18th of January 1747. He was educated at Glasgow University, where, at the age of twenty, he acted for a short time as substitute for the professor of Greek. In 1784 he completed his *History of Ancient Greece, its Colonies and Conquests* (published 1786). This work, valuable at a time when the study of Greek history was in its infancy, and translated into French and German, was written from a strong Whig bias, and is now entirely superseded (see Greece: *Ancient History*, "Authorities"). On the death of William Robertson (1721-1793), Gillies was appointed historiographer-royal for Scotland. In his old age he retired to Clapham, where he died on the 15th of February 1836.

Of his other works, none of which are much read, the principal are: *View of the Reign of Frederic II. of Prussia, with a Parallel between that Prince and Philip II. of Macedon* (1789), rather a panegyric than a critical history; translations of Aristotle's *Rhetoric* (1823) and *Ethics and Politics* (1786-1797); of the *Orations* of Lysias and Isocrates (1778); and *History of the World from Alexander to Augustus* (1807), which, although deficient in style, was commended for its learning and research.

GILLINGHAM, a market town in the northern parliamentary division of Dorsetshire, England, 105 m. W.S.W. from London by the London & South-Western railway. Pop. (1901) 3380. The church of St Mary the Virgin has a Decorated chancel. There is a large agricultural trade, and manufactures of bricks and tiles, cord, sacking and silk, brewing and bacon-curing are carried on. The rich undulating district in which Gillingham is situated was a forest preserved by King John and his successors, and the site of their lodge is traceable near the town.

GILLINGHAM, a municipal borough of Kent, England, in the parliamentary borough of Chatham and the mid-division of the county, on the Medway immediately east of Chatham, on the South-Eastern & Chatham railway. Pop. (1891) 27,809; (1901) 42,530. Its population is largely industrial, employed in the Chatham dockyards, and in cement and brick works in the neighbourhood. The church of St Mary Magdalene ranges in date from Early English to Perpendicular, retaining also traces of Norman work and some early brasses. A great battle between Edmund Ironside and Canute, *c.* 1016, is placed here; and there was formerly a palace of the archbishops of Canterbury. Gillingham was incorporated in 1903, and is governed by a mayor, 6 aldermen and 18 councillors. The borough includes the populous districts of Brompton and New Brompton. Area, 4355 acres.

GILLOT, CLAUDE (1673-1722), French painter, best known as the master of Watteau and Lancret, was born at Langres. His sportive mythological landscape pieces, with such titles as “Feast of Pan” and “Feast of Bacchus,” opened the Academy of Painting at Paris to him in 1715; and he then adapted his art to the fashionable tastes of the day, and introduced the decorative *fêtes champêtres*, in which he was afterwards surpassed by his pupils. He was also closely connected with the opera and theatre as a designer of scenery and costumes.

GILLOTT, JOSEPH (1799-1873); English pen-maker, was born at Sheffield on the 11th of October 1799. For some time he was a working cutler there, but in 1821 removed to Birmingham, where he found employment in the “steel toy” trade, the technical name for the manufacture of steel buckles, chains and light ornamental steel-work generally. About 1830 he turned his attention to the manufacture of steel pens by machinery, and in 1831 patented a process for placing elongated points on the nibs of pens. Subsequently he invented other improvements, getting rid of the hardness and lack of flexibility, which had been a serious defect in nibs, by cutting, in addition to the centre slit, side slits, and cross grinding the points. By 1859 he had built up a very large business. Gillott was a liberal art-patron, and one of the first to recognize the merits of J. M. W. Turner. He died at Birmingham on the 5th of January 1873. His collection of pictures, sold after his death, realized £170,000.

GILLOW, ROBERT (d. 1773), the founder at Lancaster of a distinguished firm of English cabinet-makers and furniture designers whose books begin in 1731. He was succeeded by his eldest son Richard (1734-1811), who after being educated at the Roman Catholic seminary at Douai was taken into partnership about 1757, when the firm became Gillow & Barton, and his younger sons Robert and Thomas, and the business was continued by his grandson Richard (1778-1866). In its early days the firm of Gillow were architects as well as cabinet-makers, and the first Richard Gillow designed the classical Custom House at Lancaster. In the middle of the 18th century the business was extended to London, and about 1761 premises were opened in Oxford Street on a site which was continuously occupied until 1906. For a long period the Gillows were the best-known makers of English furniture—Sheraton and Heppelwhite both designed for them, and replicas are still made of pieces from the drawings of Robert Adam. Between 1760 and 1770 they invented the original form of the billiard-table; they were the patentees (about 1800) of the telescopic dining-table which has long been universal in English houses; for a Captain Davenport they made, if they did not invent, the first writing-table of that name. Their vogue is indicated by references to them in the works of Jane Austen, Thackeray and the first Lord Lytton, and more recently in one of Gilbert and Sullivan’s comic operas.

GILLRAY, JAMES (1757-1815), English caricaturist, was born at Chelsea in 1757. His father, a native of Lanark, had served as a soldier, losing an arm at Fontenoy, and was admitted first as an inmate, and afterwards as an outdoor pensioner, at Chelsea hospital. Gillray commenced life by learning letter-engraving, in which he soon became an adept. This employment, however, proving irksome, he wandered about for a time with a company of strolling players. After a very checkered experience he returned to London, and was admitted a student in the Royal Academy, supporting himself by engraving, and probably issuing a considerable number of caricatures under fictitious

names. Hogarth's works were the delight and study of his early years. "Paddy on Horseback," which appeared in 1779, is the first caricature which is certainly his. Two caricatures on Rodney's naval victory, issued in 1782, were among the first of the memorable series of his political sketches. The name of Gillray's publisher and printseller, Miss Humphrey—whose shop was first at 227 Strand, then in New Bond Street, then in Old Bond Street, and finally in St James's Street—is inextricably associated with that of the caricaturist. Gillray lived with Miss (often called Mrs) Humphrey during all the period of his fame. It is believed that he several times thought of marrying her, and that on one occasion the pair were on their way to the church, when Gillray said: "This is a foolish affair, methinks, Miss Humphrey. We live very comfortably together; we had better let well alone." There is no evidence, however, to support the stories which scandalmongers invented about their relations. Gillray's plates were exposed in Humphrey's shop window, where eager crowds examined them. A number of his most trenchant satires are directed against George III., who, after examining some of Gillray's sketches, said, with characteristic ignorance and blindness to merit, "I don't understand these caricatures." Gillray revenged himself for this utterance by his splendid caricature entitled, "A Connoisseur Examining a Cooper," which he is doing by means of a candle on a "save-all"; so that the sketch satirizes at once the king's pretensions to knowledge of art and his miserly habits.

The excesses of the French Revolution made Gillray conservative; and he issued caricature after caricature, ridiculing the French and Napoleon, and glorifying John Bull. He is not, however, to be thought of as a keen political adherent of either the Whig or the Tory party; he dealt his blows pretty freely all round. His last work, from a design by Bunbury, is entitled "Interior of a Barber's Shop in Assize Time," and is dated 1811. While he was engaged on it he became mad, although he had occasional intervals of sanity, which he employed on his last work. The approach of madness must have been hastened by his intemperate habits. Gillray died on the 1st of June 1815, and was buried in St James's churchyard, Piccadilly.

The times in which Gillray lived were peculiarly favourable to the growth of a great school of caricature. Party warfare was carried on with great vigour and not a little bitterness; and personalities were freely indulged in on both sides. Gillray's incomparable wit and humour, knowledge of life, fertility of resource, keen sense of the ludicrous, and beauty of execution, at once gave him the first place among caricaturists. He is honourably distinguished in the history of caricature by the fact that his sketches are real works of art. The ideas embodied in some of them are sublime and poetically magnificent in their intensity of meaning; while the coarseness by which others are disfigured is to be explained by the general freedom of treatment common in all intellectual departments in the 18th century. The historical value of Gillray's work has been recognized by accurate students of history. As has been well remarked: "Lord Stanhope has turned Gillray to account as a veracious reporter of speeches, as well as a suggestive illustrator of events." His contemporary political influence is borne witness to in a letter from Lord Bateman, dated November 3, 1798. "The Opposition," he writes to Gillray, "are as low as we can wish them. You have been of infinite service in lowering them, and making them ridiculous." Gillray's extraordinary industry may be inferred from the fact that nearly 1000 caricatures have been attributed to him; while some consider him the author of 1600 or 1700. He is invaluable to the student of English manners as well as to the political student. He attacks the social follies of the time with scathing satire; and nothing escapes his notice, not even a trifling change of fashion in dress. The great tact Gillray displays in hitting on the ludicrous side of any subject is only equalled by the exquisite finish of his sketches—the finest of which reach an epic grandeur and Miltonic sublimity of conception.

> Gillray's caricatures are divided into two classes, the political series and the social. The political caricatures form really the best history extant of the latter part of the reign of George III. They were circulated not only over Britain but throughout Europe, and exerted a powerful influence. In this series, George III., the queen, the prince of Wales, Fox, Pitt, Burke and Napoleon are the most prominent figures. In 1788 appeared two fine caricatures by Gillray. "Blood on Thunder fording the Red Sea" represents Lord Thurlow carrying Warren Hastings through a sea of gore: Hastings looks very comfortable, and is carrying two large bags of money. "Market-Day" pictures the ministerialists of the time as horned cattle for sale. Among Gillray's best satires on the king are: "Farmer George and his Wife," two companion plates, in one of which the king is toasting muffins for breakfast, and in the other the queen is frying sprats; "The Anti-Saccharites," where the royal pair propose to dispense with sugar, to the great horror of the family; "A Connoisseur Examining a Cooper"; "Temperance enjoying a Frugal Meal"; "Royal Affability"; "A Lesson in Apple Dumplings"; and "The Pigs Possessed." Among his other political caricatures may be mentioned: "Britannia between Scylla and Charybdis," a picture in which Pitt, so often Gillray's butt, figures in a favourable light; "The Bridal Night"; "The Apotheosis of Hoche," which concentrates the excesses of the French Revolution in one view; "The Nursery with Britannia reposing in Peace"; "The First Kiss these Ten Years" (1803), another satire on the peace, which is said to have greatly amused Napoleon; "The Handwriting upon the Wall"; "The Confederated Coalition," a fling at the coalition which superseded the Addington ministry; "Uncorking Old Sherry"; "The Plum-Pudding in Danger"; "Making Decent," *i.e.* "Broad-bottomites getting into the Grand Costume"; "Comforts of a Bed of Roses"; "View of the Hustings in Covent Garden"; "Phaëthon Alarmed"; and "Pandora opening her Box." The miscellaneous series of caricatures, although they have scarcely the historical importance of the political series, are more readily intelligible, and are even more amusing. Among the finest are: "Shakespeare Sacrificed"; "Flemish Characters" (two plates); "Twopenny Whist"; "Oh! that this too solid flesh would melt"; "Sandwich Carrots"; "The Gout"; "Comfort to the Corns"; "Begone Dull Care"; "The Cow-Pock," which gives humorous expression to the popular dread of vaccination; "Dilletanti Theatricals"; and "Harmony before Matrimony" and "Matrimonial Harmonics"—two exceedingly good sketches in violent contrast to each other.

A selection of Gillray's works appeared in parts in 1818; but the first good edition was Thomas M'Lean's, which was published, with a key, in 1830. A somewhat bitter attack, not only on Gillray's character, but even on his genius, appeared in the *Athenaeum* for October 1, 1831, which was successfully refuted by J. Landseer in the *Athenaeum* a fortnight later. In 1851 Henry G. Bohn put out an edition, from the original plates, in a handsome folio, the coarser sketches being published in a separate volume. For this edition Thomas Wright and R. H. Evans wrote a valuable commentary, which is a good history of the times embraced by the caricatures. The next edition, entitled *The Works of James Gillray, the Caricaturist: with the Story of his Life and Times* (Chatto & Windus, 1874), was the work of Thomas Wright, and, by its popular exposition and narrative, introduced Gillray to a very large circle formerly ignorant of him. This edition, which is complete in one volume, contains two portraits of Gillray, and upwards of 400 illustrations. Mr J. J. Cartwright, in a letter to the *Academy* (Feb. 28, 1874), drew attention to the existence of a MS. volume, in the British Museum, containing letters to and from Gillray, and other illustrative documents. The extracts he gave were used in a valuable article in the *Quarterly Review* for April 1874. See also the *Academy* for Feb. 21 and May 16, 1874.

There is a good account of Gillray in Wright's *History of Caricature and Grotesque in Literature and Art* (1865); See also the article CARICATURE.

GILLYFLOWER, a popular name applied to various flowers, but principally to the clove, *Dianthus Caryophyllus*, of which the carnation is a cultivated variety, and to the stock, *Matthiola incana*, a well-known garden favourite. The word is sometimes written gilliflower or gilloflower, and is reputedly a corruption of July-flower, "so called from the month they blow in." Henry Phillips (1775-1838); in his *Flora historica*, remarks that Turner (1568) "calls it gelouer, to which he adds the word stock, as we would say gelouers that grow on a stem or stock, to distinguish them from the clove-gelouers and the wall-gelouers. Gerard, who succeeded Turner, and after him Parkinson, calls it gilloflower, and thus it travelled from its original orthography until it was called July-flower by those who knew not whence it was derived." Dr Prior, in his useful volume on the *Popular Names of British Plants*, very distinctly shows the origin of the name. He remarks that it was "formerly spelt gyllofer and gilofre with the *o* long, from the French *giroflée*, Italian *garofalo* (M. Lat. *gariofilum*), corrupted from the Latin *Caryophyllum*, and referring to the spicy odour of the flower, which seems to have been used in flavouring wine and other liquors to replace the more costly clove of India. The name was originally given in Italy to plants of the pink tribe, especially the carnation, but has in England been transferred of late years to several cruciferous plants." The gillyflower of Chaucer and Spenser and Shakespeare was, as in Italy, *Dianthus Caryophyllus*; that of later writers and of gardeners, *Matthiola*. Much of the confusion in the names of plants has doubtless arisen from the vague use of the French terms *giroflée*, *œillet* and *violette*, which were all applied to flowers of the pink tribe, but in England were subsequently extended and finally restricted to very different plants. The use made of the flowers to impart a spicy flavour to ale and wine is alluded to by Chaucer, who writes:

"And many a clove gilofre
To put in ale";

also by Spenser, who refers to them by the name of sops in wine, which was applied in consequence of their being steeped in the liquor. In both these cases, however, it is the clove-gillyflower which is intended, as it is also in the passage from Gerard, in which he states that the conserve made of the flowers with sugar "is exceeding cordiall, and wonderfully above measure doth comfort the heart, being eaten now and then." The principal other plants which bear the name are the wallflower, *Cheiranthus Cheiri*, called wall-gillyflower in old books; the dame's violet, *Hesperis matronalis*, called variously the queen's, the rogue's and the winter gillyflower; the ragged-robin, *Lychnis Flos-cuculi*, called marsh-gillyflower and cuckoo-gillyflower; the water-violet, *Hottonia palustris*, called water-gillyflower; and the thrift, *Armeria vulgaris*, called sea-gillyflower. As a separate designation it is nowadays usually applied to the wallflower.

GILMAN, DANIEL COIT (1831-1908), American educationist, was born in Norwich, Connecticut, on the 6th of July 1831. He graduated at Yale in 1852, studied in Berlin, was assistant librarian of Yale in 1856-1858 and librarian in 1858-1865, and was professor of physical and political geography in the Sheffield Scientific School of Yale University and a member of the Governing Board of this School in 1863-1872. From 1856 to 1860 he was a member of the school board of New Haven, and from August 1865 to January 1867 secretary of the Connecticut Board of Education. In 1872 he became president of the University of California at Berkeley. On the 30th of December 1874 he was elected first president of Johns Hopkins University (*q.v.*) at Baltimore. He entered upon his duties on the 1st of May 1875, and was formally inaugurated on the 22nd of February 1876. This post he filled until 1901. From 1901 to 1904 he was the first president of the Carnegie Institution at Washington, D.C. He died at Norwich,

Conn., on the 13th of October 1908. He received the honorary degree of LL.D. from Harvard, St John's, Columbia, Yale, North Carolina, Princeton, Toronto, Wisconsin and Clark Universities, and William and Mary College. His influence upon higher education in America was great, especially at Johns Hopkins, where many wise details of administration, the plan of bringing to the university as lecturers for a part of the year scholars from other colleges, the choice of a singularly brilliant and able faculty, and the marked willingness to recognize workers in new branches of science were all largely due to him. To the organization of the Johns Hopkins hospital, of which he was made director in 1889, he contributed greatly. He was a singularly good judge of men and an able administrator, and under him Johns Hopkins had an immense influence, especially in the promotion of original and productive research. He was always deeply interested in the researches of the professors at Johns Hopkins, and it has been said of him that his attention as president was turned inside and not outside the university. He was instrumental in determining the policy of the Sheffield Scientific School of Yale University while he was a member of its governing board; on the 28th of October 1897 he delivered at New Haven a semi-centennial discourse on the school, which appears in his *University Problems*. He was a prominent member of the American Archaeological Society and of the American Oriental Society; was one of the original trustees of the John F. Slater Fund (for a time he was secretary, and from 1893 until his death was president of the board); from 1891 until his death was a trustee of the Peabody Educational Fund (being the vice-president of the board); and was an original member of the General Education Board (1902) and a trustee of the Russell Sage Foundation for Social Betterment (1907). In 1896-1897 he served on the Venezuela Boundary Commission appointed by President Cleveland. In 1901 he succeeded Carl Schurz as president of the National Civil Service Reform League and served until 1907. Some of his papers and addresses are collected in a volume entitled *University Problems in the United States* (1888). He wrote, besides, *James Monroe* (1883), in the American Statesmen Series; a *Life of James D. Dana*, the geologist (1899); *Science and Letters at Yale* (1901), and *The Launching of a University* (1906), an account of the early years of Johns Hopkins.

GILMORE, PATRICK SARSFIELD (1829-1892), American bandmaster, was born in Ireland, and settled in America about 1850. He had been in the band of an Irish regiment, and he had great success as leader of a military band at Salem, Massachusetts, and subsequently (1859) in Boston. He increased his reputation during the Civil War, particularly by organizing a monster orchestra of massed bands for a festival at New Orleans in 1864; and at Boston in 1869 and 1872 he gave similar performances. He was enormously popular as a bandmaster, and composed or arranged a large variety of pieces for orchestra. He died at St Louis on the 24th of September 1892.

GILPIN, BERNARD (1517-1583), the "Apostle of the North," was descended from a Westmorland family, and was born at Kentmere in 1517. He was educated at Queen's College, Oxford, graduating B.A. in 1540, M.A. in 1542 and B.D. in 1549. He was elected fellow of Queen's and ordained in 1542; subsequently he was elected student of Christ Church. At Oxford he first adhered to the conservative side, and defended the doctrines of the church against Hooper; but his confidence was somewhat shaken by another public disputation which he had with Peter Martyr. In 1552 he preached before King Edward VI. a sermon on sacrilege, which was duly published, and displays the high ideal which even then he had formed of the clerical office; and about the same time he was presented to the vicarage of Norton, in the diocese of Durham, and obtained a licence, through William Cecil, as a general preacher throughout the kingdom as long as the king lived. On Mary's accession he went abroad to pursue his theological investigations at Louvain, Antwerp and Paris; and from a letter of his own, dated Louvain, 1554, we get a glimpse of the quiet student rejoicing in an "excellent library belonging to a monastery of Minorites." Returning to England towards the close of Queen Mary's reign, he was invested by his mother's uncle, Tunstall, bishop of Durham, with the archdeaconry of Durham, to which the rectory of Easington was annexed. The freedom of his attacks on the vices, and especially the clerical vices, of his times excited hostility against him, and he was formally brought before the bishop on a charge consisting of thirteen articles. Tunstall, however, not only dismissed the case, but presented the offender with the rich living of Houghton-le-Spring; and when the accusation was again brought forward, he again protected him. Enraged at this defeat, Gilpin's enemies laid their complaint before Bonner, bishop of London, who secured a royal warrant for his apprehension. Upon this Gilpin prepared for martyrdom; and, having ordered his house-steward to provide him with a long garment, that he might "goe the more comely to the stake," he set out for London. Fortunately, however, for him, he broke his leg on the journey, and his arrival was thus delayed till the news of Queen Mary's death freed him from further danger. He at once returned to Houghton, and there he continued to labour till his death on the 4th of March 1583. When the Roman Catholic bishops were deprived he was offered the see of Carlisle; but he declined this honour and also the provostship of Queen's, which was offered him in 1560. At Houghton his course of life was a ceaseless round of benevolent activity. In June 1560 he entertained Cecil and Dr Nicholas Wotton on their way to

Edinburgh. His hospitable manner of living was the admiration of all. His living was a comparatively rich one, his house was better than many bishops' palaces, and his position was that of a clerical magnate. In his household he spent "every fortnight 40 bushels of corn, 20 bushels of malt and an ox, besides a proportional quantity of other kinds of provisions." Strangers and travellers found a ready reception; and even their horses were treated with so much care that it was humorously said that, if one were turned loose in any part of the country, it would immediately make its way to the rector of Houghton. Every Sunday from Michaelmas till Easter was a public day with Gilpin. For the reception of his parishioners he had three tables well covered—one for gentlemen, the second for husbandmen, the third for day-labourers; and this piece of hospitality he never omitted, even when losses or scarcity made its continuance difficult. He built and endowed a grammar-school at a cost of upwards of £500, educated and maintained a large number of poor children at his own charge, and provided the more promising pupils with means of studying at the universities. So many young people, indeed, flocked to his school that there was not accommodation for them in Houghton, and he had to fit up part of his house as a boarding establishment. Grieved at the ignorance and superstition which the remissness of the clergy permitted to flourish in the neighbouring parishes, he used every year to visit the most neglected parts of Northumberland, Yorkshire, Cheshire, Westmorland and Cumberland; and that his own flock might not suffer, he was at the expense of a constant assistant. Among his parishioners he was looked up to as a judge, and did great service in preventing law-suits amongst them. If an industrious man suffered a loss, he delighted to make it good; if the harvest was bad, he was liberal in the remission of tithes. The boldness which he could display at need is well illustrated by his action in regard to duelling. Finding one day a challenge-glove stuck up on the door of a church where he was to preach, he took it down with his own hand, and proceeded to the pulpit to inveigh against the unchristian custom. His theological position was not in accord with any of the religious parties of his age, and Gladstone thought that the catholicity of the Anglican Church was better exemplified in his career than in those of more prominent ecclesiastics (pref. to A. W. Hutton's edition of S. R. Maitland's *Essays on the Reformation*). He was not satisfied with the Elizabethan settlement, had great respect for the Fathers, and was with difficulty induced to subscribe. Archbishop Sandys' views on the Eucharist horrified him; but on the other hand he maintained friendly relations with Bishop Pilkington and Thomas Lever, and the Puritans had some hope of his support.

A life of Bernard Gilpin, written by George Carleton, bishop of Chichester, who had been a pupil of Gilpin's at Houghton, will be found in Bates's *Vitae selectorum aliquot virorum*, &c. (London, 1681). A translation of this sketch by William Freake, minister, was published at London, 1629; and in 1852 it was reprinted in Glasgow, with an introductory essay by Edward Irving. It forms one of the lives in Christopher Wordsworth's *Ecclesiastical Biography* (vol. iii., 4th ed.), having been compared with Carleton's Latin text. Another biography of Gilpin, which, however, adds little to Bishop Carleton's, was written by William Gilpin, M.A., prebendary of Ailsbury (London, 1753 and 1854). See also *Dict. Nat. Biog.*

GILSONITE (so named after S. H. Gilson of Salt Lake City), or UINTAHITE, or UINTAITE, a description of asphalt occurring in masses several inches in diameter in the Uinta (or Uintah) valley, near Fort Duchesne, Utah. It is of black colour; its fracture is conchoidal, and it has a lustrous surface. When warmed it becomes plastic, and on further beating fuses perfectly. It has a specific gravity of 1.065 to 1.070. It dissolves freely in hot oil of turpentine. The output amounted to 10,916 short tons for the year 1905, and the value was $4.51 per ton.

GILYAKS, a hybrid people, originally widespread throughout the Lower Amur district, but now confined to the Amur delta and the north of Sakhalin. They have been affiliated by some authorities to the Ainu of Sakhalin and Yezo; but they are more probably a mongrel people, and Dr A. Anuchin states that there are two types, a Mongoloid with sparse beard, high cheek-bones and flat face, and a Caucasic with bushy beard and more regular features. The Chinese call them *Yupitatse*, "Fish-skin-clad people," from their wearing a peculiar dress made from salmon skin.

See E. G. Ravenstein, *The Russians on the Amur* (1861); Dr A. Anuchin, *Mem. Imp. Soc. Nat. Sc.* xx., Supplement (Moscow, 1877); H. von Siebold, *Über die Aino* (Berlin, 1881); J. Deniker in Revue d'ethnographie (Paris, 1884); L. Schrenck, *Die Völker des Amurlandes* (St Petersburg, 1891).

GIMBAL, a mechanical device for hanging some object so that it should keep a horizontal and

constant position, while the body from which it is suspended is in free motion, so that the motion of the supporting body is not communicated to it. It is thus used particularly for the suspension of compasses or chronometers and lamps at sea, and usually consists of a ring freely moving on an axis, within which the object swings on an axis at right angles to the ring.

The word is derived from the O. Fr. *gemel*, from Lat. *gemellus*, diminutive of *geminus*, a twin, and appears also in *gimmel* or *jimbel* and as *gemel*, especially as a term for a ring formed of two hoops linked together and capable of separation, used in the 16th and 17th centuries as betrothal and keepsake rings. They sometimes were made of three or more hoops linked together.

GIMLET (from the O. Fr. *guimbelet*, probably a diminutive of the O.E. *wimble*, and the Scandinavian *wammle*, to bore or twist; the modern French is *gibelet*), a tool used for boring small holes. It is made of steel, with a shaft having a hollow side, and a screw at the end for boring the wood; the handle of wood is fixed transversely to the shaft. A gimlet is always a small tool. A similar tool of large size is called an “auger” (see Tool).

GIMLI, in Scandinavian mythology, the great hall of heaven whither the righteous will go to spend eternity.

GIMP, or Gymp. (1) (Of somewhat doubtful origin, but probably a nasal form of the Fr. *guipure*, from *guiper*, to cover or “whip” a cord over with silk), a stiff trimming made of silk or cotton woven around a firm cord, often further ornamented by a metal cord running through it. It is also sometimes covered with bugles, beads or other glistening ornaments. The trimming employed by upholsterers to edge curtains, draperies, the seats of chairs, &c., is also called gimp; and in lace work it is the firmer or coarser thread which outlines the pattern and strengthens the material. (2) A shortened form of gimple (the O. E. *wimple*), the kerchief worn by a nun around her throat, sometimes also applied to a nun’s stomacher.

GIN, an aromatized or compounded potable spirit, the characteristic flavour of which is derived from the juniper berry. The word “gin” is an abbreviation of Geneva, both being primarily derived from the Fr. *genièvre* (juniper). The use of the juniper for flavouring alcoholic beverages may be traced to the invention, or perfecting, by Count de Morret, son of Henry IV. of France, of juniper wine. It was the custom in the early days of the spirit industry, in distilling spirit from fermented liquors, to add in the working some aromatic ingredients, such as ginger, grains of paradise, &c., to take off the nauseous flavour of the crude spirits then made. The invention of juniper wine, no doubt, led some one to try the juniper berry for this purpose, and as this flavouring agent was found not only to yield an agreeable beverage, but also to impart a valuable medicinal quality to the spirit, it was generally made use of by makers of aromatized spirits thereafter. It is probable that the use of grains of paradise, pepper and so on, in the early days of spirit manufacture, for the object mentioned above, indirectly gave rise to the statements which are still found in current text-books and works of reference as to the use of Cayenne pepper, *cocculus indicus*, sulphuric acid and so on, for the purpose of adulterating spirits. It is quite certain that such materials are not used nowadays, and it would indeed, in view of modern conditions of manufacture and of public taste, be hard to find a reason for their use. The same applies to the suggestions that such substances as acetate of lead, alum or sulphate of zinc are employed for the fining of gin.

There are two distinct types of gin, namely, the Dutch *geneva* or *hollands* and the British gin. Each of these types exists in the shape of numerous sub-varieties. Broadly speaking, British gin is prepared with a highly rectified spirit, whereas in the manufacture of Dutch gin a preliminary rectification is not an integral part of the process. The old-fashioned Hollands is prepared much after the following fashion. A mash consisting of about one-third of malted barley or bere and two-thirds rye-meal is prepared, and infused at a somewhat high temperature. After cooling, the whole is set to ferment with

a small quantity of yeast. After two to three days the attenuation is complete, and the wash so obtained is distilled, and the resulting distillate (the low wines) is redistilled, with the addition of the flavouring matter (juniper berries, &c.) and a little salt. Originally the juniper berries were ground with the malt, but this practice no longer obtains, but some distillers, it is believed, still mix the juniper berries with the wort and subject the whole to fermentation. When the redistillation over juniper is repeated, the product is termed *double* (*geneva*, &c.). There are numerous variations in the process described, wheat being frequently employed in lieu of rye. In the manufacture of British gin,[1] a highly rectified spirit (see SPIRITS) is redistilled in the presence of the flavouring matter (principally juniper and coriander), and frequently this operation is repeated several times. The product so obtained constitutes the "dry" gin of commerce. Sweetened or cordialized gin is obtained by adding sugar and flavouring matter (juniper, coriander, angelica, &c.) to the dry variety. Inferior qualities of gin are made by simply adding essential oils to plain spirit, the distillation process being omitted. The essential oil of juniper is a powerful diuretic, and gin is frequently prescribed in affections of the urinary organs.

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1 The precise origin of the term "Old Tom," as applied to unsweetened gin, appears to be somewhat obscure. In the English case of *Boord & Son* v. *Huddart* (1903), in which the plaintiffs established their right to the "Cat Brand" trade-mark, it was proved before Mr Justice Swinfen Eady that this firm had first adopted about 1849 the punning association of the picture of a Tom cat on a barrel with the name of "Old Tom"; and it was at one time supposed that this was due to a tradition that a cat had fallen into one of the vats, the gin from which was highly esteemed. But the term "Old Tom" had been known before that, and Messrs Boord & Son inform us that previously "Old Tom" had been a man, namely "old Thomas Chamberlain of Hodge's distillery"; an old label book in their possession (1909) shows a label and bill-head with a picture of "Old Tom" the man on it, and another label shows a picture of a sailor lad on shipboard described as "Young Tom."

GINDELY, ANTON (1829-1892), German historian, was the son of a German father and a Slavonic mother, and was born at Prague on the 3rd of September 1829. He studied at Prague and at Olmütz, and, after travelling extensively in search of historical material, became professor of history at the university of Prague and archivist for Bohemia in 1862. He died at Prague on the 24th of October 1892. Gindely's chief work is his *Geschichte des dreissigjährigen Krieges* (Prague, 1869-1880), which has been translated into English (New York, 1884); and his historical work is mainly concerned with the period of the Thirty Years' War. Perhaps the most important of his numerous other works are: *Geschichte der böhmischen Brüder* (Prague, 1857-1858); *Rudolf II. und seine Zeit* (1862-1868), and a criticism of Wallenstein, *Waldstein während seines ersten Generalats* (1886). He wrote a history of Bethlen Gabor in Hungarian, and edited the *Monumenta historiae Bohemica*. Gindely's posthumous work, *Geschichte der Gegenreformation in Böhmen*, was edited by T. Tupetz (1894).

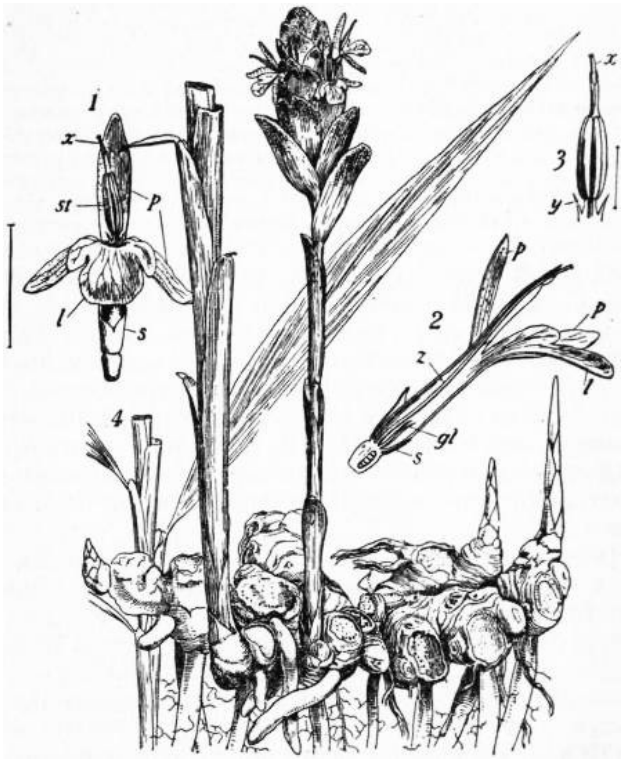
See the *Allgemeine deutsche Biographie*, Band 49 (Leipzig, 1904).

GINGALL, or JINGAL (Hindostani *janjal*), a gun used by the natives throughout the East, usually a light piece mounted on a swivel; it sometimes takes the form of a heavy musket fired from a rest.

GINGER (Fr. *gingembre*, Ger. *Ingwer*), the rhizome or underground stem of *Zingiber officinale* (nat. ord. Zingiberaceae), a perennial reed-like plant growing from 3 to 4 ft. high. The flowers and leaves are borne on separate stems, those of the former being shorter than those of the latter, and averaging from 6 to 12 in. The flowers themselves are borne at the apex of the stems in dense ovate-oblong cone-like spikes from 2 to 3 in. long, composed of obtuse strongly-imbricated bracts with membranous margins, each bract enclosing a single small sessile flower. The leaves are alternate and arranged in two rows, bright green, smooth, tapering at both ends, with very short stalks and long sheaths which stand away from the stem and end in two small rounded auricles. The plant rarely flowers and the fruit is unknown. Though not found in a wild state, it is considered with very good reason to be a native of the warmer parts of Asia, over which it has been cultivated from an early period and the rhizome imported into England. From Asia the plant has spread into the West Indies, South America, western tropical Africa, and Australia. It is commonly grown in botanic gardens in Britain.

The use of ginger as a spice has been known from very early times; it was supposed by the Greeks and Romans to be a product of southern Arabia, and was received by them by way of the Red Sea; in India it has also been known from a very remote period, the Greek and Latin names being derived from the Sanskrit. Flückiger and Hanbury, in their *Pharmacographia*, give the following notes on the history

of ginger. On the authority of Vincent's *Commerce and Navigation of the Ancients*, it is stated that in the list of imports from the Red Sea into Alexandria, which in the second century of our era were there liable to the Roman fiscal duty, ginger occurs among other Indian spices. So frequent is the mention of ginger in similar lists during the middle ages, that it evidently constituted an important item in the commerce between Europe and the East. It thus appears in the tariff of duties levied at Acre in Palestine about 1173, in that of Barcelona in 1221, Marseilles in 1228 and Paris in 1296. Ginger seems to have been well known in England even before the Norman Conquest, being often referred to in the Anglo-Saxon leech-books of the 11th century. It was very common in the 13th and 14th centuries, ranking next in value to pepper, which was then the commonest of all spices, and costing on an average about 1s. 7d. per lb. Three kinds of ginger were known among the merchants of Italy about the middle of the 14th century: (1) *Belledi* or *Baladi*, an Arabic name, which, as applied to ginger, would signify country or wild, and denotes common ginger; (2) *Colombino*, which refers to Columbum, Kolam or Quilon, a port in Travancore, frequently mentioned in the middle ages; and (3) *Micchino*, a name which denoted that the spice had been brought from or by way of Mecca. Marco Polo seems to have seen the ginger plant both in India and China between 1280 and 1290. John of Montecorvino, a missionary friar who visited India about 1292, gives a description of the plant, and refers to the fact of the root being dug up and transported. Nicolo di Conto, a Venetian merchant in the early part of the 15th century, also describes the plant and the collection of the root, as seen by him in India. Though the Venetians received ginger by way of Egypt, some of the superior kinds were taken from India overland by the Black Sea. The spice is said to have been introduced into America by Francisco de Mendoça, who took it from the East Indies to New Spain. It seems to have been shipped for commercial purposes from San Domingo as early as 1585, and from Barbados in 1654; so early as 1547 considerable quantities were sent from the West Indies to Spain.



From Bentley & Trimen's *Medicinal Plants*, by permission of J. & A. Churchill.

Ginger (*Zingiber officinale*), about ½ nat. size, with leafy and flowering stem; the former cut off short.

1. Flower.
2. Flower in vertical section.
3. Fertile stamen, enveloping the style which projects above it.
4. Piece of leafy stem. 1-3 enlarged.

s, Sepals.
p, Petals.
l, Labellum, representing two barren stamens.
st, Fertile stamen.
y, Staminode.
x, Tip of style bearing the stigma.
z, Style.
gl, Honey-secreting glands.

Ginger is known in commerce in two distinct forms, termed respectively coated and uncoated ginger, as having or wanting the epidermis. For the first, the pieces, which are called "races" or "hands," from their irregular palmate form, are washed and simply dried in the sun. In this form ginger presents a brown, more or less irregularly wrinkled or striated surface, and when broken shows a dark brownish fracture, hard, and sometimes horny and resinous. To produce uncoated ginger the rhizomes are washed, scraped and sun-dried, and are often subjected to a system of bleaching, either from the fumes of burning sulphur or by immersion for a short time in a solution of chlorinated lime. The

whitewashed appearance that much of the ginger has, as seen in the shops, is due to the fact of its being washed in whiting and water, or even coated with sulphate of lime. This artificial coating is supposed by some to give the ginger a better appearance; it often, however, covers an inferior quality, and can readily be detected by the ease with which it rubs off, or by its leaving a white powdery substance at the bottom of the jar in which it is contained. Uncoated ginger, as seen in trade, varies from single joints an inch or less in length to flattish irregularly branched pieces of several joints, the "races" or "hands," and from 3 to 4 in. long; each branch has a depression at its summit showing the former attachment of a leafy stem. The colour, when not whitewashed, is a pale buff; it is somewhat rough or fibrous, breaking with a short mealy fracture, and presenting on the surfaces of the broken parts numerous short bristly fibres.

> The principal constituents of ginger are starch, volatile oil (to which the characteristic odour of the spice is due) and resin (to which is attributed its pungency). Its chief use is as a condiment or spice, but as an aromatic and stomachic medicine it is also used internally. "The stimulant, aromatic and carminative properties render it of much value in atonic dyspepsia, especially if accompanied with much flatulence, and as an adjunct to purgative medicines to correct griping." Externally applied as a rubefacient, it has been found to relieve headache and toothache. The rhizomes, collected in a young green state, washed, scraped and preserved in syrup, form a delicious preserve, which is largely exported both from the West Indies and from China. Cut up into pieces like lozenges and preserved in sugar, ginger also forms a very agreeable sweetmeat.

GINGHAM, a cotton or linen cloth, for the name of which several origins are suggested. It is said to have been made at Guingamp, a town in Brittany; the *New English Dictionary* derives the word from Malay *ging-gang*, meaning "striped." The cloth is now of a light or medium weight, and woven of dyed or white yarns either in a single colour or different colours, and in stripes, checks or plaids. It is made in Lancashire and in Glasgow, and also to a large extent in the United States. Imitations of it are obtained by calico-printing. It is used for dresses, &c.

GINGI, or Gingee, a rock fortress of southern India, in the South Arcot district of Madras. It consists of three hills, connected by walls enclosing an area of 7 sq. m., and practically impregnable to assault. The origin of the fortress is shrouded in legend. When occupied by the Mahrattas at the end of the 17th century, it withstood a siege of eight years against the armies of Aurangzeb. In 1750 it was captured by the French, who held it with a strong force for eleven years. It surrendered to the English in 1761, in the words of Orme, "terminated the long hostilities between the two rival European powers in Coromandel, and left not a single ensign of the French nation avowed by the authority of its government in any part of India."

GINGUENÉ, PIERRE LOUIS (1748-1815), French author, was born on the 27th of April 1748 at Rennes, in Brittany. He was educated at a Jesuit college in his native town, and came to Paris in 1772. He wrote criticisms for the *Mercure de France*, and composed a comic opera, *Pomponin* (1777). *The Satire des satires* (1778) and the *Confession de Zulmé* (1779) followed. *The Confession* was claimed by six or seven different authors, and though the value of the piece is not very great, it obtained great success. His defence of Piccini against the partisans of Gluck made him still more widely known. He hailed the first symptoms of the Revolution, joined Giuseppe Cerutti, the author of the *Mémoire pour le peuple français* (1788), and others in producing the *Feuille villageoise*, a weekly paper addressed to the villages of France. He also celebrated in an indifferent ode the opening of the states-general. In his *Lettres sur les confessions de J.-J. Rousseau* (1791) he defended the life and principles of his author. He was imprisoned during the Terror, and only escaped with life by the downfall of Robespierre. Some time after his release he assisted, as director-general of the "commission exécutive de l'instruction publique," in reorganizing the system of public instruction, and he was an original member of the Institute of France. In 1797 the directory appointed him minister plenipotentiary to the king of Sardinia. After fulfilling his duties for seven months, very little to the satisfaction of his employers, Ginguené retired for a time to his country house of St Prix, in the valley of Montmorency. He was appointed a member of the tribunate, but Napoleon, finding that he was not sufficiently tractable, had him expelled at the first "purge," and Ginguené returned to his literary pursuits. He was one of the commission charged to continue the *Histoire littéraire de la France*, and he contributed to the volumes of this series which appeared in 1814, 1817 and 1820. Ginguené's most important work is the *Histoire*

littéraire d'Italie (14 vols., 1811-1835). He was putting the finishing touches to the eighth and ninth volumes when he died on the 11th of November 1815. The last five volumes were written by Francesco Salfi and revised by Pierre Daunou.

In the composition of his history of Italian literature he was guided for the most part by the great work of Girolamo Tiraboschi, but he avoids the prejudices and party views of his model.

Ginguené edited the *Décade philosophique, politique et littéraire* till it was suppressed by Napoleon in 1807. He contributed largely to the *Biographie universelle*, the *Mercure de France* and the *Encyclopédie méthodique*; and he edited the works of Chamfort and of Lebrun. Among his minor productions are an opera, *Pomponin ou le tuteur mystifié* (1777); *La Satire des satires* (1778); *De l'autorité de Rabelais dans la révolution présente* (1791); *De M. Neckar* (1795); *Fables nouvelles* (1810); *Fables inédites* (1814). See "Éloge de Ginguené" by Dacier, in the *Mémoires de l'institut*, tom. vii.; "Discours" by M. Daunou, prefixed to the 2nd ed. of the *Hist. litt. d'Italie*; D. J. Garat, *Notice sur la vie et les ouvrages de P. L. Ginguené*, prefixed to a catalogue of his library (Paris, 1817).

GINKEL, GODART VAN (1630-1703); 1st earl of Athlone, Dutch general in the service of England, was born at Utrecht in 1630. He came of a noble family, and bore the title of Baron van Reede, being the eldest son of Godart Adrian van Reede, Baron Ginkel. In his youth he entered the Dutch army, and in 1688 he followed William, prince of Orange, in his expedition to England. In the following year he distinguished himself by a memorable exploit—the pursuit, defeat and capture of a Scottish regiment which had mutinied at Ipswich, and was marching northward across the fens. It was the alarm excited by this mutiny that facilitated the passing of the first Mutiny Act. In 1690 Ginkel accompanied William III. to Ireland, and commanded a body of Dutch cavalry at the battle of the Boyne. On the king's return to England General Ginkel was entrusted with the conduct of the war. He took the field in the spring of 1691, and established his headquarters at Mullingar. Among those who held a command under him was the marquis of Ruvigny, the recognized chief of the Huguenot refugees. Early in June Ginkel took the fortress of Ballymore, capturing the whole garrison of 1000 men. The English lost only 8 men. After reconstructing the fortifications of Ballymore the army marched to Athlone, then one of the most important of the fortified towns of Ireland. The Irish defenders of the place were commanded by a distinguished French general, Saint-Ruth. The firing began on June 19th, and on the 30th the town was stormed, the Irish army retreating towards Galway, and taking up their position at Aughrim. Having strengthened the fortifications of Athlone and left a garrison there, Ginkel led the English, on July 12th, to Aughrim. An immediate attack was resolved on, and, after a severe and at one time doubtful contest, the crisis was precipitated by the fall of Saint-Ruth, and the disorganized Irish were defeated and fled. A horrible slaughter of the Irish followed the struggle, and 4000 corpses were left unburied on the field, besides a multitude of others that lay along the line of the retreat. Galway next capitulated, its garrison being permitted to retire to Limerick. There the viceroy Tyrconnel was in command of a large force, but his sudden death early in August left the command in the hands of General Sarsfield and the Frenchman D'Usson. The English came in sight of the town on the day of Tyrconnel's death, and the bombardment was immediately begun. Ginkel, by a bold device, crossed the Shannon and captured the camp of the Irish cavalry. A few days later he stormed the fort on Thomond Bridge, and after difficult negotiations a capitulation was signed, the terms of which were divided into a civil and a military treaty. Thus was completed the conquest or pacification of Ireland, and the services of the Dutch general were amply recognized and rewarded. He received the formal thanks of the House of Commons, and was created by the king 1st earl of Athlone and baron of Aughrim. The immense forfeited estates of the earl of Limerick were given to him, but the grant was a few years later revoked by the English parliament. The earl continued to serve in the English army, and accompanied the king to the continent in 1693. He fought at the sieges of Namur and the battle of Neerwinden, and assisted in destroying the French magazine at Givet. In 1702, waiving his own claims to the position of commander-in-chief, he commanded the Dutch serving under the duke of Marlborough. He died at Utrecht on the 11th of February 1703, and was succeeded by his son the 2nd earl (1668-1719), a distinguished soldier in the reigns of William III. and Anne. On the death of the 9th earl without issue in 1844, the title became extinct.

GINSBURG, CHRISTIAN DAVID (1831-), Hebrew scholar, was born at Warsaw on the 25th of December 1831. Coming to England shortly after the completion of his education in the Rabbinic College at Warsaw, Dr Ginsburg continued his study of the Hebrew Scriptures, with special attention to the Megilloth. The first result of these studies was a translation of the Song of Songs, with a commentary historical and critical, published in 1857. A similar translation of Ecclesiastes, followed by treatises on the Karaites, on the Essenes and on the Kabbala, kept the author prominently before biblical students while he was preparing the first sections of his *magnum opus*, the critical study of the Massorah. Beginning in 1867 with the publication of Jacob ben Chajim's Introduction to the Rabbinic

Bible, Hebrew and English, with notices, and the Massoreth Ha-Massoreth of Elias Levita, in Hebrew, with translation and commentary, Dr Ginsburg took rank as an eminent Hebrew scholar. In 1870 he was appointed one of the first members of the committee for the revision of the English version of the Old Testament. His life-work culminated in the publication of the Massorah, in three volumes folio (1880-1886), followed by the Masoretico-critical edition of the Hebrew Bible (1894), and the elaborate introduction to it (1897). Dr Ginsburg had one predecessor in the field, the learned Jacob ben Chajim, who in 1524-1525 published the second Rabbinic Bible, containing what has ever since been known as the Massorah; but neither were the materials available nor was criticism sufficiently advanced for a complete edition. Dr Ginsburg took up the subject almost where it was left by those early pioneers, and collected portions of the Massorah from the countless MSS. scattered throughout Europe and the East. More recently Dr Ginsburg has published *Facsimiles of Manuscripts of the Hebrew Bible* (1897 and 1898), and *The Text of the Hebrew Bible in Abbreviations* (1903), in addition to a critical treatise "on the relationship of the so-called Codex Babylonicus of A.D. 916 to the Eastern Recension of the Hebrew Text" (1899, for private circulation). In the last-mentioned work he seeks to prove that the St Petersburg Codex, for so many years accepted as the genuine text of the Babylonian school, is in reality a Palestinian text carefully altered so as to render it conformable to the Babylonian recension. He subsequently undertook the preparation of a new edition of the Hebrew Bible for the British and Foreign Bible Society. He also contributed many articles to J. Kitto's *Encyclopaedia*, W. Smith's *Dictionary of Christian Biography* and the *Encyclopaedia Britannica*.

GINSENG, the root of a species of *Panax* (*P. Ginseng*), native of Manchuria and Korea, belonging to the natural order Araliaceae, used in China as a medicine. Other roots are substituted for it, notably that of *Panax quinquefolium*, distinguished as American ginseng, and imported from the United States. At one time the ginseng obtained from Manchuria was considered to be the finest quality, and in consequence became so scarce that an imperial edict was issued prohibiting its collection. That prepared in Korea is now the most esteemed variety. The root of the wild plant is preferred to that of cultivated ginseng, and the older the plant the better is the quality of the root considered to be. Great care is taken in the preparation of the drug. The account given by Kaempfer of the preparation of nindsin, the root of *Sium ninsi*, in Korea, will give a good idea of the preparation of ginseng, ninsi being a similar drug of supposed weaker virtue, obtained from a different plant, and often confounded with ginseng. "In the beginning of winter nearly all the population of Sjansai turn out to collect the root, and make preparations for sleeping in the fields. The root, when collected, is macerated for three days in fresh water, or water in which rice has been boiled twice; it is then suspended in a closed vessel over the fire, and afterwards dried, until from the base to the middle it assumes a hard, resinous and translucent appearance, which is considered a proof of its good quality."

Ginseng of good quality generally occurs in hard, rather brittle, translucent pieces, about the size of the little finger, and varying in length from 2 to 4 in. The taste is mucilaginous, sweetish and slightly bitter and aromatic. The root is frequently forked, and it is probably owing to this circumstance that medicinal properties were in the first place attributed to it, its resemblance to the body of a man being supposed to indicate that it could restore virile power to the aged and impotent. In price it varies from 6 or 12 dollars to the enormous sum of 300 or 400 dollars an ounce.

> Lockhart gives a graphic description of a visit to a ginseng merchant. Opening the outer box, the merchant removed several paper parcels which appeared to fill the box, but under them was a second box, or perhaps two small boxes, which, when taken out, showed the bottom of the large box and all the intervening space filled with more paper parcels. These parcels, he said, "contained quicklime, for the purpose of absorbing any moisture and keeping the boxes quite dry, the lime being packed in paper for the sake of cleanliness. The smaller box, which held the ginseng, was lined with sheet-lead; the ginseng further enclosed in silk wrappers was kept in little silken-covered boxes. Taking up a piece, he would request his visitor not to breathe upon it, nor handle it; he would dilate upon the many merits of the drug and the cures it had effected. The cover of the root, according to its quality, was silk, either embroidered or plain, cotton cloth or paper." In China the ginseng is often sent to friends as a valuable present; in such cases, "accompanying the medicine is usually given a small, beautifully-finished double kettle, in which the ginseng is prepared as follows. The inner kettle is made of silver, and between this and the outside vessel, which is a copper jacket, is a small space for holding water. The silver kettle, which fits on a ring near the top of the outer covering, has a cup-like cover in which rice is placed with a little water; the ginseng is put in the inner vessel with water, a cover is placed over the whole, and the apparatus is put on the fire. When the rice in the cover is sufficiently cooked, the medicine is ready, and is then eaten by the patient, who drinks the ginseng tea at the same time." The dose of the root is from 60 to 90 grains. During the use of the drug tea-drinking is forbidden for at least a month, but no other change is made in the diet. It is taken in the morning before breakfast, from three to eight days together, and sometimes it is taken in the evening before going to bed.
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> The action of the drug appears to be entirely psychic, and comparable to that of the mandrake of the Hebrews. There is no evidence that it possesses any pharmacological or therapeutic properties.
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> See Porter Smith, *Chinese Materia Medica*, p. 103; *Reports on Trade at the Treaty Ports of China* (1868), p. 63; Lockhart, *Med. Missionary in China* (2nd ed.), p. 107; *Bull. de la Société Impériale de Nat. de Moscou* (1865), No. 1, pp. 70-76; *Pharmaceutical Journal* (2), vol. iii. pp. 197, 333, (2), vol. ix. p.

77; Lewis, *Materia Medica*, p. 324; Geoffroy, *Tract. de matière médicale*, t. ii. p. 112; Kaempfer, *Amoenitates exoticae*, p. 824.

GIOBERTI, VINCENZO (1801-1852), Italian philosopher, publicist and politician, was born in Turin on the 5th of April 1801. He was educated by the fathers of the Oratory with a view to the priesthood and ordained in 1825. At first he led a very retired life; but gradually took more and more interest in the affairs of his country and the new political ideas as well as in the literature of the day. Partly under the influence of Mazzini, the freedom of Italy became his ruling motive in life,—its emancipation, not only from foreign masters, but from modes of thought alien to its genius, and detrimental to its European authority. This authority was in his mind connected with papal supremacy, though in a way quite novel—intellectual rather than political. This must be remembered in considering nearly all his writings, and also in estimating his position, both in relation to the ruling clerical party—the Jesuits—and also to the politics of the court of Piedmont after the accession of Charles Albert in 1831. He was now noticed by the king and made one of his chaplains. His popularity and private influence, however, were reasons enough for the court party to mark him for exile; he was not one of them, and could not be depended on. Knowing this, he resigned his office in 1833, but was suddenly arrested on a charge of conspiracy, and, after an imprisonment of four months, was banished without a trial. Gioberti first went to Paris, and, a year later, to Brussels, where he remained till 1845, teaching philosophy, and assisting a friend in the work of a private school. He nevertheless found time to write many works of philosophical importance, with special reference to his country and its position. An amnesty having been declared by Charles Albert in 1846, Gioberti (who was again in Paris) was at liberty to return to Italy, but refused to do so till the end of 1847. On his entrance into Turin on the 29th of April 1848 he was received with the greatest enthusiasm. He refused the dignity of senator offered him by Charles Albert, preferring to represent his native town in the Chamber of Deputies, of which he was soon elected president. At the close of the same year, a new ministry was formed, headed by Gioberti; but with the accession of Victor Emmanuel in March 1849, his active life came to an end. For a short time indeed he held a seat in the cabinet, though without a portfolio; but an irreconcilable disagreement soon followed, and his removal from Turin was accomplished by his appointment on a mission to Paris, whence he never returned. There, refusing the pension which had been offered him and all ecclesiastical preferment, he lived frugally, and spent his days and nights as at Brussels in literary labour. He died suddenly, of apoplexy, on the 26th of October 1852.

Gioberti's writings are more important than his political career. In the general history of European philosophy they stand apart. As the speculations of Rosmini-Serbati, against which he wrote, have been called the last link added to medieval thought, so the system of Gioberti, known as "Ontologism," more especially in his greater and earlier works, is unrelated to other modern schools of thought. It shows a harmony with the Roman Catholic faith which caused Cousin to declare that "Italian philosophy was still in the bonds of theology," and that Gioberti was no philosopher. Method is with him a synthetic, subjective and psychological instrument. He reconstructs, as he declares, ontology, and begins with the "ideal formula," "the *Ens* creates *ex nihilo* the existent." God is the only being (Ens); all other things are merely existences. God is the origin of all human knowledge (called *l'idea*, thought), which is one and so to say identical with God himself. It is directly beheld (intuited) by reason, but in order to be of use it has to be reflected on, and this by means of language. A knowledge of being and existences (concrete, not abstract) and their mutual relations, is necessary as the beginning of philosophy. Gioberti is in some respects a Platonist. He identifies religion with civilization, and in his treatise *Del primato morale e civile degli Italiani* arrives at the conclusion that the church is the axis on which the well-being of human life revolves. In it he affirms the idea of the supremacy of Italy, brought about by the restoration of the papacy as a moral dominion, founded on religion and public opinion. In his later works, the *Rinnovamento* and the *Protologia*, he is thought by some to have shifted his ground under the influence of events. His first work, written when he was thirty-seven, had a personal reason for its existence. A young fellow-exile and friend, Paolo Pallia, having many doubts and misgivings as to the reality of revelation and a future life, Gioberti at once set to work with *La Teorica del sovrannaturale*, which was his first publication (1838). After this, philosophical treatises followed in rapid succession. The *Teorica* was followed by *Introduzione allo studio della filosofia* in three volumes (1839-1840). In this work he states his reasons for requiring a new method and new terminology. Here he brings out the doctrine that religion is the direct expression of the *idea* in this life, and is one with true civilization in history. Civilization is a conditioned mediate tendency to perfection, to which religion is the final completion if carried out; it is the end of the second cycle expressed by the second formula, the Ens redeems existences. Essays (not published till 1846) on the lighter and more popular subjects, *Del bello* and *Del buono*, followed the *Introduzione*. *Del primato morale e civile degli Italiani* and the *Prolegomeni* to the same, and soon afterwards his triumphant exposure of the Jesuits, Il Gesuita moderno, no doubt hastened the transfer of rule from clerical to civil hands. It was the popularity of these semi-political works, increased by other occasional political articles, and his *Rinnovamento civile d'Italia*, that caused Gioberti to be welcomed with such enthusiasm on his return to his native country. All these works were perfectly orthodox, and aided in drawing the liberal clergy into the movement which has resulted since his time in the unification of Italy. The Jesuits, however, closed round the pope more firmly after his return to Rome, and in the end Gioberti's writings were placed on the *Index* (see J. Kleutgen, *Über die Verurtheilung des Ontologismus durch den heiligen Stuhl*, 1867). The remainder of his works, especially *La Filosofia della Rivelazione* and the *Protologia*, give his mature

views on many points. The entire writings of Gioberti, including those left in manuscript, have been edited by Giuseppe Massari (Turin, 1856-1861).

See Massari, *Vita de V. Gioberti* (Florence, 1848); A. Rosmini-Serbati, *V. Gioberti e il panteismo* (Milan, 1848); C. B. Smyth, *Christian Metaphysics* (1851); B. Spaventa, *La Filosofia di Gioberti* (Naples, 1854); A. Mauri, *Della vita e delle opere di V. Gioberti* (Genoa, 1853); G. Prisco, *Gioberti e l' ontologismo* (Naples, 1867); P. Luciani, *Gioberti e la filosofia nuova italiana* (Naples, 1866-1872); D. Berti, *Di V. Gioberti* (Florence, 1881); see also L. Ferri, *L'Histoire de la philosophie en Italie au XIX^e siècle* (Paris, 1869); C. Werner, *Die italienische Philosophie des 19. Jahrhunderts*, ii. (1885); appendix to Ueberweg's *Hist. of Philosophy* (Eng. tr.); art. in *Brownson's Quarterly Review* (Boston, Mass.), xxi.; R. Mariano, *La Philosophie contemporaine en Italie* (1866); R. Seydel's exhaustive article in Ersch and Gruber's *Allgemeine Encyclopädie*. The centenary of Gioberti called forth several monographs in Italy.

GIOIOSA-IONICA, a town of Calabria, Italy, in the province of Reggio Calabria, from which it is 65 m. N.E. by rail, and 38 m. direct, 492 ft. above sea-level. Pop. (1901) town, 9072; commune, 11,200. Near the station, which is on the E. coast of Calabria 3 m. below the town to the S.E., the remains of a theatre belonging to the Roman period were discovered in 1883; the orchestra was 46 ft. in diameter (*Notizie degli scavi*, 1883, p. 423). The ruins of an ancient building called the Naviglio, the nature of which does not seem clear, are described (*ib.* 1884, p. 252).

GIOJA, MELCHIORRE (1767-1829), Italian writer on philosophy and political economy, was born at Piacenza, on the 20th of September 1767. Originally intended for the church, he took orders, but renounced them in 1796 and went to Milan, where he devoted himself to the study of political economy. Having obtained the prize for an essay on "the kind of free government best adapted to Italy" he decided upon the career of a publicist. The arrival of Napoleon in Italy drew him into public life. He advocated a republic under the dominion of the French in a pamphlet *I Tedeschi, i Francesi, ed i Russi in Lombardia*, and under the Cisalpine Republic he was named historiographer and director of statistics. He was several times imprisoned, once for eight months in 1820 on a charge of being implicated in a conspiracy with the Carbonari. After the fall of Napoleon he retired into private life, and does not appear to have held office again. He died on the 2nd of January 1829. Gioja's fundamental idea is the value of statistics or the collection of facts. Philosophy itself is with him classification and consideration of ideas. Logic he regarded as a practical art, and his *Esercizioni logici* has the further title, *Art of deriving benefit from ill-constructed books*. In ethics Gioja follows Bentham generally, and his large treatise *Del merito e delle recompense* (1818) is a clear and systematic view of social ethics from the utilitarian principle. In political economy this avidity for facts produced better fruits. The *Nuovo Prospetto delle scienze economiche* (1815-1817), although long to excess, and overburdened with classifications and tables, contains much valuable material. The author prefers large properties and large commercial undertakings to small ones, and strongly favours association as a means of production. He defends a restrictive policy and insists on the necessity of the action of the state as a regulating power in the industrial world. He was an opponent of ecclesiastical domination. He must be credited with the finest and most original treatment of division of labour since the *Wealth of Nations*. Much of what Babbage taught later on the subject of combined work is anticipated by Gioja. His theory of production is also deserving of attention from the fact that it takes into account and gives due prominence to immaterial goods. Throughout the work there is continuous opposition to Adam Smith. Gioja's latest work *Filosofia della statistica* (2 vols., 1826; 4 vols., 1829-1830) contains in brief compass the essence of his ideas on human life, and affords the clearest insight into his aim and method in philosophy both theoretical and practical.

See monographs by G. D. Romagnosi (1829), F. Falco (1866); G. Pecchio, *Storia dell' economia pubblica in Italia* (1829), and article in Ersch and Gruber's *Allgemeine Encyclopädie*; for Gioja's philosophy, L. Ferri, *Essai sur l'histoire de la philosophie en Italie au XIX^e siècle* (1869); Ueberweg's *Hist. of Philosophy* (Eng. tr., appendix ii.); A. Rosmini-Serbati, *Opuscoli filosofici*, iii. (1844) (containing an attack on Gioja's "sensualism"); for his political economy, list of works in J. Conrad's *Handwörterbuch der Staatswissenschaften* (1892); L. Cossa, *Introd. to Pol. Econ.* (Eng. trans., p. 488). Gioja's complete works were published at Lugano (1832-1849). He was one of the founders of the *Annali universali di statistica*.

GIOLITTI, GIOVANNI (1842-), Italian statesman, was born at Mondovì on the 27th of October

1842. After a rapid career in the financial administration he was, in 1882, appointed councillor of state and elected to parliament. As deputy he chiefly acquired prominence by attacks on Magliani, treasury minister in the Depretis cabinet, and on the 9th of March 1889 was himself selected as treasury minister by Crispi. On the fall of the Rudinì cabinet in May 1892, Giolitti, with the help of a court clique, succeeded to the premiership. His term of office was marked by misfortune and misgovernment. The building crisis and the commercial rupture with France had impaired the situation of the state banks, of which one, the Banca Romana, had been further undermined by maladministration. A bank law, passed by Giolitti failed to effect an improvement. Moreover, he irritated public opinion by raising to senatorial rank the director-general of the Banca Romana, Signor Tanlongo, whose irregular practices had become a byword. The senate declined to admit Tanlongo, whom Giolitti, in consequence of an interpellation in parliament upon the condition of the Banca Romana, was obliged to arrest and prosecute. During the prosecution Giolitti abused his position as premier to abstract documents bearing on the case. Simultaneously a parliamentary commission of inquiry investigated the condition of the state banks. Its report, though acquitting Giolitti of personal dishonesty, proved disastrous to his political position, and obliged him to resign. His fall left the finances of the state disorganized, the pensions fund depleted, diplomatic relations with France strained in consequence of the massacre of Italian workmen at Aigues-Mortes, and Sicily and the Lunigiana in a state of revolt, which he had proved impotent to suppress. After his resignation he was impeached for abuse of power as minister, but the supreme court quashed the impeachment by denying the competence of the ordinary tribunals to judge ministerial acts. For several years he was compelled to play a passive part, having lost all credit. But by keeping in the background and giving public opinion time to forget his past, as well as by parliamentary intrigue, he gradually regained much of his former influence. He made capital of the Socialist agitation and of the repression to which other statesmen resorted, and gave the agitators to understand that were he premier they would be allowed a free hand. Thus he gained their favour, and on the fall of the Pelloux cabinet he became minister of the Interior in Zanardelli’s administration, of which he was the real head. His policy of never interfering in strikes and leaving even violent demonstrations undisturbed at first proved successful, but indiscipline and disorder grew to such a pitch that Zanardelli, already in bad health, resigned, and Giolitti succeeded him as prime minister (November 1903). But during his tenure of office he, too, had to resort to strong measures in repressing some serious disorders in various parts of Italy, and thus he lost the favour of the Socialists. In March 1905, feeling himself no longer secure, he resigned, indicating Fortis as his successor. When Sonnino became premier in February 1906, Giolitti did not openly oppose him, but his followers did, and Sonnino was defeated in May, Giolitti becoming prime minister once more.

GIORDANO, LUCA (1632-1705), Italian painter, was born in Naples, son of a very indifferent painter, Antonio, who imparted to him the first rudiments of drawing. Nature predestined him for the art, and at the age of eight he painted a cherub into one of his father’s pictures, a feat which was at once noised abroad, and induced the viceroy of Naples to recommend the child to Ribera. His father afterwards took him to Rome, to study under Pietro da Cortona. He acquired the nickname of Luca Fa-presto (Luke Work-fast). One might suppose this nickname to be derived merely from the almost miraculous celerity with which from an early age and throughout his life he handled the brush; but it is said to have had a more express origin. The father, we are told, poverty-stricken and greedy of gain, was perpetually urging his boy to exertion with the phrase, “Luca, fà presto.” The youth obeyed his parent to the letter, and would actually not so much as pause to snatch a hasty meal, but received into his mouth, while he still worked on, the food which his father’s hand supplied. He copied nearly twenty times the “Battle of Constantine” by Julio Romano, and with proportionate frequency several of the great works of Raphael and Michelangelo. His rapidity, which belonged as much to invention as to mere handiwork, and his versatility, which enabled him to imitate other painters deceptively, earned for him two other epithets, “The Thunderbolt” (Fulmine), and “The Proteus,” of Painting. He shortly visited all the main seats of the Italian school of art, and formed for himself a style combining in a certain measure the ornamental pomp of Paul Veronese and the contrasting compositions and large schemes of chiaroscuro of Pietro da Cortona. He was noted also for lively and showy colour. Returning to Naples, and accepting every sort of commission by which money was to be made, he practised his art with so much applause that Charles II. of Spain towards 1687 invited him over to Madrid, where he remained thirteen years. Giordano was very popular at the Spanish court, being a sprightly talker along with his other marvellously facile gifts, and the king created him a cavaliere. One anecdote of his rapidity of work is that the queen of Spain having one day made some inquiry about his wife, he at once showed Her Majesty what the lady was like by painting her portrait into the picture on which he was engaged. Soon after the death of Charles in 1700 Giordano, gorged with wealth, returned to Naples. He spent large sums in acts of munificence, and was particularly liberal to his poorer brethren of the art. He again visited various parts of Italy, and died in Naples on the 12th of January 1705, his last words being “O Napoli, sospiro mio” (O Naples, my heart’s love!). One of his maxims was that the good painter is the one whom the public like, and that the public are attracted more by colour than by design.

Giordano had an astonishing readiness and facility, in spite of the general commonness and

superficiality of his performances. He left many works in Rome, and far more in Naples. Of the latter one of the most renowned is “Christ expelling the Traders from the Temple,” in the church of the Padri Girolamini, a colossal work, full of expressive lazzaroni; also the frescoes of S. Martino, and those in the Tesoro della Certosa, including the subject of “Moses and the Brazen Serpent”; and the cupola-paintings in the Church of S. Brigida, which contains the artist’s own tomb. In Spain he executed a surprising number of works,—continuing in the Escorial the series commenced by Cambiasi, and painting frescoes of the “Triumphs of the Church,” the “Genealogy and Life of the Madonna,” the stories of Moses, Gideon, David and Solomon, and the “Celebrated Women of Scripture,” all works of large dimensions. His pupils, Aniello Rossi and Matteo Pacelli, assisted him in Spain. In Madrid he worked more in oil-colour, a Nativity there being one of his best productions. Other superior examples are the “Judgment of Paris” in the Berlin Museum, and “Christ with the Doctors in the Temple,” in the Corsini Gallery of Rome. In Florence, in his closing days, he painted the Cappella Corsini, the Galleria Riccardi and other works. In youth he etched with considerable skill some of his own paintings, such as the “Slaughter of the Priests of Baal.” He also painted much on the crystal borderings of looking-glasses, cabinets, &c., seen in many Italian palaces, and was, in this form of art, the master of Pietro Garofolo. His best pupil, in painting of the ordinary kind, was Paolo de Matteis.

Bellori, in his *Vite de’ pittori moderni*, is a leading authority regarding Luca Giordano. P. Benvenuto (1882) has written a work on the Riccardi paintings.

GIORGIONE (1477-1510), Italian painter, was born at Castelfranco in 1477. In contemporary documents he is always called (according to the Venetian manner of pronunciation and spelling) Zorzi, Zorzo or Zorzon of Castelfranco. A tradition, having its origin in the 17th century, represented him as the natural son of some member of the great local family of the Barbarelli, by a peasant girl of the neighbouring village of Vedelago; consequently he is commonly referred to in histories and catalogues under the name of Giorgio Barbarelli or Barbarella. This tradition has, however, on close examination been proved baseless. On the other hand mention has been found in a contemporary document of an earlier Zorzon, a native of Vedelago, living in Castelfranco in 1460. Vasari, who wrote before the Barbarella legend had sprung up, says that Giorgione was of very humble origin. It seems probable that he was simply the son or grandson of the afore-mentioned Zorzon the elder; that the after-claim of the Barbarelli to kindred with him was a mere piece of family vanity, very likely suggested by the analogous case of Leonardo da Vinci; and that, this claim once put abroad, the peasant-mother of Vedelago was invented on the ground of some dim knowledge that his real progenitors came from that village.

Of the facts of his life we are almost as meagrely informed as of the circumstances of his birth. The little city, or large fortified village, for it is scarcely more, of Castelfranco in the Trevisan stands in the midst of a rich and broken plain at some distance from the last spurs of the Venetian Alps. From the natural surroundings of Giorgione’s childhood was no doubt derived his ideal of pastoral scenery, the country of pleasant copses, glades, brooks and hills amid which his personages love to wander or recline with lute and pipe. How early in boyhood he went to Venice we do not know, but internal evidence supports the statement of Ridolfi that he served his apprenticeship there under Giovanni Bellini; and there he made his fame and had his home. That his gifts were early recognized we know from the facts, recorded in contemporary documents, that in 1500, when he was only twenty-three (that is if Vasari gives rightly the age at which he died), he was chosen to paint portraits of the Doge Agostino Barberigo and the condottiere Consalvo Ferrante; that in 1504 he was commissioned to paint an altarpiece in memory of Matteo Costanzo in the cathedral of his native town, Castelfranco; that in 1507 he received at the order of the Council of Ten part payment for a picture (subject not mentioned) on which he was engaged for the Hall of the Audience in the ducal palace; and that in 1507-1508 he was employed, with other artists of his own generation, to decorate with frescoes the exterior of the newly rebuilt Fondaco dei Tedeschi or German merchants’ hall at Venice, having already done similar work on the exterior of the Casa Soranzo, the Casa Grimani alii Servi and other Venetian palaces. Vasari gives also as an important event in Giorgione’s life, and one which had influence on his work, his meeting with Leonardo da Vinci on the occasion of the Tuscan master’s visit to Venice in 1500. In September or October 1510 he died of the plague then raging in the city, and within a few days of his death we find the great art-patroness and amateur, Isabella d’Este, writing from Mantua and trying in vain to secure for her collection a night-piece by his hand of which the fame had reached her.

All accounts agree in representing Giorgione as a personage of distinguished and romantic charm, a great lover, a great musician, made to enjoy in life and to express in art to the uttermost the delight, the splendour, the sensuous and imaginative grace and fulness, not untinged with poetic melancholy, of the Venetian existence of his time. They represent him further as having made in Venetian painting an advance analogous to that made in Tuscan painting by Leonardo more than twenty years before; that is as having released the art from the last shackles of archaic rigidity and placed it in possession of full freedom and the full mastery of its means. He also introduced a new range of subjects. Besides altarpieces and portraits he painted pictures that told no story, whether biblical or classical, or if they professed to tell such, neglected the action and simply embodied in form and colour moods of lyrical or romantic feeling, much as a musician might embody them in sounds. Innovating with the courage and

felicity of genius, he had for a time an overwhelming influence on his contemporaries and immediate successors in the Venetian school, including Titian, Sebastian del Piombo, the elder Palma, Cariani and the two Campagnolas, and not a little even on seniors of long-standing fame such as Giovanni Bellini. His name and work have exercised, and continue to exercise, no less a spell on posterity. But to identify and define, among the relics of his age and school, precisely what that work is, and to distinguish it from the kindred work of other men whom his influence inspired, is a very difficult matter. There are inclusive critics who still claim for Giorgione nearly every painting of the time that at all resembles his manner, and there are exclusive critics who pare down to some ten or a dozen the list of extant pictures which they will admit to be actually his.

To name first those which are either certain or command the most general acceptance, placing them in something like an approximate and probable order of date. In the Uffizi at Florence are two companion pieces of the “Trial of Moses” and the “Judgment of Solomon,” the latter the finer and better preserved of the two, which pass, no doubt justly, as typical works of Giorgione’s youth, and exhibit, though not yet ripely, his special qualities of colour-richness and landscape romance, the peculiar facial types of his predilection, with the pure form of forehead, fine oval of cheek, and somewhat close-set eyes and eyebrows, and the intensity of that still and brooding sentiment with which, rather than with dramatic life and movement, he instinctively invests his figures. Probably the earliest of the portraits by common consent called his is the beautiful one of a young man at Berlin. His earliest devotional picture would seem to be the highly finished “Christ bearing his Cross” (the head and shoulders only, with a peculiarly serene and high-bred cast of features) formerly at Vicenza and now in the collection of Mrs Gardner at Boston. Other versions of this picture exist, and it has been claimed that one in private possession at Vienna is the true original: erroneously in the judgment of the present writer. Another “Christ bearing the Cross,” with a Jew dragging at the rope round his neck, in the church of San Rocco at Venice, is a ruined but genuine work, quoted by Vasari and Ridolfi, and copied with the name of Giorgione appended, by Van Dyck in that master’s Chatsworth sketch-book. (Vasari gives it to Giorgione in his first and to Titian in his second edition.) The composition of a lost early picture of the birth of Paris is preserved in an engraving of the “Teniers Gallery” series, and an old copy of part of the same picture is at Budapest. In the Giovanelli Palace at Venice is that fascinating and enigmatical mythology or allegory, known to the Anonimo Morelliano, who saw it in 1530 in the house of Gabriel Vendramin, simply as “the small landscape with the storm, the gipsy woman and the soldier”; the picture is conjecturally interpreted by modern authorities as illustrating a passage in Statius which describes the meeting of Adrastus with Hypsipyle when she was serving as nurse with the king of Nemea. Still belonging to the earlier part of the painter’s brief career is a beautiful, virginally pensive Judith at St Petersburg, which passed under various alien names, as Raphael, Moretto, &c., until its kindred with the unquestioned work of Giorgione was in late years firmly established. The great Castelfranco altarpiece, still, in spite of many restorations, one of the most classically pure and radiantly impressive works of Renaissance painting, may be taken as closing the earlier phase of the young master’s work (1504). It shows the Virgin loftily enthroned on a plain, sparely draped stone structure with St Francis and a warrior saint (St Liberale) standing in attitudes of great simplicity on either side of the foot of the throne, a high parapet behind them, and a beautiful landscape of the master’s usual type seen above it. Nearly akin to this masterpiece, not in shape or composition but by the type of the Virgin and the very Bellinesque St Francis, is the altarpiece of the Madonna with St Francis and St Roch at Madrid. Of the master’s fully ripened time is the fine and again enigmatical picture formerly in the house of Taddeo Contarini at Venice, described by contemporary witnesses as the “Three Philosophers,” and now, on slender enough grounds, supposed to represent Evander showing Aeneas the site of Troy as narrated in the eighth Aeneid. The portrait of a knight of Malta in the Uffizi at Florence has more power and authority, if less sentiment, than the earlier example at Berlin, and may be taken to be of the master’s middle time. Most entirely central and typical of all Giorgione’s extant works is the Sleeping Venus at Dresden, first recognized by Morelli, and now universally accepted, as being the same as the picture seen by the Anonimo and later by Ridolfi in the Casa Marcello at Venice. An exquisitely pure and severe rhythm of line and contour chastens the sensuous richness of the presentment: the sweep of white drapery on which the goddess lies, and of glowing landscape that fills the space behind her, most harmoniously frame her divinity. It is recorded that the master left this piece unfinished and that the landscape, with a Cupid which subsequent restoration has removed, were completed after his death by Titian. The picture is the prototype of Titian’s own Venus at the Uffizi and of many more by other painters of the school; but none of them attained the quality of the first exemplar. Of such small scenes of mixed classical mythology and landscape as early writers attribute in considerable number to Giorgione, there have survived at least two which bear strong evidences of his handiwork, though the action is in both of unwonted liveliness, namely the Apollo and Daphne of the Seminario at Venice and the Orpheus and Eurydice of Bergamo. The portrait of Antonio Grocardo at Budapest represents his fullest and most penetrating power in that branch of art. In his last years the purity and relative slenderness of form which mark his earlier female nudes, including the Dresden Venus, gave way to ideals of ampler mould, more nearly approaching those of Titian and his successors in Venetian art; as is proved by those last remaining fragments of the frescoes on the Grand Canal front of the Fondaco dei Tedeschi which were seen and engraved by Zanetti in 1760, but have now totally disappeared. Such change of ideal is apparent enough in the famous “Concert” or “Pastoral Symphony” of the Louvre, probably the latest, and certainly one of the most characteristic and harmoniously splendid, of Giorgione’s creations that has come down to us, and has caused some critics too hastily to doubt its authenticity.

We pass now to pictures for which some affirm and others deny the right to bear Giorgione’s name. As youthful in style as the two early pictures in the Uffizi, and closely allied to them in feeling, though

less so in colour, is an unexplained subject in the National Gallery, sometimes called for want of a better title the “Golden Age”; this is officially and by many critics given only to the “school of” Giorgione, but may not unreasonably be claimed for his own work (No. 1173). There is also in England a group of three paintings which are certainly by one hand, and that a hand very closely related to Giorgione if not actually his own, namely the small oblong “Adoration of the Magi” in the National Gallery (No. 1160), the “Adoration of the Shepherds” belonging to Lord Allendale (with its somewhat inferior but still attractive replica at Vienna), and the small “Holy Family” in the collection of Mr R. H. Benson. The type of the Madonna in all these three pieces is different from that customary with the master, but there seems no reason why he should not at some particular moment have changed his model. The sentiment and gestures of the figures, the cast of draperies, the technical handling, and especially, in Lord Allendale’s picture, the romantic richness of the landscape, all incline us to accept the group as original, notwithstanding the deviation of type already mentioned and certain weaknesses of drawing and proportion which we should have hardly looked for. Better known to European students in general are the two fine pictures commonly given to the master at the Pitti gallery in Florence, namely the “Three Ages” and the “Concert.” Both are very Giorgionesque, the “Three Ages” leaning rather towards the early manner of Lorenzo Lotto, to whom by some critics it is actually given. The “Concert” is held on technical grounds by some of the best judges rather to bear the character of Titian at the moment when the inspiration of Giorgione was strongest on him, at least so far as concerns the extremely beautiful and expressive central figure of the monk playing on the clavichord with reverted head, a very incarnation of musical rapture and yearning—the other figures are too much injured to judge.

There are at least two famous single portraits as to which critics will probably never agree whether they are among the later works of Giorgione or among the earliest of Titian under his influence: these are the jovial and splendid half-length of Catherine Cornaro (or a stout lady much resembling her) with a bas-relief, in the collection of Signor Crespi at Milan, and the so-called “Ariosto” from Lord Darnley’s collection acquired for the National Gallery in 1904. Ancient and half-effaced inscriptions, of which there is no cause to doubt the genuineness, ascribe them both to Titian; both, to the mind of the present writer at least, are more nearly akin to such undoubted early Titians as the “Man with the Book” at Hampton Court and the “Man with the Glove” at the Louvre than to any authenticated work of Giorgione. At the same time it should be remembered that Giorgione is known to have actually enjoyed the patronage of Catherine Cornaro and to have painted her portrait. The Giorgionesque influence and feeling, to a degree almost of sentimental exaggeration, encounter us again in another beautiful Venetian portrait at the National Gallery which has sometimes been claimed for him, that of a man in crimson velvet with white pleated shirt and a background of bays, long attributed to the elder Palma (No. 636). The same qualities are present with more virility in a very striking portrait of a young man at Temple Newsam, which stands indeed nearer than any other extant example to the Brocardo portrait at Budapest. The full-face portrait of a woman in the Borghese gallery at Rome has the marks of the master’s design and inspiration, but in its present sadly damaged condition can hardly be claimed for his handiwork. The head of a boy with a pipe at Hampton Court, a little over life size, has been enthusiastically claimed as Giorgione’s workmanship, but is surely too slack and soft in handling to be anything more than an early copy of a lost work, analogous to, though better than, the similar copy at Vienna of a young man with an arrow, a subject he is known to have painted. The early records prove indeed that not a few such copies of Giorgione’s more admired works were produced in his own time or shortly afterwards. One of the most interesting and unmistakable such copies still extant is the picture formerly in the Manfrin collection at Venice, afterwards in that of Mr Barker in London, and now at Dresden, which is commonly called “The Horoscope,” and represents a woman seated near a classic ruin with a young child at her feet, an armed youth standing looking down at them, and a turbaned sage seated near with compasses, disk and book. Of important subject pictures belonging to the debatable borderland between Giorgione and his imitators are the large and interesting unfinished “Judgment of Solomon” at Kingston Lacy, which must certainly be the same that Ridolfi saw and attributed to him in the Casa Grimani at Venice, but has weaknesses of design and drawing sufficiently baffling to criticism; and the “Woman taken in Adultery” in the public gallery at Glasgow, a picture truly Giorgionesque in richness of colour, but betraying in its awkward composition, the relative coarseness of its types and the insincere, mechanical animation of its movements, the hand of some lesser master of the school, almost certainly (by comparison with his existing engravings and woodcuts) that of Domenico Campagnola. It seems unnecessary to refer, in the present notice, to any of the numerous other and inferior works which have been claimed for Giorgione by a criticism unable to distinguish between a living voice and its echoes.

BIBLIOGRAPHY.—Morelli, *Notizie*, &c. (ed. Frizzoni, 1884): Vasari (ed. Milanesi), vol. iv.; Ridolfi, *Le Maraviglie dell’ arte*, vol. i.; Zanetti, *Varie Pitture* (1760); Crowe-Cavalcaselle, *History of Painting in North Italy*; Morelli, *Kunstkritische Studien*; Gronau, *Zorzon da Castelfranco, la sua origine*, &c. (1894); Herbert Cook, *Giorgione* (in “Great Masters” series, 1900); Ugo Monneret de Villard, *Giorgione da Castelfranco* (1905). The two last-named works are critically far too inclusive, but useful as going over the whole ground of discussion, with full references to earlier authorities, &c.

(S. C.)

GIOTTINO (1324-1357), an early Florentine painter. Vasari is the principal authority in regard to this artist; but it is not by any means easy to bring the details of his narrative into harmony with such facts as can now be verified. It would appear that there was a painter of the name of Tommaso (or Maso) di Stefano termed Giottino; and the Giottino of Vasari is said to have been born in 1324, and to have died early, of consumption, in 1357,—dates which must be regarded as open to considerable doubt. Stefano, the father of Tommaso, was himself a celebrated painter in the early revival of art; his naturalism was indeed so highly appreciated by contemporaries as to earn him the appellation of "Scimia della Natura" (ape of nature). He, it seems, instructed his son, who, however, applied himself with greater predilection to studying the works of the great Giotto, formed his style on these, and hence was called Giottino. It is even said that Giottino was really the son (others say the great-grandson) of Giotto. To this statement little or no importance can be attached. To Maso di Stefano, or Giottino, Vasari and Ghiberti attribute the frescoes in the chapel of S. Silvestro (or of the Bardi family) in the Florentine church of S. Croce; these represent the miracles of Pope S. Silvestro as narrated in the "Golden Legend," one conspicuous subject being the sealing of the lips of a malignant dragon. These works are animated and firm in drawing, with naturalism carried further than by Giotto. From the evidence of style, some modern connoisseurs assign to the same hand the paintings in the funeral vault of the Strozzi family, below the Cappella degli Spagnuoli in the church of S. Maria Novella, representing the crucifixion and other subjects. Vasari ascribes also to his Giottino the frescoes of the life of St Nicholas in the lower church of Assisi. This series, however, is not really in that part of the church which Vasari designates, but is in the chapel of the Sacrament; and the works in that chapel are understood to be by Giotto di Stefano, who worked in the second half of the 14th century—very excellent productions of their period. They are much damaged, and the style is hardly similar to that of the Sylvester frescoes. It might hence be inferred that two different men produced the works which are unitedly fathered upon the half-legendary "Giottino," the consumptive youth, solitary and melancholic, but passionately devoted to his art. A large number of other works have been attributed to the same hand; we need only mention an "Apparition of the Virgin to St Bernard," in the Florentine Academy; a lost painting, very popular in its day, commemorating the expulsion, which took place in 1343, of the duke of Athens from Florence; and a marble statue erected on the Florentine campanile. Vasari particularly praises Giottino for well-blended chiaroscuro.

GIOTTO [Giotto di Bondone[1]] (1267?-1337), Italian painter, was born at Vespignano in the Mugello, a few miles north of Florence, according to one account in 1276, and according to another, which from the few known circumstances of his life seems more likely to be correct, in 1266 or 1267. His father was a landowner at Colle in the commune of Vespignano, described in a contemporary document as *vir praeclarus*, but by biographers both early and late as a poor peasant; probably therefore a peasant proprietor of no large possessions but of reputable stock and descent. It is impossible to tell whether there is any truth in the legend of Giotto's boyhood which relates how he first showed his disposition for art, and attracted the attention of Cimabue, by being found drawing one of his father's sheep with a sharp stone on the face of a smooth stone or slate. With his father's consent, the story goes on, Cimabue carried off the boy to be his apprentice, and it was under Cimabue's tuition that Giotto took his first steps in the art of which he was afterwards to be the great emancipator and renovator. The place where these early steps can still, according to tradition, be traced, is in the first and second, reckoning downwards, of the three courses of frescoes which adorn the walls of the nave in the Upper Church of St Francis at Assisi. These frescoes represent subjects of the Old and New Testament, and great labour, too probably futile, has been spent in trying to pick out those in which the youthful handiwork of Giotto can be discerned, as it is imagined, among that of Cimabue and his other pupils. But the truth is that the figure of Cimabue himself, in spite of Dante's testimony to his having been the foremost painter of Italy until Giotto arose, has under the search-light of modern criticism melted into almost mythical vagueness. His accepted position as Giotto's instructor and the pioneer of reform in his art has been attacked from several sides as a mere invention of Florentine writers for the glorification of their own city. One group of critics maintain that the real advance in Tuscan painting before Giotto was the work of the Sienese school and not of the Florentine. Another group contend that the best painting done in Italy down to the last decade of the 13th century was not done by Tuscan hands at all, but by Roman craftsmen trained in the inherited principles of Italo-Byzantine decoration in mosaic and fresco, and that from such Roman craftsmen alone could Giotto have learnt anything worth his learning. The debate thus opened is far from closed, and considering how scanty, ambiguous and often defaced are the materials existing for discussion, it is perhaps never likely to be closed. But there is no debate as to the general nature of the reform effected by the genius of Giotto himself. He was the great humanizer of painting; it is his glory to have been the first among his countrymen to breathe life into wall-pictures and altar-pieces, and to quicken the dead conventionalism of inherited practice with the fire of natural action and natural feeling. Upon yet another point there is no question; and that is that the reform thus effected by Giotto in painting had been anticipated in the sister art of sculpture by nearly a whole generation. About the middle of the 13th century Nicola Pisano had renewed that art, first by strict imitation of classical models, and later by infusing into his work a fresh spirit of nature and humanity, perhaps partly caught from the Gothic schools of France. His son Giovanni had carried the same re-vitalising of sculpture a great deal further; and hence to some critics it would seem that the real inspirer and precursor of Giotto was Giovanni Pisano the sculptor, and not

any painter or wall-decorator, whether of Florence, Siena or Rome.

In this division of opinion it is safer to regard the revival of painting in Giotto's hands simply as part of the general awakening of the time, and to remember that, as of all Italian communities Florence was the keenest in every form of activity both intellectual and practical, so it was natural that a son of Florence should be the chief agent in such an awakening. And in considering his career the question of his possible participation in the primitive frescoes of the upper courses at Assisi is best left out of account, the more so because of the deplorable condition in which they now exist. But with reference to the lowest course of paintings on the same walls, those illustrating the life of St Francis according to the narrative of St Bonaventura, no one has any doubt, at least in regard to nineteen or twenty of the twenty-eight subjects which compose the series, that Giotto himself was their designer and chief executant. In these, sadly as they too have suffered from time and wholesale repair, there can nevertheless be discerned the unmistakable spirit of the young Florentine master as we know him in his other works—his shrewd realistic and dramatic vigour, the deep sincerity and humanity of feeling which he knows how to express in every gesture of his figures without breaking up the harmony of their grouping or the grandeur of their linear design, qualities inherited from the earlier schools of impressive but lifeless hieratic decoration. The "Renunciation of the Saint by his Father," the "Pope's Dream of the Saint upholding the tottering Church," the "Saint before the Sultan," the "Miracle of the Spring of Water," the "Death of the Nobleman of Celano," the "Saint preaching before Pope Honorius"—these are some of the most noted and best preserved examples of the painter's power in this series. Where doubt begins again is as to the relations of date and sequence which the series bears to other works by the master executed at Assisi and at Rome in the same early period of his career, that is, probably between 1295 and 1300. Giotto's remaining undisputed works at Assisi are the four celebrated allegorical compositions in honour of St Francis in the vaulting of the Lower Church,—the "Marriage of St Francis to Poverty," the "Allegory of Chastity," the "Allegory of Obedience" and the "Vision of St Francis in Glory." These works are scarcely at all retouched, and relatively little dimmed by time; they are of a singular beauty, at once severe and tender, both in colour and design; the compositions, especially the first three, fitted with admirable art into the cramped spaces of the vaulting, the subjects, no doubt in the main dictated to the artist by his Franciscan employers, treated in no cold or mechanical spirit but with a full measure of vital humanity and original feeling. Had the career and influence of St Francis had no other of their vast and far-reaching effects in the world than that of inspiring these noble works of art, they would still have been entitled to no small gratitude from mankind. Other works at Assisi which most modern critics, but not all, attribute to Giotto himself are three miracles of St Francis and portions of a group of frescoes illustrating the history of Mary Magdalene, both in the Lower Church; and again, in one of the transepts of the same Lower Church, a series of ten frescoes of the Life of the Virgin and Christ, concluding with the Crucifixion. It is to be remarked as to this transept series that several of the frescoes present not only the same subjects, but with a certain degree of variation the same compositions, as are found in the master's great series executed in the Arena chapel at Padua in the fullness of his powers about 1306; and that the versions in the Assisi transept show a relatively greater degree of technical accomplishment than the Paduan versions, with a more attractive charm and more abundance of accessory ornament, but a proportionately less degree of that simple grandeur in composition and direct strength of human motive which are the special notes of Giotto's style. Therefore a minority of critics refuse to accept the modern attribution of this transept series to Giotto himself, and see in it later work by an accomplished pupil softening and refining upon his master's original creations at Padua. Others, insisting that these unquestionably beautiful works must be by the hand of Giotto and none but Giotto, maintain that in comparison with the Paduan examples they illustrate a gradual progress, which can be traced in other of his extant works, from the relatively ornate and soft to the austerely grand and simple. This argument is enforced by comparison with early work of the master's at Rome as to the date of which we have positive evidence. In 1298 Giotto completed for Cardinal Stefaneschi for the price of 2200 gold ducats a mosaic of Christ saving St Peter from the waves (the celebrated "Navicella"); this is still to be seen, but in a completely restored and transformed state, in the vestibule of St Peter's. For the same patron he executed, probably just before the "Navicella," an elaborate ciborium or altar-piece for the high altar of St Peter's, for which he received 800 ducats. It represents on the principal face a colossal Christ enthroned with adoring angels beside him and a kneeling donor at his feet, and the martyrdoms of St Peter and St Paul on separate panels to right and left; on the reverse is St Peter attended by St George and other saints, receiving from the donor a model of his gift, with stately full-length figures of two apostles to right and two to left, besides various accessory scenes and figures in the predellas and the margins. The separated parts of this altar-piece are still to be seen, in a quite genuine though somewhat tarnished condition, in the sacristy of St Peter's. A third work by the master at Rome is a repainted fragment at the Lateran of a fresco of Pope Boniface VIII. proclaiming the jubilee of 1300. The "Navicella" and the Lateran fragment are too much ruined to argue from; but the ciborium panels, it is contended, combine with the aspects of majesty and strength a quality of ornate charm and suavity such as is remarked in the transept frescoes of Assisi. The sequence proposed for these several works is accordingly, first the St Peter's ciborium, next the allegories in the vaulting of the Lower Church, next the three frescoes of St Francis' miracles in the north transept, next the St Francis series in the Upper Church; and last, perhaps after an interval and with the help of pupils, the scenes from the life of Mary Magdalene in her chapel in the Lower Church. This involves a complete reversal of the prevailing view, which regards the unequal and sometimes clumsy compositions of this St Francis series as the earliest independent work of the master. It must be admitted that there is something paradoxical in the idea of a progress from the manner of the Lower Church transept series of the life of Christ to the much ruder manner of the Upper Church series of St Francis.

A kindred obscurity and little less conflict of opinion await the inquirer at almost all stages of Giotto's career. In 1841 there were partially recovered from the whitewash that had overlain them a series of frescoes executed in the chapel of the Magdalene, in the Bargello or Palace of the Podestà at Florence, to celebrate (as was supposed) a pacification between the Black and White parties in the state effected by the Cardinal d'Acquasparta as delegate of the pope in 1302. In them are depicted a series of Bible scenes, besides great compositions of Hell and Paradise, and in the Paradise are introduced portraits of Dante, Brunetto Latini and Corso Donato. These recovered fragments, freely "restored" as soon as they were disclosed, were acclaimed as the work of Giotto and long held in especial regard for the sake of the portrait of Dante. Latterly it has been shown that if Giotto ever executed them at all, which is doubtful, it must have been at a later date than the supposed pacification, and that they must have suffered grievous injury in the fire which destroyed a great part of the building in 1332, and been afterwards repainted by some well-trained follower of the school. To about 1302 or 1303 would belong, if there is truth in it, the familiar story of Giotto's O. Pope Benedict XI., the successor of Boniface VIII., sent, as the tale runs, a messenger to bring him proofs of the painter's powers. Giotto would give no other sample of his talent than an O drawn with a free sweep of the brush from the elbow; but the pope was satisfied and engaged him at a great salary to go and adorn with frescoes the papal residence at Avignon. Benedict, however, dying at this time (1305), nothing came of this commission; and the remains of Italian 14th-century frescoes still to be seen at Avignon are now recognized as the work, not, as was long supposed, of Giotto, but of the Sienese Simone Martini and his school.

At this point in Giotto's life we come to the greatest by far of his undestroyed and undisputed enterprises, and one which can with some certainty be dated. This is the series of frescoes with which he decorated the entire internal walls of the chapel built at Padua in honour of the Virgin of the Annunciation by a rich citizen of the town, Enrico Scrovegni, perhaps in order to atone for the sins of his father, a notorious usurer whom Dante places in the seventh circle of hell. The building is on the site of an ancient amphitheatre, and is therefore generally called the chapel of the Arena. Since it is recorded that Dante was Giotto's guest at Padua, and since we know that it was in 1306 that the poet came from Bologna to that city, we may conclude that to the same year, 1306, belongs the beginning of Giotto's great undertaking in the Arena chapel. The scheme includes a Saviour in Glory over the altar, a Last Judgment, full of various and impressive incident, occupying the whole of the entrance wall, with a series of subjects from the Old and New Testament and the apocryphal Life of Christ painted in three tiers on either side wall, and lowest of all a fourth tier with emblematic Virtues and Vices in monochrome; the Virtues being on the side of the chapel next the incidents of redemption in the entrance fresco of the Last Judgment, the Vices on the side next the incidents of perdition. A not improbable tradition asserts that Giotto was helped by Dante in the choice and disposition of the subjects. The frescoes, though not free from injury and retouching, are upon the whole in good condition, and nowhere else can the highest powers of the Italian mind and hand at the beginning of the 14th century be so well studied as here. At the close of the middle ages we find Giotto laying the foundation upon which all the progress of the Renaissance was afterwards securely based. In his day the knowledge possessed by painters of the human frame and its structure rested only upon general observation and not upon detailed or scientific study; while to facts other than those of humanity their observation had never been closely directed. Of linear perspective they possessed but elementary and empirical ideas, and their endeavours to express aerial perspective and deal with the problems of light and shade were rare and partial. As far as painting could possibly be carried under these conditions, it was carried by Giotto. In its choice of subjects, his art is entirely subservient to the religious spirit of his age. Even in its mode of conceiving and arranging those subjects it is in part still trammelled by the rules and consecrated traditions of the past. Many of those truths of nature to which the painters of succeeding generations learned to give accurate and complete expression, Giotto was only able to express by way o£ imperfect symbol and suggestion. But among the elements of art over which he has control he maintains so just a balance that his work produces in the spectator less sense of imperfection than that of many later and more accomplished masters. In some particulars his mature painting, as we see it in the Arena chapel, has never been surpassed—in mastery of concise and expressive generalized line and of inventive and harmonious decorative tint; in the judicious division of the field and massing and scattering of groups; in the combination of high gravity with complete frankness in conception, and the union of noble dignity in the types with direct and vital truth in the gestures of the personages.

The frescoes of the Arena chapel must have been a labour of years, and of the date of their termination we have no proof. Of many other works said to have been executed by Giotto at Padua, all that remains consists of some scarce recognizable traces in the chapter-house of the great Franciscan church of St Antonio. For twenty years or more we lose all authentic data as to Giotto's doings and movements. Vasari, indeed, sends him on a giddy but in the main evidently fabulous round of travels, including a sojourn in France, which it is certain he never made. Besides Padua, he is said to have resided and left great works at Ferrara, Ravenna, Urbino, Rimini, Faenza, Lucca and other cities; in some of them paintings of his school are still shown, but nothing which can fairly be claimed to be by his hand. It is recorded also that he was much employed in his native city of Florence; but the vandalism of later generations has effaced nearly all that he did there. Among works whitewashed over by posterity were the frescoes with which he covered no less than five chapels in the church of Santa Croce. Two of these, the chapels of the Bardi and the Peruzzi families, were scraped in the early part of the 19th century, and very important remains were uncovered and immediately subjected to a process of restoration which has robbed them of half their authenticity. But through the ruins of time we can trace in some of these Santa Croce frescoes all the qualities of Giotto's work at an even higher and

more mature development than in the best examples at Assisi or Padua. The frescoes of the Bardi chapel tell again the story of St Francis, to which so much of his best power had already been devoted; those of the Peruzzi chapel deal with the lives of St John the Baptist and St John the Evangelist. Such scenes as the Funeral of St Francis, the Dance of Herodias's Daughter, and the Resurrection of St John the Evangelist, which have to some extent escaped the disfigurements of the restorer, are among acknowledged classics of the world's art. The only clues to the dates of any of these works are to be found in the facts that among the figures in the Bardi chapel occurs that of St Louis of Toulouse, who was not canonized till 1317, therefore the painting must be subsequent to that year, and that the "Dance of Salome" must have been painted before 1331, when it was copied by the Lorenzetti at Siena. The only other extant works of Giotto at Florence are a fine "Crucifix," not undisputed, at San Marco, and the majestic but somewhat heavy altar-piece of the Madonna, probably an early work, which is placed in the Academy beside a more primitive Madonna supposed to be the work of Cimabue.

Towards the end of Giotto's life we escape again from confused legend, and from the tantalizing record of works which have not survived for us to verify, into the region of authentic document and fact. It appears that Giotto had come under the notice of Duke Charles of Calabria, son of King Robert of Naples, during the visits of the duke to Florence which took place between 1326 and 1328, in which year he died. Soon afterwards Giotto must have gone to King Robert's court at Naples, where he was enrolled as an honoured guest and member of the household by a royal decree dated the 20th of January 1330. Another document shows him to have been still at Naples two years later. Tradition says much about the friendship of the king for the painter and the freedom of speech and jest allowed him; much also of the works he carried out at Naples in the Castel Nuovo, the Castel dell' Uovo, and the church and convent of Sta Chiara. Not a trace of these works remains; and others which later criticism have claimed for him in a hall which formerly belonged to the convent of Sta Chiara have been proved not to be his.

Meantime Giotto had been advancing, not only in years and worldly fame, but in prosperity. He was married young, and had, so far as is recorded, three sons, Francesco, Niccola and Donato, and three daughters, Bice, Caterina and Lucia. He had added by successive purchases to the plot of land inherited from his father at Vespignano. His fellow-citizens of all occupations and degrees delighted to honour him. And now, in his sixty-eighth year (if we accept the birth-date 1266/7), on his return from Naples by way of Gaeta, he received the final and official testimony to the esteem in which he was held at Florence. By a solemn decree of the *Priori* on the 12th of April 1334, he was appointed master of the works of the cathedral of Sta Reparata (later and better known as Sta Maria del Fiore) and official architect of the city walls and the towns within her territory. What training as a practical architect his earlier career had afforded him we do not know, but his interest in the art from the beginning is made clear by the carefully studied architectural backgrounds of many of his frescoes. Dying on the 8th of January 1336 (old style 1337), Giotto only enjoyed his new dignities for two years. But in the course of them he had found time not only to make an excursion to Milan, on the invitation of Azzo Visconti and with the sanction of his own government, but to plan two great architectural works at Florence and superintend the beginning of their execution, namely the west front of the cathedral and its detached campanile or bell-tower. The unfinished enrichments of the cathedral front were stripped away in a later age. The foundation-stone of the Campanile was laid with solemn ceremony in the presence of a great concourse of magistrates and people on the 18th of July 1334. Its lower courses seem to have been completed from Giotto's design, and the first course of its sculptured ornaments (the famous series of primitive Arts and Industries) actually by his own hand, before his death. It is not clear what modifications of his design were made by Andrea Pisano, who was appointed to succeed him, or again by Francesco Talenti, to whom the work was next entrusted; but the incomparable structure as we now see it stands justly in the world's esteem as the most fitting monument to the genius who first conceived and directed it.

The art of painting, as re-created by Giotto, was carried on throughout Italy by his pupils and successors with little change or development for nearly a hundred years, until a new impulse was given to art by the combined influences of naturalism and classicism in the hands of men like Donatello and Masaccio. Most of the anecdotes related of the master are probably inaccurate in detail, but the general character both as artist and man which tradition has agreed in giving him can never be assailed. He was from the first a kind of popular hero. He is celebrated by the poet Petrarch and by the historian Villani. He is made the subject of tales and anecdotes by Boccaccio and by Franco Sacchetti. From these notices, as well as from Vasari, we gain a distinct picture of the man, as one whose nature was in keeping with his country origin; whose sturdy frame and plain features corresponded to a character rather distinguished for shrewd and genial strength than for sublimer or more ascetic qualities; a master craftsman, to whose strong combining and inventing powers nothing came amiss; conscious of his own deserts, never at a loss either in the things of art or in the things of life, and equally ready and efficient whether he has to design the scheme of some great spiritual allegory in colour or imperishable monument in stone, or whether he has to show his wit in the encounter of practical jest and repartee. From his own hand we have a contribution to literature which helps to substantiate this conception of his character. A large part of Giotto's fame as painter was won in the service of the Franciscans, and in the pictorial celebration of the life and ordinances of their founder. As is well known, it was a part of the ordinances of Francis that his disciples should follow his own example in worshipping and being wedded to poverty,—poverty idealized and personified as a spiritual bride and mistress. Giotto, having on the commission of the order given the noblest pictorial embodiment to this and other aspects of the Franciscan doctrine, presently wrote an ode in which his own views on poverty are expressed; and in this he shows that, if on the one hand his genius was at the

service of the ideals of his time, and his imagination open to their significance, on the other hand his judgment was shrewdly and humorously awake to their practical dangers and exaggerations.

AUTHORITIES.—Ghiberti, *Commentari*; Vasari, *Le Vite*, vol. i.; Crowe-Cavalcaselle, *History of Painting in Italy*, ed. Langton Douglas (1903); H. Thode, *Giotto* (1899); M. G. Zimmermann, *Giotto und die Kunst Italiens im Mittelalter* (1899); B. Berenson, *Florentine Painters of the Renaissance*; F. Mason Perkin, *Giotto* (in "Great Masters" series) (1902); Basil de Sélincourt, *Giotto* (1905).

(S. C.)

1 Not to be confused with Giotto di Buondone, a contemporary citizen and politician of Siena.

GIPSIES, or GYPSIES, a wandering folk scattered through every European land, over the greater part of western Asia and Siberia; found also in Egypt and the northern coast of Africa, in America and even in Australia. No correct estimate of their numbers outside of Europe can be given, and even in Europe the information derived from official statistics is often contradictory and unreliable. The only country in which the figures have been given correctly is Hungary. In 1893 there were 274,940 in Transleithania, of whom 243,432 were settled, 20,406 only partly settled and 8938 nomads. Of these 91,603 spoke the Gipsy language in 1890, but the rest had already been assimilated. Next in numbers stands Rumania, the number varying between 250,000 and 200,000 (1895). Turkey in Europe counted 117,000 (1903), of whom 51,000 were in Bulgaria and Eastern Rumelia, 22,000 in the vilayet of Adrianople and 2500 in the vilayet of Kossovo. In Asiatic Turkey the estimates vary between 67,000 and 200,000. Servia has 41,000; Bosnia and Herzegovina, 18,000; Greece, 10,000; Austria (Cisleithania), 16,000, of whom 13,500 are in Bohemia and Moravia; Germany, 2000; France, 2000 (5000?); Basque Provinces, 500 to 700; Italy, 32,000; Spain, 40,000; Russia, 58,000; Poland, 15,000; Sweden and Norway, 1500; Denmark and Holland, 5000; Persia, 15,000; Transcaucasia, 3000. The rest is mere guesswork. For Africa, America and Australia the numbers are estimated between 135,000 and 166,000. The estimate given by Miklosich (1878) of 700,000 fairly agrees with the above statistics. No statistics are forthcoming for the number in the British Isles. Some estimate their number at 12,000.

The Gipsies are known principally by two names, which have been modified by the nations with whom they came in contact, but which can easily be traced to either the one or the other of these two distinct stems. The one group, embracing the majority of Gipsies in Europe, the compact masses living in the Balkan Peninsula, Rumania and Transylvania and extending also as far as Germany and Italy, are known by the name *Atzigan* or *Atsigan*, which becomes in time Tshingian (Turkey and Greece), Tsigan (Bulgarian, Servian, Rumanian), Czigány (Hungarian), Zigeuner (Germany), Zingari (Italian), and it is not unlikely that the English word Tinker or Tinkler (the latter no doubt due to a popular etymology connecting the gaudy gipsy with the tinkling coins or the metal wares which he carried on his back as a smith and tinker) may be a local transformation of the German *Zigeuner*. The second name, partly known in the East, where the word, however, is used as an expression of contempt, whilst Zigan is not felt by the gipsies as an insult, is *Egyptian*; in England, Gipsy; in some German documents of the 16th century *Aegypter*; Spanish *Gitano*; modern Greek *Gyphtos*. They are also known by the parallel expressions *Faraon* (Rumanian) and *Phárao Nephka* (Hungarian) or Pharaoh's people, which are only variations connected with the Egyptian origin. In France they are known as *Bohémiens*, a word the importance of which will appear later. To the same category belong other names bestowed upon them, such as Walachi, Saraceni, Agareni, Nubiani, &c. They were also known by the name of Tartars, given to them in Germany, or as "Heathen," *Heydens*. All these latter must be considered as nicknames without thereby denoting their probable origin. The same may have now been the ease with the first name with which they appear in history, *Atzigan*. Much ingenuity has been displayed in attempts to explain the name, for it was felt that a true explanation might help to settle the question of their origin and the date of their arrival in Europe. Here again two extreme theories have been propounded, the one supported by Bataillard, who connected them with the Sigynnoi of Herodotus and identified them with the Komodromoi of the later Byzantine writers, known already in the 6th century. Others bring them to Europe as late as the 14th century; and the name has also been explained by de Goeje from the Persian *Chang*, a kind of harp or zither, or the Persian *Zang*, black, swarthy. Rienzi (1832) and Trumpp (1872) have connected the name with the Changars of North-East India, but all have omitted to notice that the real form was Atzigan or (more correct) Atzingan and not Tsigan. The best explanation remains that suggested by Miklosich, who derives the word from the Athinganoi, a name originally belonging to a peculiar heretical sect living in Asia Minor near Phrygia and Lycaonia, known also as the Melki-Zedekites. The members of this sect observed very strict rules of purity, as they were afraid to be defiled by the touch of other people whom they considered unclean. They therefore acquired the name of Athinganoi (*i.e.* "Touch-me-nots").

Miklosich has collected seven passages where the Byzantine historians of the 9th century describe the Athinganoi as soothsayers, magicians and serpent-charmers. From these descriptions nothing definite can be proved as to the identity of the Athinganoi with the Gipsies, or the reason why this name was given to soothsayers, charmers, &c. But the inner history of the Byzantine empire of that period may easily give a clue to it and explain how it came about that such a nickname was given to a new sect or to a new race which suddenly appeared in the Greek Empire at that period. In the history

of the Church we find them mentioned in one breath with the Paulicians and other heretical sects which were transplanted in their tens of thousands from Asia Minor to the Greek empire and settled especially in Rumelia, near Adrianople and Philippopolis. The Greeks called these heretical sects by all kinds of names, derived from ancient Church traditions, and gave to each sect such names as first struck them, on the scantiest of imaginary similarities. One sect was called Paulician, another Melki-Zedekite; so also these were called Athinganoi, probably being considered the descendants of the outcast Samer, who, according to ancient tradition, was a goldsmith and the maker of the Golden Calf in the desert. For this sin Samer was banished and compelled to live apart from human beings and even to avoid their touch (Athinganos: "Touch-me-not"). Travelling from East to West these heretical sects obtained different names in different countries, in accordance with the local traditions or to imaginary origins. The Bogomils and Patarenes became Bulgarians in France, and so the gypsies Bohémiens, a name which was also connected with the heretical sect of the Bohemian brothers (*Böhmische Brüder*). Curiously enough the Kutzo-Vlachs living in Macedonia (*q.v.*) and Rumelia are also known by the nickname Tsintsari, a word that has not yet been explained. Very likely it stands in close connexion with Zingari, the name having been transferred from one people to the other without the justification of any common ethnical origin, except that the Kutzo-Vlachs, like the Zingari, differed from their Greek neighbours in race, as in language, habits and customs; while they probably followed similar pursuits to those of the Zingari, as smiths, &c. As to the other name, Egyptians, this is derived from a peculiar tale which the gipsies spread when appearing in the west of Europe. They alleged that they had come from a country of their own called Little Egypt, either a confusion between Little Armenia and Egypt or the Peloponnesus.

Attention may be drawn to a remarkable passage in the Syriac version of the apocryphal Book of Adam, known as the *Cave of Treasures* and compiled probably in the 6th century: "And of the seed of Canaan were as I said the Aegyptians; and, lo, they were scattered all over the earth and served as slaves of slaves" (ed. Bezold, German translation, p. 25). No reference to such a scattering and serfdom of the Egyptians is mentioned anywhere else. This must have been a legend, current in Asia Minor, and hence probably transferred to the swarthy Gipsies.

A new explanation may now be ventured upon as to the name which the Gipsies of Europe give to themselves, which, it must be emphasized, is not known to the Gipsies outside of Europe. Only those who starting from the ancient Byzantine empire have travelled westwards and spread over Europe, America and Australia call themselves by the name of Rom, the woman being Romni and a stranger Gaži. Many etymologies have been suggested for the word Rom. Paspati derived it from the word Droma (Indian), and Miklosich had identified it with Ḍoma or Ḍomba, a "low caste musician," rather an extraordinary name for a nation to call itself by. Having no home and no country of their own and no political traditions and no literature, they would naturally try to identify themselves with the people in whose midst they lived, and would call themselves by the same name as other inhabitants of the Greek empire, known also as the Empire of New Rom, or of the Romaioi, Romeliots, Romanoi, as the Byzantines used to call themselves before they assumed the prouder name of Hellenes. The Gipsies would therefore call themselves also Rom, a much more natural name, more flattering to their vanity, and geographically and politically more correct than if they called themselves "low caste musicians." This Greek origin of the name would explain why it is limited to the European Gipsies, and why it is not found among that stock of Gipsies which has migrated from Asia Minor southwards and taken a different route to reach Egypt and North Africa.

Appearance in Europe.—Leaving aside the doubtful passages in the Byzantine writers where the Athinganoi are mentioned, the first appearance of Gipsies in Europe cannot be traced positively further back than the beginning of the 14th century. Some have hitherto believed that a passage in what was erroneously called the Rhymed Version of Genesis of Vienna, but which turns out to be the work of a writer before the year 1122, and found only in the Klagenfurt manuscript (edited by Ditmar, 1862), referred to the Gipsies. It runs as follows: Gen. xiii. 15—"Hagar had a son from whom were born the Chaltsmide. When Hagar had that child, she named it Ismael, from whom the Ismaelites descend who journey through the land, and we call them Chaltsmide, may evil befall them! They sell only things with blemishes, and for whatever they sell they always ask more than its real value. They cheat the people to whom they sell. They have no home, no country, they are satisfied to live in tents, they wander over the country, they deceive the people, they cheat men but rob no one noisily."

This reference to the Chaltsmide (not goldsmiths, but very likely ironworkers, smiths) has wrongly been applied to the Gipsies. For it is important to note that at least three centuries before historical evidence proves the immigration of the genuine Gipsy, there had been wayfaring smiths, travelling from country to country, and practically paving the way for their successors, the Gipsies, who not only took up their crafts but who probably have also assimilated a good proportion of these vagrants of the west of Europe. The name given to the former, who probably were Oriental or Greek smiths and pedlars, was then transferred to the new-comers. The Komodromoi mentioned by Theophanes (758-818), who speaks under the date 554 of one hailing from Italy, and by other Byzantine writers, are no doubt the same as the Chaltsmide of the German writer of the 12th century translated by Ducange as *Chaudroneurs*. We are on surer ground in the 14th century. Hopf has proved the existence of Gipsies in Corfu before 1326. Before 1346 the empress Catherine de Valois granted to the governor of Corfu authority to reduce to vassalage certain vagrants who came from the mainland; and in 1386, under the Venetians, they formed the Feudum Acindanorum, which lasted for many centuries. About 1378 the Venetian governor of Nauplia confirmed to the "Acingani" of that colony the privileges granted by his predecessor to their leader John. It is even possible to identify the people described by Friar Simon in his *Itinerarium*, who, speaking of his stay in Crete in 1322, says: "We saw there a people outside the

city who declare themselves to be of the race of Ham and who worship according to the Greek rite. They wander like a cursed people from place to place, not stopping at all or rarely in one place longer than thirty days; they live in tents like the Arabs, a little oblong black tent." But their name is not mentioned, and although the similarity is great between these "children of Ham" and the Gipsies, the identification has only the value of an hypothesis. By the end of the 15th century they must have been settled for a sufficiently long time in the Balkan Peninsula and the countries north of the Danube, such as Transylvania and Walachia, to have been reduced to the same state of serfdom as they evidently occupied in Corfu in the second half of the 14th century. The voivode Mircea I. of Walachia confirms the grant made by his uncle Vladislav Voivode to the monastery of St Anthony of Voditsa as to forty families of "Atsigane," for whom no taxes should be paid to the prince. They were considered crown property. The same gift is renewed in the year 1424 by the voivode Dan, who repeats the very same words (i Acigăne, m, čeliudi. da su slobodni ot vstkih rabot i dankov) (Hăjdău, *Arhiva*, i. 20). At that time there must already have been in Walachia settled Gipsies treated as serfs, and migrating Gipsies plying their trade as smiths, musicians, dancers, soothsayers, horse-dealers, &c., for we find the voivode Alexander of Moldavia granting these Gipsies in the year 1478 "freedom of air and soil to wander about and free fire and iron for their smithy." But a certain portion, probably the largest, became serfs, who could be sold, exchanged, bartered and inherited. It may be mentioned here that in the 17th century a family when sold fetched forty Hungarian florins, and in the 18th century the price was sometimes as high as 700 Rumanian piastres, about £8, 10s. As late as 1845 an auction of 200 families of Gipsies took place in Bucharest, where they were sold in batches of no less than 5 families and offered at a "ducat" cheaper per head than elsewhere. The Gipsies followed at least four distinct pursuits in Rumania and Transylvania, where they lived in large masses. A goodly proportion of them were tied to the soil; in consequence their position was different from that of the Gipsies who had started westwards and who are nowhere found to have obtained a permanent abode for any length of time, or to have been treated, except for a very short period, with any consideration of humanity.

Their appearance in the West is first noted by chroniclers early in the 15th century. In 1414 they are said to have already arrived in Hesse. This date is contested, but for 1417 the reports are unanimous of their appearance in Germany. Some count their number to have been as high as 1400, which of course is exaggeration. In 1418 they reached Hamburg, 1419 Augsburg, 1428 Switzerland. In 1427 they had already entered France (Provence). A troupe is said to have reached Bologna in 1422, whence they are said to have gone to Rome, on a pilgrimage alleged to have been undertaken for some act of apostasy. After this first immigration a second and larger one seems to have followed in its wake, led by Zumbel. The Gipsies spread over Germany, Italy and France between the years 1438 and 1512. About 1500 they must have reached England. On the 5th of July 1505 James IV. of Scotland gave to "Antonius Gaginae," count of Little Egypt, letters of recommendation to the king of Denmark; and special privileges were granted by James V. on the 15th of February 1540 to "oure louit johnne Faw Lord and Erle of Litill Egypt," to whose son and successor he granted authority to hang and punish all Egyptians within the realm (May 26, 1540).

It is interesting to hear what the first writers who witnessed their appearance have to tell us; for ever since the Gipsies have remained the same. Albert Krantzius (Krantz), in his *Saxonia* (xi. 2), was the first to give a full description, which was afterwards repeated by Munster in his *Cosmographia* (iii. 5). He says that in the year 1417 there appeared for the first time in Germany a people uncouth, black, dirty, barbarous, called in Italian "Ciani," who indulge specially in thieving and cheating. They had among them a count and a few knights well dressed, others followed afoot. The women and children travelled in carts. They also carried with them letters of safe-conduct from the emperor Sigismund and other princes, and they professed that they were engaged on a pilgrimage of expiation for some act of apostasy.

The guilt of the Gipsies varies in the different versions of the story, but all agree that the Gipsies asserted that they came from their own country called "Litill Egypt," and they had to go to Rome, to obtain pardon for that alleged sin of their forefathers. According to one account it was because they had not shown mercy to Joseph and Mary when they had sought refuge in Egypt from the persecution of Herod (*Basel Chronicle*). According to another, because they had forsaken the Christian faith for a while (*Rhaetia*, 1656), &c. But these were fables, no doubt connected with the legend of Cartaphylus or the Wandering Jew.

Krantz's narrative continues as follows: This people have no country and travel through the land. They live like dogs and have no religion although they allow themselves to be baptized in the Christian faith. They live without care and gather unto themselves also other vagrants, men and women. Their old women practise fortune-telling, and whilst they are telling men of their future they pick their pockets. Thus far Krantz. It is curious that he should use the name by which these people were called in Italy, "Ciani." Similarly Crusius, the author of the *Annales Suevici*, knows their Italian name *Zigani* and the French *Bohémiens*. Not one of these oldest writers mentions them as coppersmiths or farriers or musicians. The immunity which they enjoyed during their first appearance in western Europe is due to the letter of safe-conduct of the emperor. As it is of extreme importance for the history of civilization as well as the history of the Gipsies, it may find a place here. It is taken from the compilation of Felix Oefelius, *Rerum Boicarum scriptores* (Augsburg, 1763), ii. 15, who reproduces the "Diarium sexennale" of "Andreas Presbyter," the contemporary of the first appearance of the Gipsies in Germany.

"Sigismundus Dei gratia Romanorum Rex semper Augustus, ac Hungariae, Bohemiae, Dalmatiae, Croatiae, &c. Rex Fidelibus nostris universis Nobilibus, Militibus, Castellanis, Officialibus, Tributariis,

civitatibus liberis, opidis et eorum iudicibus in Regno et sub domino nostro constitutis ex existentibus salutem cum dilectione. Fidèles nostri adierunt in praesentiam personaliter Ladislaus Wayuoda Ciganorum cum aliis ad ipsum spectantibus, nobis humilimas porrexerunt supplicationes, huc in sepus in nostra praesentia supplicationum precum cum instantiâ, ut ipsis gratiâ nostra uberiori providere dignaremur. Unde nos illorum supplicatione illecti eisdem hanc libertatem duximus concedendam, qua re quandocunque idem Ladislaus Wayuoda et sua gens ad dicta nostra dominia videlicet civitates vel oppida pervenerint, ex tunc vestris fidelitatibus praesentibus firmiter committimus et mandamus ut eosdem Ladislaum Wayuodam et Ciganos sibi subiectos omni sine impedimento ac perturbatione aliquali fovere ac conservare debeatis, immo ab omnibus impetitionibus seu offensionibus tueri velitis: Si autem inter ipsos aliqua Zizania seu perturbatio evenerit ex parte, quorumcunque ex tunc non vos nec aliquis alter vestrum, sed idem Ladislaus Wayuoda iudicandi et liberandi habeat facultatem. Praesentes autem post earum lecturam semper reddi iubemus praesentanti.

"Datum in Sepus Dominica die ante festum St Georgii Martyris Anno Domini MCCCCXXIII., Regnorum nostrorum anno Hungar. XXXVI., Romanorum vero XII., Bohemiae tertio."

Freely translated this reads: "We Sigismund by the grace of God emperor of Rome, king of Hungary, Bohemia, &c. unto all true and loyal subjects, noble soldiers, commanders, castellans, open districts, free towns and their judges in our kingdom established and under our sovereignty, kind greetings. Our faithful voivode of the Tsigani with others belonging to him has humbly requested us that we might graciously grant them our abundant favour. We grant them their supplication, we have vouchsafed unto them this liberty. Whenever therefore this voivode Ladislaus and his people should come to any part of our realm in any town, village or place, we commit them by these presents, strongly to your loyalty and we command you to protect in every way the same voivode Ladislaus and the Tsigani his subjects without hindrance, and you should show kindness unto them and you should protect them from every trouble and persecution. But should any trouble or discord happen among them from whichever side it may be, then none of you nor anyone else belonging to you should interfere, but this voivode Ladislaus alone should have the right of punishing and pardoning. And we moreover command you to return these presents always after having read them. Given in our court on Sunday the day before the Feast of St George in the year of our Lord 1423. The 36th year of our kingdom of Hungary, the 12th of our being emperor of Rome and the 3rd of our being king of Bohemia."

There is no reason to doubt the authenticity of this document, which is in no way remarkable considering that at that time the Gipsies must have formed a very considerable portion of the inhabitants of Hungary, whose king Sigismund was. They may have presented the emperor's grant of favours to Alexander prince of Moldavia in 1472, and obtained from him safe-conduct and protection, as mentioned above.

No one has yet attempted to explain the reason why the Gipsies should have started in the 14th and especially in the first half of the 15th century on their march westwards. But if, as has been assumed above, the Gipsies had lived for some length of time in Rumelia, and afterwards spread thence across the Danube and the plains of Transylvania, the incursion of the Turks into Europe, their successive occupation of those very provinces, the overthrow of the Servian and Bulgarian kingdoms and the dislocation of the native population, would account to a remarkable degree for the movement of the Gipsies: and this movement increases in volume with the greater successes of the Turks and with the peopling of the country by immigrants from Asia Minor. The first to be driven from their homes would no doubt be the nomadic element, which felt itself ill at ease in its new surroundings, and found it more profitable first to settle in larger numbers in Walachia and Transylvania and thence to spread to the western countries of Europe. But their immunity from persecution did not last long.

Later History.—Less than fifty years from the time that they emerge out of Hungary, or even from the date of the Charter of the emperor Sigismund, they found themselves exposed to the fury and the prejudices of the people whose good faith they had abused, whose purses they had lightened, whose barns they had emptied, and on whose credulity they had lived with ease and comfort. Their inborn tendency to roaming made them the terror of the peasantry and the despair of every legislator who tried to settle them on the land. Their foreign appearance, their unknown tongue and their unscrupulous habits forced the legislators of many countries to class them with rogues and vagabonds, to declare them outlaws and felons and to treat them with extreme severity. More than one judicial murder has been committed against them. In some places they were suspected as Turkish spies and treated accordingly, and the murderer of a Gipsy was often regarded as innocent of any crime.

Weissenbruch describes the wholesale murder of a group of Gipsies, of whom five men were broken on the wheel, nine perished on the gallows, and three men and eight women were decapitated. This took place on the 14th and 15th of November 1726. Acts and edicts were issued in many countries from the end of the 15th century onwards sentencing the "Egyptians" to exile under pain of death. Nor was this an empty threat. In Edinburgh four "Faas" were hanged in 1611 "for abyding within the kingdome, they being Egiptienis," and in 1636 at Haddington the Egyptians were ordered "the men to be hangied and the weomen to be drowned, and suche of the weomen as hes children to be scourgit throw the burg and burnt in the cheeks." The burning on the cheek or on the back was a common penalty. In 1692 four Estremadura Gipsies caught by the Inquisition were charged with cannibalism and made to own that they had eaten a friar, a pilgrim and even a woman of their own tribe, for which they suffered the penalty of death. And as late as 1782, 45 Hungarian Gipsies were charged with a similar monstrous crime, and when the supposed victims of a supposed murder could not be found on the spot indicated by the Gipsies, they owned under torture and said on the rack, "We ate them." Of

course they were forthwith beheaded or hanged. The emperor Joseph II., who was also the author of one of the first edicts in favour of the Gipsies, and who abolished serfdom throughout the Empire, ordered an inquiry into the incident; it was then discovered that no murder had been committed, except that of the victims of this monstrous accusation.

The history of the legal status of the Gipsies, of their treatment in various countries and of the penalties and inflictions to which they have been subjected, would form a remarkable chapter in the history of modern civilization. The materials are slowly accumulating, and it is interesting to note as one of the latest instances, that not further back than the year 1907 a "drive" was undertaken in Germany against the Gipsies, which fact may account for the appearance of some German Gipsies in England in that year, and that in 1904 the Prussian Landtag adopted unanimously a proposition to examine anew the question of granting peddling licences to German Gipsies; that on the 17th of February 1906 the Prussian minister issued special instructions to combat the Gipsy nuisance; and that in various parts of Germany and Austria a special register is kept for the tracing of the genealogy of vagrant and sedentary Gipsy families.

Different has been the history of the Gipsies in what originally formed the Turkish empire of Europe, notably in Rumania, *i.e.* Walachia and Moldavia, and a careful search in the archives of Rumania would offer rich materials for the history of the Gipsies in a country where they enjoyed exceptional treatment almost from the beginning of their settlement. They were divided mainly into two classes, (1) *Robi* or Serfs, who were settled on the land and deprived of all individual liberty, being the property of the nobles and of churches or monastic establishments, and (2) the Nomadic vagrants. They were subdivided into four classes according to their occupation, such as the Lingurari (woodcarvers; lit. "spoonmakers"), Caldarari (tinkers, coppersmiths and ironworkers), Ursari (lit. "bear drivers") and Rudari (miners), also called Aurari (gold-washers), who used formerly to wash the gold out of the auriferous river-sands of Walachia. A separate and smaller class consisted of the Gipsy *Lãeshi* or *Vătrashi* (settled on a homestead or "having a fireplace" of their own). Each *shatra* or Gipsy community was placed under the authority of a judge or leader, known in Rumania as *jude*, in Hungary as *aga*; these officials were subordinate to the *bulubasha* or *voivod*, who was himself under the direct control of the *yuzbasha* (or governor appointed by the prince from among his nobles). The *yuzbasha* was responsible for the regular income to be derived from the vagrant Gipsies, who were considered and treated as the prince's property. These voivodi or yuzbashi who were not Gipsies by origin often treated the Gipsies with great tyranny. In Hungary down to 1648 they belonged to the aristocracy. The last Polish *Krolestvo cyganskie* or Gipsy king died in 1790. The *Robi* could be bought and sold, freely exchanged and inherited, and were treated as the negroes in America down to 1856, when their final freedom in Moldavia was proclaimed. In Hungary and in Transylvania the abolition of servitude in 1781-1782 carried with it the freedom of the Gipsies. In the 18th and 19th centuries many attempts were made to settle and to educate the roaming Gipsies; in Austria this was undertaken by the empress Maria Theresa and the emperor Francis II. (1761-1783), in Spain by Charles III. (1788). In Poland (1791) the attempt succeeded. In England (1827) and in Germany (1830) societies were formed for the reclamation of the Gipsies, but nothing was accomplished in either case. In other countries, however, definite progress was made. Since 1866 the Gipsies have become Rumanian citizens, and the latest official statistics no longer distinguish between the Rumanians and the Gipsies, who are becoming thoroughly assimilated, forgetting their language, and being slowly absorbed by the native population. In Bulgaria the Gipsies were declared citizens, enjoying equal political rights in accordance with the treaty of Berlin in 1878, but through an arbitrary interpretation they were deprived of that right, and on the 6th of January 1906 the first Gipsy Congress was held in Sofia, for the purpose of claiming political rights for the Turkish Gipsies or Gopti as they call themselves. Ramadan Alief, the *tzari-bashi* (*i.e.* the head of the Gipsies in Sofia), addressed the Gipsies assembled; they decided to protest and subsequently sent a petition to the Sobranye, demanding the recognition of their political rights. A curious reawakening, and an interesting chapter in the history of this peculiar race.

Origin and Language of the Gipsies.—The real key to their origin is, however, the Gipsy language. The scientific study of that language began in the middle of the 19th century with the work of Pott, and was brought to a high state of perfection by Miklosich. From that time on monographs have multiplied and minute researches have been carried on in many parts of the world, all tending to elucidate the true origin of the Gipsy language. It must remain for the time being an open question whether the Gipsies were originally a pure race. Many a strange element has contributed to swell their ranks and to introduce discordant elements into their vocabulary. Ruediger (1782), Grellmann (1783) and Marsden (1783) almost simultaneously and independently of one another came to the same conclusion, that the language of the Gipsies, until then considered a thieves' jargon, was in reality a language closely allied with some Indian speech. Since then the two principal problems to be solved have been, firstly, to which of the languages of India the original Gipsy speech was most closely allied, and secondly, by which route the people speaking that language had reached Europe and then spread westwards. Despite the rapid increase in our knowledge of Indian languages, no solution has yet been found to the first problem, nor is it likely to be found. For the language of the Gipsies, as shown now by recent studies of the Armenian Gipsies, has undergone such a profound change and involves so many difficulties, that it is impossible to compare the modern Gipsy with any modern Indian dialect owing to the inner developments which the Gipsy language has undergone in the course of centuries. All that is known, moreover, of the Gipsy language, and all that rests on reliable texts, is quite modern, scarcely earlier than the middle of the 19th century. Followed up in the various dialects into which that language has split, it shows such a thorough change from dialect to dialect, that except as regards general outlines and principles of inflexion, nothing would be more misleading than to draw

conclusions from apparent similarities between Gipsy, or any Gipsy dialect, and any Indian language; especially as the Gipsies must have been separated from the Indian races for a much longer period than has elapsed since their arrival in Europe and since the formation of their European dialects. It must also be borne in mind that the Indian languages have also undergone profound changes of their own, under influences totally different from those to which the Gipsy language has been subjected. The problem would stand differently if by any chance an ancient vocabulary were discovered representing the oldest form of the common stock from which the European dialects have sprung; for there can be no doubt of the unity of the language of the European Gipsies. The question whether Gipsy stands close to Sanskrit or Prakrit, or shows forms more akin to Hindi dialects, specially those of the North-West frontier, or Dardestan and Kafiristan, to which may be added now the dialects of the Pisāca language (Grierson, 1906), is affected by the fact established by Fink that the dialect of the Armenian Gipsies shows much closer resemblance to Prakrit than the language of the European Gipsies, and that the dialects of Gipsy spoken throughout Syria and Asia Minor differ profoundly in every respect from the European Gipsy, taken as a whole spoken. The only explanation possible is that the European Gipsy represents the first wave of the Westward movement of an Indian tribe or caste which, dislocated at a certain period by political disturbances, had travelled through Persia, making a very short stay there, thence to Armenia staying there a little longer, and then possibly to the Byzantine Empire at an indefinite period between 1100 and 1200; and that another clan had followed in their wake, passing through Persia, settling in Armenia and then going farther down to Syria, Egypt and North Africa. These two tribes though of a common remote Indian origin must, however, be kept strictly apart from one another in our investigation, for they stand to each other in the same relation as they stand to the various dialects in India. The linguistic proof of origin can therefore now not go further than to establish the fact that the Gipsy language is in its very essence an originally Indian dialect, enriched in its vocabulary from the languages of the peoples among whom the Gipsies had sojourned, whilst in its grammatical inflection it has slowly been modified, to such an extent that in some cases, like the English or the Servian, barely a skeleton has remained.

Notwithstanding the statements to the contrary, a Gipsy from Greece or Rumania could no longer understand a Gipsy of England or Germany, so profound is the difference. But the words which have entered into the Gipsy language, borrowed as they were from the Greeks, Hungarians, Rumanians, &c., are not only an indication of the route taken—and this is the only use that has hitherto been made of the vocabulary—but they are of the highest importance for fixing the time when the Gipsies had come in contact with these languages. The absence of Arabic is a positive proof that not only did the Gipsies not come via Arabia (as maintained by De Goeje) before they reached Europe, but that they could not even have been living for any length of time in Persia after the Mahommedan conquest, or at any rate that they could not have come in contact with such elements of the population as had already adopted Arabic in addition to Persian. But the form of the Persian words found among European Gipsies, and similarly the form of the Armenian words found in that language, are a clear indication that the Gipsies could not have come in contact with these languages before Persian had assumed its modern form and before Armenian had been changed from the old to the modern form of language. Still more strong and clear is the evidence in the case of the Greek and Rumanian words. If the Gipsies had lived in Greece, as some contend, from very ancient times, some at least of the old Greek words would be found in their language, and similarly the Slavonic words would be of an archaic character, whilst on the contrary we find medieval Byzantine forms, nay, modern Greek forms, among the Gipsy vocabulary collected from Gipsies in Germany or Italy, England or France; a proof positive that they could not have been in Europe much earlier than the approximate date given above of the 11th or 12th century. We then find from a grammatical point of view the same deterioration, say among the English or Spanish Gipsies, as has been noticed in the Gipsy dialect of Armenia. It is no longer Gipsy, but a corrupt English or Spanish adapted to some remnants of Gipsy inflections. The purest form has been preserved among the Greek Gipsies and to a certain extent among the Rumanian. Notably through Miklosich’s researches and comparative studies, it is possible to follow the slow change step by step and to prove, at any rate, that, as far as Europe is concerned, the language of these Gipsies was one and the same, and that it was slowly split up into a number of dialects (13 Miklosich, 14 Colocci) which shade off into one another, and which by their transitional forms mark the way in which the Gipsies have travelled, as also proved by historical evidence. The Welsh dialect, known by few, has retained, through its isolation, some of the ancient forms.

Religion, Habits and Customs.—Those who have lived among the Gipsies will readily testify that their religious views are a strange medley of the local faith, which they everywhere embrace, and some old-world superstitions which they have in common with many nations. Among the Greeks they belong to the Greek Church, among the Mahommedans they are Mahommedans, in Rumania they belong to the National Church. In Hungary they are mostly Catholics, according to the faith of the inhabitants of that country. They have no ethical principles and they do not recognize the obligations of the Ten Commandments. There is extreme moral laxity in the relation of the two sexes, and on the whole they take life easily, and are complete fatalists. At the same time they are great cowards, and they play the rôle of the fool or the jester in the popular anecdotes of eastern Europe. There the poltroon is always a Gipsy, but he is good-humoured and not so malicious as those Gipsies who had endured the hardships of outlawry in the west of Europe.

There is nothing specifically of an Oriental origin in their religious vocabulary, and the words *Devla* (God), *Bang* (devil) or *Trushul* (Cross), in spite of some remote similarity, must be taken as later adaptations, and not as remnants of an old Sky-worship or Serpent-worship. In general their beliefs, customs, tales, &c. belong to the common stock of general folklore, and many of their symbolical

expressions find their exact counterpart in Rumanian and modern Greek, and often read as if they were direct translations from these languages. Although they love their children, it sometimes happens that a Gipsy mother will hold her child by the legs and beat the father with it. In Rumania and Turkey among the settled Gipsies a good number are carriers and bricklayers; and the women take their full share in every kind of work, no matter how hard it may be. The nomadic Gipsies carry on the ancient craft of coppersmiths, or workers in metal; they also make sieves and traps, but in the East they are seldom farriers or horse-dealers. They are far-famed for their music, in which art they are unsurpassed. The Gipsy musicians belong mostly to the class who originally were serfs. They were retained at the courts of the boyars for their special talent in reciting old ballads and love songs and their deftness in playing, notably the guitar and the fiddle. The former was used as an accompaniment to the singing of either love ditties and popular songs or more especially in recital or heroic ballads and epic songs; the latter for dances and other amusements. They were the troubadours and minstrels of eastern Europe; the largest collection of Rumanian popular ballads and songs was gathered by G. Dem. Teodorescu from a Gipsy minstrel, Petre Sholkan; and not a few of the songs of the guslars among the Servians and other Slavonic nations in the Balkans come also from the Gipsies. They have also retained the ancient tunes and airs, from the dreamy “doina” of the Rumanian to the fiery “czardas” of the Hungarian or the stately “hora” of the Bulgarian. Liszt went so far as to ascribe to the Gipsies the origin of the Hungarian national music. This is an exaggeration, as seen by the comparison of the Gipsy music in other parts of south-east Europe; but they undoubtedly have given the most faithful expression to the national temperament. Equally famous is the Gipsy woman for her knowledge of occult practices. She is the real witch; she knows charms to injure the enemy or to help a friend. She can break the charm if made by others. But neither in the one case nor in the other, and in fact as little as in their songs, do they use the Gipsy language. It is either the local language of the natives as in the case of charms, or a slightly Romanized form of Greek, Rumanian or Slavonic. The old Gipsy woman is also known for her skill in palmistry and fortune-telling by means of a special set of cards, the well-known Tarok of the Gipsies. They have also a large stock of fairy tales resembling in each country the local fairy tales, in Greece agreeing with the Greek, and in Rumania with the Rumanian fairy tales. It is doubtful, however, whether they have contributed to the dissemination of these tales throughout Europe, for a large number of Gipsy tales can be shown to have been known in Europe long before the appearance of the Gipsies, and others are so much like those of other nations that the borrowing may be by the Gipsy from the Greek, Slav or Rumanian. It is, however, possible that playing-cards might have been introduced to Europe through the Gipsies. The oldest reference to cards is found in the Chronicle of Nicolaus of Cavellazzo, who says that the cards were first brought into Viterbo in 1379 from the land of the Saracens, probably from Asia Minor or the Balkans. They spread very quickly, but no one has been able as yet to trace definitely the source whence they were first brought. Without entering here into the history of the playing-cards and of the different forms of the faces and of the symbolical meaning of the different designs, one may assume safely that the cards, before they were used for mere pastime or for gambling, may originally have had a mystical meaning and been used as *sortes* in various combinations. To this very day the oldest form is known by the hitherto unexplained name of Tarock, played in Bologna at the beginning of the 15th century and retained by the French under the form Tarot, connected direct with the Gipsies, “Le Tarot des Bohémiens.” It was noted above that the oldest chronicler (Presbyter) who describes the appearance of the Gipsies in 1416 in Germany knows them by their Italian name “Cianos,” so evidently he must have known of their existence in Italy previous to any date recorded hitherto anywhere, and it is therefore not impossible that coming from Italy they brought with them also their book of divination.

Physical Characteristics.—As a race they are of small stature varying in colour from the dark tan of the Arab to the whitish hue of the Servian and the Pole. In fact there are some white-coloured Gipsies, especially in Servia and Dalmatia, and these are often not easily distinguishable from the native peoples, except that they are more lithe and sinewy, better proportioned and more agile in their movements than the thick-set Slavs and the mixed race of the Rumanians. By one feature, however, they are easily distinguishable and recognize one another, viz. by the lustre of their eyes and the whiteness of their teeth. Some are well built; others have the features of a mongrel race, due no doubt to intermarriage with outcasts of other races. The women age very quickly and the mortality among the Gipsies is great, especially among children; among adults it is chiefly due to pulmonary diseases. They love display and Oriental showiness, bright-coloured dresses, ornaments, bangles, &c.; red and green are the colours mostly favoured by the Gipsies in the East. Along with a showy handkerchief or some shining gold coins round their necks, they will wear torn petticoats and no covering on their feet. And even after they have been assimilated and have forgotten their own language they still retain some of the prominent features of their character, such as the love of inordinate display and gorgeous dress; and their moral defects not only remain for a long time as glaring as among those who live the life of vagrants, but even become more pronounced. The Gipsy of to-day is no longer what his forefathers have been. The assimilation with the nations in the near East and the steps taken for the suppression of vagrancy in the West, combine to denationalize the Gipsy and to make “Romàni Chib” a thing of the past.

Bibliography.—The scientific study of the Gipsy language and its origin, as well as the critical history of the Gipsy race, dates (with the notable exception of Grellmann) almost entirely from Pott’s researches in 1844.

I. *Collections of Documents, &c.*—Lists of older publications appeared in the books of Pott, Miklosich and the archduke Joseph; Pott adds a critical appreciation of the scientific value of the books enumerated. See also *Verzeichnis von Werken und Aufsätzen ... über die Geschichte und Sprache der*

Zigeuner, &c., 248 entries (Leipzig, 1886); J. Tipray, "Adalékok a czigányokról szóló írodalomhoz," in *Magyar Könyvszemle* (Budapest, 1877); Ch. G. Leland, *A Collection of Cuttings ... relating to Gypsies* (1874-1891), bequeathed by him to the British Museum. See also the *Orientalischer Jahresbericht*, ed. Müller (Berlin, 1887 ff.).

II. *History.*—(*a*) The first appearance of the Gipsies in Europe. Sources: A. F. Oefelius, *Rerum Boicarum scriptores, &c.* (Augsburg, 1763); M. Freher, *Andreae Presbyteri ... chronicon de ducibus Bavariae ...* (1602); S. Munster, *Cosmographia ... &c.* (Basel, 1545); J. Thurmaier, *Annalium Boiorum libri septem*, ed. T. Zieglerus (Ingolstad, 1554); M. Crusius, *Annales Suevici, &c.* (Frankfurt, 1595-1596), *Schwäbische Chronik ...* (Frankfurt, 1733); A. Krantz, *Saxonia* (Cologne, 1520); Simon Simeon, *Itineraria, &c.*, ed. J. Nasmith (Cambridge, 1778). (*b*) Origin and spread of the Gipsies: H. M. G. Grellmann, *Die Zigeuner, &c.* (1st ed., Dessau and Leipzig, 1783; 2nd ed., Göttingen, 1787); English by M. Roper (London, 1787; 2nd ed., London, 1807), entitled *Dissertation on the Gipsies, &c.*; Carl von Heister, *Ethnographische ... Notizen über die Zigeuner* (Königsberg, 1842), a third and greatly improved edition of Grellmann and the best book of its kind up to that date; A. F. Pott, *Die Zigeuner in Europa und Asien* (2 vols., Halle, 1844-1845), the first scholarly work with complete and critical bibliography, detailed grammar, etymological dictionary and important texts; C. Hopf, *Die Einwanderung der Zigeuner in Europa* (Gotha, 1870); F. von Miklosich, "Beiträge zur Kenntnis der Zigeuner-Mundarten," i.-iv., in *Sitzungsber. d. Wiener Akad. d. Wissenschaften* (Vienna, 1874-1878), "Über die Mundarten und die Wanderungen der Zigeuner Europas," i.-xii., in *Denkschriften d. Wiener Akad. d. Wissenschaften* (1872-1880); M. J. de Goeje, *Bijdrage tot de geschiedenis der Zigeuners* (Amsterdam, 1875), English translation by MacRitchie, *Account of the Gipsies of India* (London, 1886); Zedler, *Universal-Lexicon*, vol. lxii., s.v. "Zigeuner," pp. 520-544 containing a rich bibliography; many publications of P. Bataillard from 1844 to 1885; A. Colocci, *Storia d' un popolo errante*, with illustrations, map and Gipsy-Ital. and Ital.-Gipsy glossaries (Turin, 1889); F. H. Groome, "The Gypsies," in E. Magnusson, *National Life and Thought* (1891), and art. "Gipsies" in *Encyclopaedia Britannica* (9th ed., 1879); C. Améro, *Bohémiens, Tsiganes et Gypsies* (Paris, 1895); M. Kogalnitschan, *Esquisse sur l'histoire, les mœurs et la langue des Cigains* (Berlin, 1837; German trans., Stuttgart, 1840)—valuable more for the historical part than for the linguistic; J. Czacki, *Dziela*, vol. iii. (1844-1845)—for historic data about Gipsies in Poland; I. Kopernicki and J. Moyer, *Charakterystyka fizyczna ludrości galicyjskiéj* (1876)—for the history and customs of Galician gipsies; *Ungarische statistische Mitteilungen*, vol. ix. (Budapest, 1895), containing the best statistical information on the Gipsies; V. Dittrich, A *nagy-idai czigányok* (Budapest, 1898); T. H. Schwicker, "Die Zigeuner in Ungarn u. Siebenbürgen," in vol. xii. of *Die Völker Österreich-Ungarns* (Vienna, 1883), and in *Mitteilungen d. K. K. geographischen Gesellschaft* (Vienna, 1896); Dr J. Polek, *Die Zigeuner in der Bukowina* (Czernowitz, 1908); Ficker, "Die Zigeuner der Bukowina," in *Statist. Monatschrift*, v. 6, *Hundert Jahre 1775-1875: Zigeuner in d. Bukowina* (Vienna, 1875), *Die Völkerstämme der österr.-ungar. Monarchie, &c.* (Vienna, 1869); V. S. Morwood, *Our Gipsies* (London, 1885); D. MacRitchie, *Scottish Gypsies under the Stewarts* (Edinburgh, 1894); F. A. Coelho, "Os Ciganos de Portugal," in *Bol. Soc. Geog.* (Lisbon, 1892); A. Dumbarton, *Gypsy Life in the Mysore Jungle* (London, 1902).

III. *Linguistic.*—[Armenia], F. N. Finck, "Die Sprache der armenischen Zigeuner," in *Mémoires de l'Acad. Imp. des Sciences*, viii. (St Petersburg, 1907). [Austria-Hungary], R. von Sowa, *Die Mundart der slovakischen Zigeuner* (Göttingen, 1887), and *Die mährische Mundart der Romsprache* (Vienna, 1893); A. J. Puchmayer, *Romàni Čib* (Prague, 1821); P. Josef Ješina, *Romáňi Čib* (in Czech, 1880; in German, 1886); G. Ihnatko, *Czigány nyelvtan* (Losoncon, 1877); A. Kalina, *La Langue des Tsiganes slovaques* (Posen, 1882); the archduke Joseph, *Czigány nyelvtan* (Budapest, 1888); H. von Wlislocki, *Die Sprache der transsilvanischen Zigeuner* (Leipzig, 1884). [Brazil], A. T. de Mello Moraes, *Os ciganos no Brazil* (Rio de Janeiro, 1886). [France, the Basques], A. Baudrimont, *Vocabulaire de la langue des Bohémiens habitant les pays basques-français* (Bordeaux, 1862). [Germany], R. Pischel, *Beiträge zur Kenntnis der deutschen Zigeuner* (Halle, 1894); R. von Sowa, "Wörterbuch des Dialekts der deutschen Zigeuner," in *Abhandlungen f. d. Kunde d. Morgenlandes*, xi. 1, very valuable (Leipzig, 1898); F. N. Finck, *Lehrbuch des Dialekts der deutschen Zigeuner*—very valuable (Marburg, 1903). [Great Britain, &c.], Ch. G. Leland, *The English Gipsies and their Language* (London and New York, 1873; 2nd ed., 1874), *The Gipsies of Russia, Austria, England, America, &c.* (London, 1882)—the validity of Leland's conclusions is often doubtful; B. C. Smart and H. J. Crofton, *The Dialect of the English Gypsies* (2nd ed., London, 1875); G. Borrow, *Romano lavo-lil* (London, 1874, 1905), *Lavengro*, ed. F. H. Groome (London, 1899). [Rumania], B. Constantinescu, *Probe de Limba şi literatura Ţiganilor din România* (Bucharest, 1878). [Russia, Bessarabia], O. Boethlingk, *Über die Sprache der Zigeuner in Russland* (St Petersburg, 1852; supplement, 1854). [Russia, Caucasus], K. Badganian, *Cygany. Nêskolĭko slovŭ o narêčijahŭ zakavkazskihŭ cyganŭ* (St Petersburg, 1887); Istomin, *Ciganskij Jazykŭ* (1900). [Spain], G. H. Borrow, *The Zincali, or an Account of the Gipsies of Spain* (London, 1841, and numerous later editions); R. Campuzano, *Origen ... de los Gitanos, y diccionario de su dialecto* (2nd ed., Madrid, 1857); A. de C., *Diccionario del dialecto gitano, &c.* (Barcelona, 1851); M. de Sales y Guindale, *Historia, costumbres y dialecto de los Gitanos* (Madrid, 1870); M. de Sales, *El Gitanismo* (Madrid, 1870); J. Tineo Rebolledo, *"A Chipicalli" la lengua gitana: diccionario gitano-español* (Granada, 1900). [Turkey], A. G. Paspati, *Études sur les Tchinghianés, ou Bohémiens de l'empire ottoman* (Constantinople, 1870), with grammar, vocabulary, tales and French glossary; very important. [General], John Sampson, "Gypsy Language and Origin," in *Journ. Gypsy Lore Soc.* vol. i. (2nd ser., Liverpool, 1907); J. A. Decourdemanche, *Grammaire du Tchingané, &c.* (Paris, 1908)—fantastic in some of its philology; F. Kluge, *Rotwelsche Quellen* (Strassburg, 1901); L. Günther, *Das Rotwelsch des deutschen Gauners* (Leipzig, 1905), for the influence of Gipsy on argot; L. Besses, *Diccionario de argot español* (Barcelona); G. A. Grierson, *The Pi'sāca Languages of North-Western India* (London, 1906), for parallels in Indian dialects; G. Borrow, *Criscote e majaró Lucas ... El evangelio segun S. Lucas ...* (London, 1837; 2nd ed., 1872)—this is the only complete translation of any one of the gospels into Gipsy. For older fragments of such translations, see Pott ii. 464-521.

IV. *Folklore, Tales, Songs, &c.*—Many songs and tales are found in the books enumerated above, where they are mostly accompanied by literal translations. See also Ch. G. Leland, E. H. Palmer and T. Tuckey, *English Gipsy Songs in Romany, with Metrical English Translation* (London, 1875); G. Smith, *Gipsy Life, &c.* (London, 1880); M. Rosenfeld, *Lieder der Zigeuner* (1882); Ch. G. Leland, *The Gypsies* (Boston, Mass., 1882), *Gypsy Sorcery and Fortune-Telling* (London, 1891); H. von Wlislocki, *Märchen und Sagen der transsilvanischen Zigeuner* (Berlin, 1886)—containing 63 tales, very freely translated; *Volksdichtungen der siebenbürgischen und südungarischen Zigeuner* (Vienna, 1890)—songs, ballads, charms, proverbs and 100 tales; *Vom wandernden Zigeunervolke* (Hamburg, 1890); *Wesen und Wirkungskreis der Zauberfrauen bei den siebenbürgischen Zigeuner* (1891); "Aus dem inneren Leben der Zigeuner," in *Ethnologische Mitteilungen* (Berlin, 1892); R. Pischel, *Bericht über Wlislocki vom wandernden Zigeunervolke* (Göttingen, 1890)—a strong criticism of Wlislocki's method, &c.; F. H. Groome, *Gypsy Folk-Tales* (London, 1899), with historical introduction and a complete and trustworthy collection of 76 gipsy tales from many countries; Katadá, *Contes gitanos* (Logroño, 1907); M. Gaster, *Zigeunermärchen aus Rumänien* (1881); "Ţiganii, &c.," in *Revista pentru Istorie, &c.*, i. p. 469 ff. (Bucharest, 1883); "Gypsy Fairy-Tales" in *Folklore*. The *Journal of the Gipsy-Lore Society* (Edinburgh, 1888-1892) was revived in Liverpool in 1907.

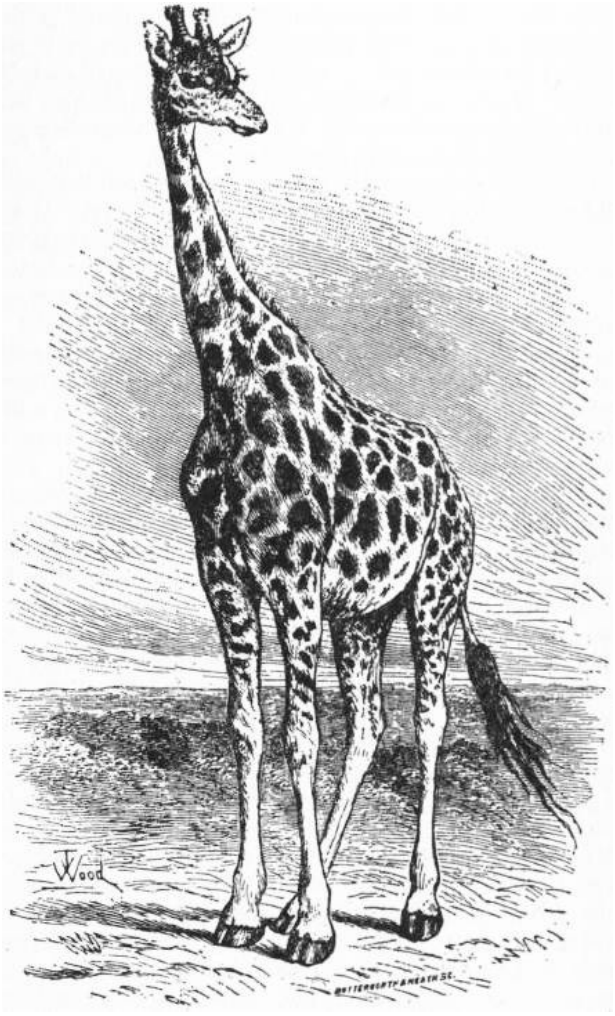
V. *Legal Status.*—A few of the books in which the legal status of the Gipsies (either alone or in conjunction with "vagrants") is treated from a juridical point of view are here mentioned, also the history of the trial in 1726. J. B. Weissenbruch, *Ausführliche Relation von der famosen Zigeuner-Diebes-Mord und Räuber* (Frankfurt and Leipzig, 1727); A. Ch. Thomasius, *Tractatio juridica de vagabundo, &c.* (Leipzig, 1731); F. Ch. B. Avé-Lallemant, *Das deutsche Gaunertum, &c.* (Leipzig, 1858-1862); V. de Rochas, *Les Parias de France et d'Espagne* (Paris, 1876); P. Chuchul, *Zum Kampfe gegen Landstreicher und Bettler* (Kassel, 1881); R. Breithaupt, *Die Zigeuner und der deutsche Staat* (Würzburg, 1907); G. Steinhausen, *Geschichte der deutschen Kultur* (Leipzig and Vienna, 1904).

(M. G.)

GIRAFFE, a corruption of *Zarāfah*, the Arabic name for the tallest of all mammals, and the typical representative of the family *Giraffidae*, the distinctive characters of which are given in the article PECORA, where the systematic position of the group is indicated. The classic term "camelopard," probably introduced when these animals were brought from North Africa to the Roman amphitheatre, has fallen into complete disuse.

In common with the okapi, giraffes have skin-covered horns on the head, but in these animals, which form the genus *Giraffa*, these appendages are present in both sexes; and there is often an unpaired one in advance of the pair on the forehead. Among other characteristics of these animals may be noticed the great length of the neck and limbs, the complete absence of lateral toes and the long and tufted tail. The tongue is remarkable for its great length, measuring about 17 in. in the dead animal, and for its great elasticity and power of muscular contraction while living. It is covered with numerous large papillae, and forms, like the trunk of the elephant, an admirable organ for the examination and prehension of food. Giraffes are inhabitants of open country, and owing to their length of neck and long flexible tongues are enabled to browse on tall trees, mimosas being favourites. To drink or graze they are obliged to straddle the fore-legs apart; but they seldom feed on grass and are capable of going long without water. When standing among mimosas they so harmonize with their surroundings that they are difficult of detection. Formerly giraffes were found in large herds, but persecution has reduced their number and led to their extermination from many districts. Although in late Tertiary times widely spread over southern Europe and India, giraffes are now confined to Africa south of the Sahara.

Apart from the distinct Somali giraffe (*Giraffa reticulata*), characterized by its deep liver-red colour marked with a very coarse network of fine white lines, there are numerous local forms of the ordinary giraffe (*Giraffa camelopardalis*). The northern races, such as the Nubian *G. c. typica* and the Kordofan *G. c. antiquorum*, are characterized by the large frontal horn of the bulls, the white legs, the network type of coloration and the pale tint. The latter feature is specially developed in the Nigerian *G. c. peralta*, which is likewise of the northern type. The Baringo *G. c. rothschildi* also has a large frontal horn and white legs, but the spots in the bulls are very dark and those of the females jagged. In the Kilimanjaro *G. c. tippelskirchi* the frontal horn is often developed in the bulls, but the legs are frequently spotted to the fetlocks. Farther south the frontal horn tends to disappear more or less completely, as in the Angola *G. c. angolensis*, the Transvaal *G. c. wardi* and the Cape *G. c. capensis*, while the legs are fully spotted and the colour-pattern on the body (especially in the last-named) is more of a blotched type, that is to say, consists of dark blotches on a fawn ground, instead of a network of light lines on a dark ground.



The North African or Nubian Giraffe (*Giraffa camelopardalis*).

For details, see a paper on the subspecies of *Giraffa camelopardalis*, by R. Lydekker in the *Proceedings of the Zoological Society of London* for 1904.

(R. L.*)

GIRALDI, GIGLIO GREGORIO [Lilius Gregorius Gyraldus] (1479-1552), Italian scholar and poet, was born on the 14th of June 1479, at Ferrara, where he early distinguished himself by his talents and acquirements. On the completion of his literary course he removed to Naples, where he lived on familiar terms with Jovianus Pontanus and Sannazaro; and subsequently to Lombardy, where he enjoyed the favour of the Mirandola family. At Milan in 1507 he studied Greek under Chalcondylas; and shortly afterwards, at Modena, he became tutor to Ercole (afterwards Cardinal) Rangone. About the year 1514 he removed to Rome, where, under Clement VII., he held the office of apostolic protonotary; but having in the sack of that city (1527), which almost coincided with the death of his patron Cardinal Rangone, lost all his property, he returned in poverty once more to Mirandola, whence again he was driven by the troubles consequent on the assassination of the reigning prince in 1533. The rest of his life was one long struggle with ill-health, poverty and neglect; and he is alluded to with sorrowful regret by Montaigne in one of his *Essais* (i. 34), as having, like Sebastian Castalio, ended his days in utter destitution. He died at Ferrara in February 1552; and his epitaph makes touching and graceful allusion to the sadness of his end. Giraldi was a man of very extensive erudition; and numerous testimonies to his profundity and accuracy have been given both by contemporary and by later scholars. His *Historia de diis gentium* marked a distinctly forward step in the systematic study of classical mythology; and by his treatises *De annis et mensibus*, and on the *Calendarium Romanum et Graecum*, he contributed to bring about the reform of the calendar, which was ultimately effected by Pope Gregory XIII. His *Progymnasma adversus literas et literatos* deserves mention at least among the curiosities of literature; and among his other works to which reference is still occasionally made are *Historiae poëtarum Graecorum ac Latinorum*; *De poëtis suorum temporum*; and *De sepultura ac vario sepeliendi ritu*. Giraldi was also an elegant Latin poet.

His *Opera omnia* were published at Leiden in 1696.

GIRALDI, GIOVANNI BATTISTA (1504-1573), surnamed Cynthius, Cinthio or Cintio, Italian novelist and poet, born at Ferrara in November 1504, was educated at the university of his native town, where in 1525 he became professor of natural philosophy, and, twelve years afterwards, succeeded Celio Calcagnini in the chair of belles-lettres. Between 1542 and 1560 he acted as private secretary, first to Ercole II. and afterwards to Alphonso II. of Este; but having, in connexion with a literary quarrel in which he had got involved, lost the favour of his patron in the latter year, he removed to Mondovi, where he remained as a teacher of literature till 1568. Subsequently, on the invitation of the senate of Milan, he occupied the chair of rhetoric at Pavia till 1573, when, in search of health, he returned to his native town, where on the 30th of December he died. Besides an epic entitled *Ercole* (1557), in twenty-six cantos, Giraldi wrote nine tragedies, the best known of which, *Orbecche*, was produced in 1541. The sanguinary and disgusting character of the plot of this play, and the general poverty of its style, are, in the opinion of many of its critics, almost fully redeemed by occasional bursts of genuine and impassioned poetry; of one scene in the third act in particular it has even been affirmed that, if it alone were sufficient to decide the question, the *Orbecche* would be the finest play in the world. Of the prose works of Giraldi the most important is the *Hecatommithi* or *Ecatomiti*, a collection of tales told somewhat after the manner of Boccaccio, but still more closely resembling the novels of Giraldi's contemporary Bandello, only much inferior in workmanship to the productions of either author in vigour, liveliness and local colour. Something, but not much, however, may be said in favour of their professed claim to represent a higher standard of morality. Originally published at Monteregale, Sicily, in 1565, they were frequently reprinted in Italy, while a French translation by Chappuys appeared in 1583 and one in Spanish in 1590. They have a peculiar interest to students of English literature, as having furnished, whether directly or indirectly, the plots of *Measure for Measure* and *Othello*. That of the latter, which is to be found in the *Hecatommithi* (iii. 7), is conjectured to have reached Shakespeare through the French translation; while that of the former (*Hecat.* viii. 5) is probably to be traced to Whetstone's *Promos and Cassandra* (1578), an adaptation of Cinthio's story, and to his *Heptamerone* (1582), which contains a direct English translation. To Giraldi also must be attributed the plot of Beaumont and Fletcher's *Custom of the Country*.

GIRALDUS CAMBRENSIS (1146?-1220), medieval historian, also called Gerald de Barri, was born in Pembrokeshire. He was the son of William de Barri and Augharat, a daughter of Gerald, the ancestors of the Fitzgeralds and the Welsh princess, Nesta, formerly mistress of King Henry I. Falling under the influence of his uncle, David Fitzgerald, bishop of St David's, he determined to enter the church. He studied at Paris, and his works show that he had applied himself closely to the study of the Latin poets. In 1172 he was appointed to collect tithe in Wales, and showed such vigour that he was made archdeacon. In 1176 an attempt was made to elect him bishop of St David's, but Henry II. was unwilling to see any one with powerful native connexions a bishop in Wales. In 1180, after another visit to Paris, he was appointed commissiary to the bishop of St David's, who had ceased to reside. But Giraldus threw up his post, indignant at the indifference of the bishop to the welfare of his see. In 1184 he was made one of the king's chaplains, and was elected to accompany Prince John on his voyage to Ireland. While there he wrote a *Topographia Hibernica*, which is full of information, and a strongly prejudiced history of the conquest, the *Expugnatio Hibernica*. In 1186 he read his work with great applause before the masters and scholars of Oxford. In 1188 he was sent into Wales with the primate Baldwin to preach the Third Crusade. Giraldus declares that the mission was highly successful; in any case it gave him the material for his *Itinerarium Cambrense*, which is, after the *Expugnatio*, his best known work. He accompanied the archbishop, who intended him to be the historian of the Crusade, to the continent, with the intention of going to the Holy Land. But in 1189 he was sent back to Wales by the king, who knew his influence was great, to keep order among his countrymen. Soon after he was absolved from his crusading vow. According to his own statements, which often tend to exaggeration, he was offered both the sees of Bangor and Llandaff, but refused them. From 1192 to 1198 he lived in retirement at Lincoln and devoted himself to literature. It is probably during this period that he wrote the *Gemma ecclesiastica* (discussing disputed points of doctrine, ritual, &c.) and the *Vita S. Remigii*. In 1198 he was elected bishop of St David's. But Hubert Walter, the archbishop of Canterbury, was determined to have in that position no Welshman who would dispute the metropolitan pretensions of the English primates. The king, for political reasons, supported Hubert Walter. For four years Giraldus exerted himself to get his election confirmed, and to vindicate the independence of St David's from Canterbury. He went three times to Rome. He wrote the *De jure Meneviensis ecclesiae* in support of the claims of his diocese. He made alliances with the princes of North and South Wales. He called a general synod of his diocese. He was accused of stirring up rebellion among the Welsh, and the justiciar proceeded against him. At length in 1202 the pope annulled all previous elections, and ordered a new one. The prior of Llanthony was finally elected. Gerald was immediately reconciled to the king and archbishop; the utmost favour was shown to him; even the expenses of his unsuccessful election were paid. He spent the rest of his life in retirement, though there was some talk of his being made a cardinal. He certainly survived John.

The works of Giraldus are partly polemical and partly historical. His value as a historian is marred by his violent party spirit; some of his historical tracts, such as the *Liber de instructione principum* and the *Vita Galfridi Archiepiscopi Eborecensis*, seem to have been designed as political pamphlets. Henry

II., Hubert Walter and William Longchamp, the chancellor of Richard I., are the objects of his worst invectives. His own pretensions to the see of St David are the motive of many of his misrepresentations. But he is one of the most vivid and witty of our medieval historians.

See the Rolls edition of his works, ed. J. S. Brewer, J. F. Dimock and G. F. Warner in 8 vols. (London, 1861-1891), some of which have valuable introductions.

GIRANDOLE (from the Ital. *girandola*), an ornamental branched candlestick of several lights. It came into use about the second half of the 17th century, and was commonly made and used in pairs. It has always been, comparatively speaking, a luxurious appliance for lighting, and in the great 18th-century period of French house decoration the famous *ciseleurs* designed some exceedingly beautiful examples. A great variety of metals has been used for the purpose—sometimes, as in the case of the candlestick, girandoles have been made in hard woods. Gilded bronze has been a very frequent medium, but for table purposes silver is still the favourite material.

GIRARD, JEAN BAPTISTE [known as “Le Père Girard” or “Le Père Gregoire”] (1765-1850), French-Swiss educationalist, was born at Fribourg and educated for the priesthood at Lucerne. He was the fifth child in a family of fourteen, and his gift for teaching was early shown at home in helping his mother with the younger children; and after passing through his noviciate he spent some time as an instructor in convents, notably at Würzburg (1785-1788). Then for ten years he was busy with religious duty. In 1798, full of Kantian ideas, he published an essay outlining a scheme of national Swiss education; and in 1804 he began his career as a public teacher, first in the elementary school at Fribourg (1805-1823), then (being driven away by Jesuit hostility) in the gymnasium at Lucerne till 1834, when he retired to Fribourg and devoted himself with the production of his books on education, *De l’enseignement régulier de la langue maternelle* (1834, 9th ed. 1894; Eng. trans. by Lord Ebrington, *The Mother Tongue*, 1847), and *Cours éducatif* (1844-1846). Father Girard’s reputation and influence as an enthusiast in the cause of education became potent not only in Switzerland, where he was hailed as a second Pestalozzi, but in other countries. He had a genius for teaching, his method of stimulating the intelligence of the children at Fribourg and interesting them actively in learning, and not merely cramming them with rules and facts, being warmly praised by the Swiss educationalist François Naville (1784-1846) in his treatise on public education (1832). His undogmatic method and his Liberal Christianity brought him into conflict with the Jesuits, but his aim was, in all his teaching, to introduce the moral idea into the minds of his pupils by familiarizing them with the right or wrong working of the facts he brought to their attention, and thus to elevate character all through the educational curriculum.

GIRARD, PHILIPPE HENRI DE (1775-1845), French mechanician, was born at Lourmarin, Vaucluse, on the 1st of February 1775. He is chiefly known in connexion with flax-spinning machinery. Napoleon having in 1810 decreed a reward of one million francs to the inventor of the best machine for spinning flax, Girard succeeded in producing what was required. But he never received the promised reward, although in 1853, after his death, a comparatively small pension was voted to his heirs, and having relied on the money to pay the expenses of his invention he got into serious financial difficulties. He was obliged, in 1815, to abandon the flax mills he had established in France, and at the invitation of the emperor of Austria founded a flax mill and a factory for his machines at Hirtenberg. In 1825, at the invitation of the emperor Alexander I. of Russia, he went to Poland, and erected near Warsaw a flax manufactory, round which grew up a village which received the name of Girardow. In 1818 he built a steamer to run on the Danube. He did not return to Paris till 1844, where he still found some of his old creditors ready to press their claims, and he died in that city on the 26th of August 1845. He was also the author of numerous minor inventions.

GIRARD, STEPHEN (1750-1831), American financier and philanthropist, founder of Girard College in Philadelphia, was born in a suburb of Bordeaux, France, on the 20th of May 1750. He lost the sight

of his right eye at the age of eight and had little education. His father was a sea captain, and the son cruised to the West Indies and back during 1764-1773, was licensed captain in 1773, visited New York in 1774, and thence with the assistance of a New York merchant began to trade to and from New Orleans and Port au Prince. In May 1776 he was driven into the port of Philadelphia by a British fleet and settled there as a merchant; in June of the next year he married Mary (Polly) Lum, daughter of a shipbuilder, who, two years later, after Girard's becoming a citizen of Pennsylvania (1778), built for him the "Water Witch," the first of a fleet trading with New Orleans and the West Indies—most of Girard's ships being named after his favourite French authors, such as "Rousseau," "Voltaire," "Helvétius" and "Montesquieu." His beautiful young wife became insane and spent the years from 1790 to her death in 1815 in the Pennsylvania Hospital. In 1810 Girard used about a million dollars deposited by him with the Barings of London for the purchase of shares of the much depreciated stock of the Bank of the United States—a purchase of great assistance to the United States government in bolstering European confidence in its securities. When the Bank was not rechartered the building and the cashier's house in Philadelphia were purchased at a third of the original cost by Girard, who in May 1812 established the Bank of Stephen Girard. He subscribed in 1814 for about 95% of the government's war loan of $5,000,000, of which only $20,000 besides had been taken, and he generously offered at par shares which upon his purchase had gone to a premium. He pursued his business vigorously in person until the 12th of February 1830, when he was injured in the street by a truck; he died on the 26th of December 1831. His public spirit had been shown during his life not only financially but personally; in 1793, during the plague of yellow fever in Philadelphia, he volunteered to act as manager of the wretched hospital at Bush Hill, and with the assistance of Peter Helm had the hospital cleansed and its work systematized; again during the yellow fever epidemic of 1797-1798 he took the lead in relieving the poor and caring for the sick. Even more was his philanthropy shown in his disposition by will of his estate, which was valued at about $7,500,000, and doubtless the greatest fortune accumulated by any individual in America up to that time. Of his fortune he bequeathed $116,000 to various Philadelphia charities, $500,000 to the same city for the improvement of the Delaware water front, $300,000 to Pennsylvania for internal improvements, and the bulk of his estate to Philadelphia, to be used in founding a school or college, in providing a better police system, and in making municipal improvements and lessening taxation. Most of his bequest to the city was to be used for building and maintaining a school "to provide for such a number of poor male white orphan children ... a better education as well as a more comfortable maintenance than they usually receive from the application of the public funds." His will planned most minutely for the erection of this school, giving details as to the windows, doors, walls, &c.; and it contained the following phrase: "I enjoin and require that no ecclesiastic, missionary or minister of any sect whatsoever, shall ever hold or exercise any duty whatsoever in the said college; nor shall any such person ever be admitted for any purpose, or as a visitor, within the premises appropriated to the purposes of the said college.... I desire to keep the tender minds of orphans ... free from the excitements which clashing doctrines and sectarian controversy are so apt to produce." Girard's heirs-at-law contested the will in 1836, and they were greatly helped by a public prejudice aroused by the clause cited; in the Supreme Court of the United States in 1844 Daniel Webster, appearing for the heirs, made a famous plea for the Christian religion, but Justice Joseph Story handed down an opinion adverse to the heirs (*Vidals* v. *Girard's Executors*). Webster was opposed in this suit by John Sergeant and Horace Binney. Girard specified that those admitted to the college must be white male orphans, of legitimate birth and good character, between the ages of six and ten; that no boy was to be permitted to stay after his eighteenth year; and that as regards admissions preference was to be shown, first to orphans born in Philadelphia, second to orphans born in any other part of Pennsylvania, third to orphans born in New York City, and fourth to orphans born in New Orleans. Work upon the buildings was begun in 1833, and the college was opened on the 1st of January 1848, a technical point of law making instruction conditioned upon the completion of the five buildings, of which the principal one, planned by Thomas Ustick Walter (1804-1887), has been called "the most perfect Greek temple in existence." To a sarcophagus in this main building the remains of Stephen Girard were removed in 1851. In the 40 acres of the college grounds there were in 1909 18 buildings (valued at $3,350,000), 1513 pupils, and a total "population," including students, teachers and all employes, of 1907. The value of the Girard estate in the year 1907 was $35,000,000, of which $550,000 was devoted to other charities than Girard College. The control of the college was under a board chosen by the city councils until 1869, when by act of the legislature it was transferred to trustees appointed by the Common Pleas judges of the city of Philadelphia. The course of training is partly industrial—for a long time graduates were indentured till they came of age—but it is also preparatory to college entrance.

See H. A. Ingram, *The Life and Character of Stephen Girard* (Philadelphia, 1884), and George P. Rupp, "Stephen Girard—Merchant and Mariner," in *1848-1898: Semi-Centennial of Girard College* (Philadelphia, 1898).

GIRARDIN, DELPHINE DE (1804-1855), French author, was born at Aix-la-Chapelle on the 26th of January 1804. Her mother, the well-known Madame Sophie Gay, brought her up in the midst of a brilliant literary society. She published two volumes of miscellaneous pieces, *Essais poétiques* (1824) and *Nouveaux Essais poétiques* (1825). A visit to Italy in 1827, during which she was enthusiastically

welcomed by the literati of Rome and even crowned in the capitol, was productive of various poems, of which the most ambitious was *Napoline* (1833). Her marriage in 1831 to Émile de Girardin (see below) opened up a new literary career. The contemporary sketches which she contributed from 1836 to 1839 to the feuilleton of *La Presse*, under the *nom de plume* of Charles de Launay, were collected under the title of *Lettres parisiennes* (1843), and obtained a brilliant success. *Contes d'une vieille fille à ses neveux* (1832), *La Canne de Monsieur de Balzac* (1836) and *Il ne faut pas jouer avec la douleur* (1853) are among the best-known of her romances; and her dramatic pieces in prose and verse include *L'École des journalistes* (1840), *Judith* (1843), *Cléopâtre* (1847), *Lady Tartufe* (1853), and the one-act comedies, *C'est la faute du mari* (1851), *La Joie fait peur* (1854), *Le Chapeau d'un horloger* (1854) and *Une Femme qui déteste son mari*, which did not appear till after the author's death. In the literary society of her time Madame Girardin exercised no small personal influence, and among the frequenters of her drawing-room were Théophile Gautier and Balzac, Alfred de Musset and Victor Hugo. She died on the 29th of June 1855. Her collected works were published in six volumes (1860-1861).

See Sainte-Beuve, *Causeries du lundi*, t. iii.; G. de Molènes, "Les Femmes poètes," in *Revue des deux mondes* (July 1842); Taxile Delord, *Les Matinées littéraires* (1860); *L'Esprit de Madame Girardin, avec une préface par M. Lamartine* (1862); G. d'Heilly, *Madame de Girardin, sa vie et ses œuvres* (1868); Imbert de Saint Amand, *Mme de Girardin* (1875).

GIRARDIN, ÉMILE DE (1802-1881), French publicist, was born, not in Switzerland in 1806 of unknown parents, but (as was recognized in 1837) in Paris in 1802, the son of General Alexandre de Girardin and of Madame Dupuy, wife of a Parisian advocate. His first publication was a novel, *Émile*, dealing with his birth and early life, and appeared under the name of Girardin in 1827. He became inspector of fine arts under the Martignac ministry just before the revolution of 1830, and was an energetic and passionate journalist. Besides his work on the daily press he issued miscellaneous publications which attained an enormous circulation. His *Journal des connaissances utiles* had 120,000 subscribers, and the initial edition of his *Almanach de France* (1834) ran to a million copies. In 1836 he inaugurated cheap journalism in a popular Conservative organ, *La Presse*, the subscription to which was only forty francs a year. This undertaking involved him in a duel with Armand Carrel, the fatal result of which made him refuse satisfaction to later opponents. In 1839 he was excluded from the Chamber of Deputies, to which he had been four times elected, on the plea of his foreign birth, but was admitted in 1842. He resigned early in February 1847, and on the 24th of February 1848 sent a note to Louis Philippe demanding his resignation and the regency of the duchess of Orleans. In the Legislative Assembly he voted with the Mountain. He pressed eagerly in his paper for the election of Prince Louis Napoleon, of whom he afterwards became one of the most violent opponents. In 1856 he sold *La Presse*, only to resume it in 1862, but its vogue was over, and Girardin started a new journal, *La Liberté*, the sale of which was forbidden in the public streets. He supported Émile Ollivier and the Liberal Empire, but plunged into vehement journalism again to advocate war against Prussia. Of his many subsequent enterprises the most successful was the purchase of *Le Petit Journal*, which served to advocate the policy of Thiers, though he himself did not contribute. The crisis of the 16th of May 1877, when Jules Simon fell from power, made him resume his pen to attack MacMahon and the party of reaction in *La France* and in *Le Petit Journal*. Émile de Girardin married in 1831 Delphine Gay (see above), and after her death in 1855 Guillemette Joséphine Brunold, countess von Tieffenbach, widow of Prince Frederick of Nassau. He was divorced from his second wife in 1872.

The long list of his social and political writings includes: *De la presse périodique au XIX^e^, siècle* (1837); *De l'instruction publique* (1838); *Études politiques* (1838); *De la liberté de la presse et du journalisme* (1842); *Le Droit au travail au Luxembourg et à l'Assemblée Nationale* (2 vols., 1848); *Les Cinquante-deux* (1849, &c.), a series of articles on current parliamentary questions; *La Politique universelle, décrets de l'avenir* (Brussels, 1852); *Le Condamné du 6 mars* (1867), an account of his own differences with the government in 1867 when he was fined 5000 fr. for an article in *La Liberté; Le Dossier de la guerre* (1877), a collection of official documents; *Questions de mon temps, 1836 à 1856*, articles extracted from the daily and weekly press (12 vols., 1858).

GIRARDON, FRANÇOIS (1628-1715), French sculptor, was born at Troyes on the 17th of March 1628. As a boy he had for master a joiner and wood-carver of his native town, named Baudesson, under whom he is said to have worked at the château of Liébault, where he attracted the notice of Chancellor Séguier. By the chancellor's influence Girardon was first removed to Paris and placed in the studio of François Anguier, and afterwards sent to Rome. In 1652 he was back in France, and seems at once to have addressed himself with something like ignoble subserviency to the task of conciliating the court painter Charles Le Brun. Girardon is reported to have declared himself incapable of composing a group, whether with truth or from motives of policy it is impossible to say. This much is certain, that a very large proportion of his work was carried out from designs by Le Brun, and shows the merits and

defects of Le Brun's manner—a great command of ceremonial pomp in presenting his subject, coupled with a large treatment of forms which if it were more expressive might be imposing. The court which Girardon paid to the "premier peintre du roi" was rewarded. An immense quantity of work at Versailles was entrusted to him, and in recognition of the successful execution of four figures for the Bains d'Apollon, Le Brun induced the king to present his protégé personally with a purse of 300 louis, as a distinguishing mark of royal favour. In 1650 Girardon was made member of the Academy, in 1659 professor, in 1674 "adjoint au recteur," and finally in 1695 chancellor. Five years before (1690), on the death of Le Brun, he had also been appointed "inspecteur général des ouvrages de sculpture"—a place of power and profit. In 1699 he completed the bronze equestrian statue of Louis XIV., erected by the town of Paris on the Place Louis le Grand. This statue was melted down during the Revolution, and is known to us only by a small bronze model (Louvre) finished by Girardon himself. His Tomb of Richelieu (church of the Sorbonne) was saved from destruction by Alexandre Lenoir, who received a bayonet thrust in protecting the head of the cardinal from mutilation. It is a capital example of Girardon's work, and the theatrical pomp of its style is typical of the funeral sculpture of the reigns of Louis XIV. and Louis XV.; but amongst other important specimens yet remaining may also be cited the Tomb of Louvois (St Eustache), that of Bignon, the king's librarian, executed in 1656 (St Nicolas du Chardonneret), and decorative sculptures in the Galerie d'Apollon and Chambre du roi in the Louvre. Mention should not be omitted of the group, signed and dated 1699, "The Rape of Proserpine" at Versailles, which also contains the "Bull of Apollo." Although chiefly occupied at Paris Girardon never forgot his native Troyes, the museum of which town contains some of his best works, including the marble busts of Louis XIV. and Maria Theresa. In the hôtel de ville is still shown a medallion of Louis XIV., and in the church of St Rémy a bronze crucifix of some importance—both works by his hand. He died in Paris in 1715.

See Corrard de Breban, *Notice sur la vie et les œuvres de Girardon* (1850).

GIRART DE ROUSSILLON, an epic figure of the Carolingian cycle of romance. In the genealogy of romance he is a son of Doon de Mayence, and he appears in different and irreconcilable circumstances in many of the *chansons de geste*. The legend of Girart de Roussillon is contained in a *Vita Girardi de Roussillon* (ed. P. Meyer, in *Romania*, 1878), dating from the beginning of the 12th century and written probably by a monk of the abbey of Pothières or of Vezelai, both of which were founded in 860 by Girart; in *Girart de Roussillon, a chanson de geste* written early in the 12th century in a dialect midway between French and Provençal, and apparently based on an earlier Burgundian poem; in a 14th century romance in alexandrines (ed. T. J. A. P. Mignard, Paris and Dijon, 1878); and in a prose romance by Jehan Wauquelin in 1447 (ed. L. de Montille, Paris, 1880). The historical Girard, son of Leuthard and Grimildis, was a Burgundian chief who was count of Paris in 837, and embraced the cause of Lothair against Charles the Bald. He fought at Fontenay in 841, and doubtless followed Lothair to Aix. In 855 he became governor of Provence for Lothair's son Charles, king of Provence (d. 863). His wife Bertha defended Vienne unsuccessfully against Charles the Bald in 870, and Girard, who had perhaps aspired to be the titular ruler of the northern part of Provence, which he had continued to administer under Lothair II. until that prince's death in 869, retired with his wife to Avignon, where he died probably in 877, certainly before 879. The tradition of his piety, of the heroism of his wife Bertha, and of his wars with Charles passed into romance; but the historical facts are so distorted that in *Girart de Roussillon* the *trouvère* makes him the opponent of Charles Martel, to whom he stands in the relation of brother-in-law. He is nowhere described in authentic historic sources as of Roussillon. The title is derived from his castle built on Mount Lassois, near Châtillon-sur-Seine. Southern traditions concerning Count Girart, in which he is made the son of Garin de Monglane, are embodied in *Girart de Viane* (13th century) by Bertrand de Bar-sur-l'Aube, and in the *Aspramonte* of Andrea da Barberino, based on the French *chanson of Aspremont*, where he figures as Girart de Frete or de Fratte.[1] *Girart de Viane* is the recital of a siege of Vienne by Charlemagne, and in *Aspramonte* Girart de Fratte leads an army of infidels against Charlemagne. *Girart de Roussillon* was long held to be of Provençal origin, and to be a proof of the existence of an independent Provençal epic, but its Burgundian origin may be taken as proved.

See F. Michel, *Gerard de Rossillon ... publié en français et en provençal d'après les MSS. de Paris et de Londres* (Paris, 1856); P. Meyer, *Girart de Roussillon* (1884), a translation in modern French with a comprehensive introduction. For *Girart de Viane* (ed. P. Tarbé, Reims, 1850) see L. Gautier, *Épopées françaises*, vol. iv.; F. A. Wulff, *Notice sur les sagas de Magus et de Geirard* (Lund, 1874).

1 It is of interest to note that Freta was the old name for the town of Saint Remy, and that it is close to the site of the ancient town of Glanum, the name of which is possibly preserved in Garin de Monglane, the ancestor of the heroes of the cycle of Guillaume d'Orange.

GIRAUD, GIOVANNI, Count (1776-1834), Italian dramatist, of French origin, was born at Rome, and showed a precocious passion for the theatre. His first play, *L'Onestà non si vince*, was successfully produced in 1798. He took part in politics as an active supporter of Pius VI., but was mainly occupied with the production of his plays, and in 1809 became director-general of the Italian theatres. He died at Naples in 1834. Count Giraud's comedies, the best of which are *Gelosie per equivoco* (1807) and *L'Ajonell' imbarazzo* (1824), were bright and amusing on the stage, but of no particular literary quality.

His collected comedies were published in 1823 and his *Teatro domestico* in 1825.

GIRDLE (O. Eng. *gyrdel*, from *gyrdan*, to gird; cf. Ger. *Gürtel*, Dutch *gordel*, from *gürten* and *gorden*; "gird" and its doublet "girth" together with the other Teutonic cognates have been referred by some to the root *ghar*—to seize, enclose, seen in Gr. χείρ, hand, Lat. *hortus*, garden, and also English yard, garden, garth, &c.), a band of leather or other material worn round the waist, either to confine the loose and flowing outer robes so as to allow freedom of movement, or to fasten and support the garments of the wearer. Among the Romans it was used to confine the *tunica*, and it formed part of the dress of the soldier; when a man quitted military service he was said, *cingulum deponere*, to lay aside the girdle. Money being carried in the girdle, *zonam perdere* signified to lose one's purse, and, among the Greeks, to cut the girdle was to rob a man of his money.

Girdles and girdle-buckles are not often found in Gallo-Roman graves, but in the graves of Franks and Burgundians they are constantly present, often ornamented with bosses of silver or bronze, chased or inlaid. Sidonius Apollinaris speaks of the Franks as belted round the waist, and Gregory of Tours in the 6th century says that a dagger was carried in the Frankish girdle.

In the Anglo-Saxon dress the girdle makes an unimportant figure, and the Norman knights, as a rule, wore their belts under their hauberks. After the Conquest, however, the artificers gave more attention to a piece whose buckle and tongue invited the work of the goldsmith. Girdles of varying richness are seen on most of the western medieval effigies. That of Queen Berengaria lets the long pendant hang below the knee, following a fashion which frequently reappears.

In the latter part of the 13th century the knight's surcoat is girdled with a narrow cord at the waist, while the great belt, which had become the pride of the well-equipped cavalier, loops across the hips carrying the heavy sword aslant over the thighs or somewhat to the left of the wearer.

But it is in the second half of the following century that the knightly belt takes its most splendid form. Under the year 1356 the continuator of the chronicle of Nangis notes that the increase of jewelled belts had mightily enhanced the price of pearls. The belt is then worn, as a rule, girdling the hips at some distance below the waist, being probably supported by hooks as is the belt of a modern infantry soldier. The end of the belt, after being drawn through the buckle, is knotted or caught up after the fashion of the tang of the Garter. The waist girdle either disappears from sight or as a narrow and ornamented strap is worn diagonally to help in the support of the belt. A mass of beautiful ornament covers the whole belt, commonly seen as an unbroken line of bosses enriched with curiously worked roundels or lozenges which, when the loose strap-end is abandoned, meet in a splendid morse or clasp on which the enameller and jeweller had wrought their best. About 1420 this fashion tends to disappear, the loose tabards worn over armour in the jousting-yard hindering its display. The belt never regains its importance as an ornament, and, at the beginning of the 16th century, sword and dagger are sometimes seen hanging at the knight's sides without visible support.

In civil dress the magnificent belt of the 14th century is worn by men of rank over the hips of the tight short-skirted coat, and in that century and in the 15th and 16th there are sumptuary laws to cheek the extravagance of rich girdles worn by men and women whose humble station made them unseemly. Even priests must be rebuked for their silver girdles with baselards hanging from them. Purses, daggers, keys, penners and inkhorns, beads and even books, dangled from girdles in the 15th and early 16th centuries. Afterwards the girdle goes on as a mere strap for holding up the clothing or as a sword-belt. At the Restoration men contrasted the fashion of the court, a light rapier hung from a broad shoulder-belt, with the fashion of the countryside, where a heavy weapon was supported by a narrow waistbelt. Soon afterwards both fashions disappeared. Sword-hangers were concealed by the skirt, and the belt, save in certain military and sporting costumes, has no more been in sight in England. Even as a support for breeches or trousers, the use of braces has gradually supplanted the girdle during the past century.

In most of those parts of the Continent—Brittany, for example—where the peasantry maintains old fashions in clothing, the belt or girdle is still an important part of the clothing. Italian non-commissioned officers find that the Sicilian recruit's main objection to the first bath of his life-time lies in the fact that he must lay down the cherished belt which carries his few valuables. With the Circassian the belt still buckles on an arsenal of pistols and knives.

Folklore and ancient custom are much concerned with the girdle. Bankrupts at one time put it off in open court; French law refused courtesans the right to wear it; Saint Guthlac casts out devils by buckling his girdle round a possessed man; an earl is "a belted earl" since the days when the putting

on of a girdle was part of the ceremony of his creation; and fairy tales of half the nations deal with girdles which give invisibility to the wearer.

(O. Ba.)

GIRGA, or Girgeh, a town of Upper Egypt on the W. bank of the Nile, 313 m. S.S.E. of Cairo by rail and about 10 m. N.N.E. of the ruins of Abydos. Pop. (1907) 19,893, of whom about one-third are Copts. The town presents a picturesque appearance from the Nile, which at this point makes a sharp bend. A ruined mosque with a tall minaret stands by the river-brink. Many of the houses are of brick decorated with glazed tiles. The town is noted for the excellence of its pottery. Girga is the seat of a Coptic bishop. It also possesses a Roman Catholic monastery, considered the most ancient in the country. As lately as the middle of the 18th century the town stood a quarter of a mile from the river, but is now on the bank, the intervening space having been washed away, together with a large part of the town, by the stream continually encroaching on its left bank.

GIRGENTI (anc. *Agrigentum*, *q.v.*), a town of Sicily, capital of the province which bears its name, and an episcopal see, on the south coast, 58 m. S. by E. of Palermo direct and 84½ m. by rail. Population (1901) 25,024. The town is built on the western summit of the ridge which formed the northern portion of the ancient site; the main street runs from E. to W. on the level, but the side streets are steep and narrow. The cathedral occupies the highest point in the town; it was not founded till the 13th century, taking the place of the so-called temple of Concord. The campanile still preserves portions of its original architecture, but the interior has been modernized. In the chapter-house a famous sarcophagus, with scenes illustrating the myth of Hippolytus, is preserved. There are other scattered remains of 13th-century architecture in the town, while, in the centre of the ancient city, close to the so-called oratory of Phalaris, is the Norman church of S. Nicolo. A small museum in the town contains vases, terra-cottas, a few sculptures, &c. The port of Girgenti, 5½ m. S.W. by rail, now known as Porto Empedocle (population in 1901, 11,529), as the principal place of shipment for sulphur, the mining district beginning immediately north of Girgenti.

(T. As.)

GIRISHK, a village and fort of Afghanistan. It stands on the right bank of the Helmund 78 m. W. of Kandahar on the road to Herat; 3641 ft. above the sea. The fort, which is garrisoned from Kandahar and is the residence of the governor of the district (Pusht-i-Rud), has little military value. It commands the fords of the Helmund and the road to Seistan, from which it is about 190 m. distant; and it is the centre of a rich agricultural district. Girishk was occupied by the British during the first Afghan War; and a small garrison of sepoys, under a native officer, successfully withstood a siege of nine months by an overwhelming Afghan force. The Dasht-i-Bakwa stretches beyond Girishk towards Farah, a level plain of considerable width, which tradition assigns as the field of the final contest for supremacy between Russia and England.

GIRNAR, a sacred hill in Western India, in the peninsula of Kathiawar, 10 m. E. of Junagarh town. It consists of five peaks, rising about 3500 ft. above the sea, on which are numerous old Jain temples, much frequented by pilgrims. At the foot of the hill is a rock, with an inscription of Asoka (2nd century B.C.), and also two other inscriptions (dated 150 and 455 A.D.) of great historical importance.

GIRODET DE ROUSSY, ANNE LOUIS (1767-1824), French painter, better known as Girodet-Trioson, was born at Montargis on the 5th of January 1767. He lost his parents in early youth, and the care of his fortune and education fell to the lot of his guardian, M. Trioson, “médecin de mesdames,”

by whom he was in later life adopted. After some preliminary studies under a painter named Luquin, Girodet entered the school of David, and at the age of twenty-two he successfully competed for the Prix de Rome. At Rome he executed his “Hippocrate refusant les présents d’Artaxerxès” and “Endymion dormant” (Louvre), a work which was hailed with acclamation at the Salon of 1792. The peculiarities which mark Girodet’s position as the herald of the romantic movement are already evident in his “Endymion.” The firm-set forms, the grey cold colour, the hardness of the execution are proper to one trained in the school of David, but these characteristics harmonize ill with the literary, sentimental and picturesque suggestions which the painter has sought to render. The same incongruity marks Girodet’s “Danaë” and his “Quatre Saisons,” executed for the king of Spain (repeated for Compiègne), and shows itself to a ludicrous extent in his “Fingal” (St Petersburg, Leuchtenberg collection), executed for Napoleon I. in 1802. This work unites the defects of the classic and romantic schools, for Girodet’s imagination ardently and exclusively pursued the ideas excited by varied reading both of classic and of modern literature, and the impressions which he received from the external world afforded him little stimulus or check; he consequently retained the mannerisms of his master’s practice whilst rejecting all restraint on choice of subject. The credit lost by “Fingal” Girodet regained in 1806, when he exhibited “Scène de Déluge” (Louvre), to which (in competition with the “Sabines” of David) was awarded the decennial prize. This success was followed up in 1808 by the production of the “Reddition de Vienne” and “Atala au Tombeau”—a work which went far to deserve its immense popularity, by a happy choice of subject, and remarkable freedom from the theatricality of Girodet’s usual manner, which, however, soon came to the front again in his “Révolte de Caire” (1810). His powers now began to fail, and his habit of working at night and other excesses told upon his constitution; in the Salon of 1812 he exhibited only a “Tête de Vierge”; in 1819 “Pygmalion et Galatée” showed a still further decline of strength; and in 1824—the year in which he produced his portraits of Cathelineau and Bonchamps—Girodet died on the 9th of December.

He executed a vast quantity of illustrations, amongst which may be cited those to the Didot *Virgil* (1798) and to the Louvre *Racine* (1801-1805). Fifty-four of his designs for *Anacreon* were engraved by M. Chatillon. Girodet wasted much time on literary composition, his poem *Le Peintre* (a string of commonplaces), together with poor imitations of classical poets, and essays on *Le Génie* and *La Grâce*, were published after his death (1829), with a biographical notice by his friend M. Coupin de la Couperie; and M. Delécluze, in his *Louis David et son temps*, has also a brief life of Girodet.

GIRONDE, a maritime department of south-western France, formed from four divisions of the old province of Guyenne, viz. Bordelais, Bazadais, and parts of Périgord and Agenais. Area, 4140 sq. m. Pop. (1906) 823,925. It is bounded N. by the department of Charente-Inférieure, E. by those of Dordogne and Lot-et-Garonne, S. by that of Landes, and W. by the Bay of Biscay. It takes its name from the river or estuary of the Gironde formed by the union of the Garonne and Dordogne. The department divides itself naturally into a western and an eastern portion. The former, which is termed the *Landes* (*q.v.*), occupies more than a third of the department, and consists chiefly of morass or sandy plain, thickly planted with pines and divided from the sea by a long line of dunes. These dunes are planted with pines, which, by binding the sand together with their roots, prevent it from drifting inland and afford a barrier against the sea. On the east the dunes are fringed for some distance by two extensive lakes, Carcans and Lacanau, communicating with each other and with the Bay of Arcachon, near the southern extremity of the department. The Bay of Arcachon contains numerous islands, and on the land side forms a vast shallow lagoon, a considerable portion of which, however, has been drained and converted into arable land. The eastern portion of the department consists chiefly of a succession of hill and dale, and, especially in the valley of the Gironde, is very fertile. The estuary of the Gironde is about 45 m. in length, and varies in breadth from 2 to 6 m. It presents a succession of islands and mud banks which divide it into two channels and render navigation somewhat difficult. It is, however, well buoyed and lighted, and has a mean depth of 21 ft. There are extensive marshes on the right bank to the north of Blaye, and the shores on the left are characterized, especially towards the mouth, by low-lying polders protected by dikes and composed of fertile salt marshes. At the mouth of the Gironde stands the famous tower of Cordouan, one of the finest lighthouses of the French coast. It was built between the years 1585 and 1611 by the architect and engineer Louis de Foix, and added to towards the end of the 18th century. The principal affluent of the Dordogne in this department is the Isle. The feeders of the Garonne are, with the exception of the Dropt, all small. West of the Garonne the only river of importance is the Leyre, which flows into the Bay of Arcachon. The climate is humid and mild and very hot in summer. Wheat, rye, maize, oats and tobacco are grown to a considerable extent. The corn produced, however, does not meet the wants of the inhabitants. The culture of the vine is by far the most important branch of industry carried on (see Wine), the vineyards occupying about one-seventh of the surface of the department. The wine-growing districts are the Médoc, Graves, Côtes, Palus, Entre-deux-Mers and Sauternes. The Médoc is a region of 50 m. in length by about 6 m. in breadth, bordering the left banks of the Garonne and the Gironde between Bordeaux and the sea. The Graves country forms a zone 30 m. in extent, stretching along the left bank of the Garonne from the neighbourhood of Bordeaux to Barsac. The Sauternes country lies to the S.E. of the Graves. The Côtes lie on the right bank of the Dordogne and Gironde, between it and the Garonne, and on the left bank of the Garonne. The produce of the Palus, the alluvial land of the valleys, and of the Entre-deux-Mers,

situated on the left bank of the Dordogne, is inferior. Fruits and vegetables are extensively cultivated, the peaches and pears being especially fine. Cattle are extensively raised, the Bazadais breed of oxen and the Bordelais breed of milch-cows being well known. Oyster-breeding is carried on on a large scale in the Bay of Arcachon. Large supplies of resin, pitch and turpentine are obtained from the pine woods, which also supply vine-props, and there are well-known quarries of limestone. The manufactures are various, and, with the general trade, are chiefly carried on at Bordeaux (*q.v.*), the chief town and third port in France. Pauillac, Blaye, Libourne and Arcachon are minor ports. Gironde is divided into the arrondissements of Bordeaux, Blaye, Lesparre, Libourne, Bazas and La Réole, with 49 cantons and 554 communes. The department is served by five railways, the chief of which are those of the Orleans and Southern companies. It forms part of the circumscription of the archbishopric, the appeal-court and the *académie* (educational division) of Bordeaux, and of the region of the XVIII. army corps, the headquarters of which are at that city. Besides Bordeaux, Libourne, La Réole, Bazas, Blaye, Arcachon, St Emilion and St Macaire are the most noteworthy towns and receive separate treatment. Among the other places of interest the chief are Cadillac, on the right bank of the Garonne, where there is a castle of the 16th century, surrounded by fortifications of the 14th century; Labrède, with a feudal château in which Montesquieu was born and lived; Villandraut, where there is a ruined castle of the 13th century; Uzeste, which has a church begun in 1310 by Pope Clement V.; Mazères with an imposing castle of the 14th century; La Sauve, which has a church (11th and 12th centuries) and other remains of a Benedictine abbey; and Ste Foy-la-Grande, a bastide created in 1255 and afterwards a centre of Protestantism, which is still strong there. La Teste (pop. in 1906, 5699) was the capital in the middle ages of the famous lords of Buch.

GIRONDISTS (Fr. *Girondins*), the name given to a political party in the Legislative Assembly and National Convention during the French Revolution (1791-1793). The Girondists were, indeed, rather a group of individuals holding certain opinions and principles in common than an organized political party, and the name was at first somewhat loosely applied to them owing to the fact that the most brilliant exponents of their point of view were deputies from the Gironde. These deputies were twelve in number, six of whom—the lawyers Vergniaud, Guadet, Gensonné, Grangeneuve and Jay, and the tradesman Jean François Ducos—sat both in the Legislative Assembly and the National Convention. In the Legislative Assembly these represented a compact body of opinion which, though not as yet definitely republican, was considerably more advanced than the moderate royalism of the majority of the Parisian deputies. Associated with these views was a group of deputies from other parts of France, of whom the most notable were Condorcet, Fauchet, Lasource, Isnard, Kersaint, Henri Larivière, and, above all, Jacques Pierre Brissot, Roland and Pétion, elected mayor of Paris in succession to Bailly on the 16th of November 1791. On the spirit and policy of the Girondists Madame Roland, whose *salon* became their gathering-place, exercised a powerful influence (see ROLAND); but such party cohesion as they possessed they owed to the energy of Brissot (*q.v.*), who came to be regarded as their mouthpiece in the Assembly and the Jacobin Club. Hence the name *Brissotins*, coined by Camille Desmoulins, which was sometimes substituted for that of *Girondins*, sometimes closely coupled with it. As strictly party designations these first came into use after the assembling of the National Convention (September 20th, 1792), to which a large proportion of the deputies from the Gironde who had sat in the Legislative Assembly were returned. Both were used as terms of opprobrium by the orators of the Jacobin Club, who freely denounced “the Royalists, the Federalists, the Brissotins, the Girondins and all the enemies of the democracy” (F. Aulard, *Soc. des Jacobins*, vi. 531).

In the Legislative Assembly the Girondists represented the principle of democratic revolution within and of patriotic defiance to the European powers without. They were all-powerful in the Jacobin Club (see JACOBINS), where Brissot’s influence had not yet been ousted by Robespierre, and they did not hesitate to use this advantage to stir up popular passion and intimidate those who sought to stay the progress of the Revolution. They compelled the king in 1792 to choose a ministry composed of their partisans—among them Roland, Dumouriez, Clavière and Servan; and it was they who forced the declaration of war against Austria. In all this there was no apparent line of cleavage between “La Gironde” and the Mountain. *Montagnards* and Girondists alike were fundamentally opposed to the monarchy; both were democrats as well as republicans; both were prepared to appeal to force in order to realize their ideals; in spite of the accusation of “federalism” freely brought against them, the Girondists desired as little as the Montagnards to break up the unity of France. Yet from the first the leaders of the two parties stood in avowed opposition, in the Jacobin Club as in the Assembly. It was largely a question of temperament. The Girondists were idealists, doctrinaires and theorists rather than men of action; they encouraged, it is true, the “armed petitions” which resulted, to their dismay, in the *émeute* of the 20th of June; but Roland, turning the ministry of the interior into a publishing office for tracts on the civic virtues, while in the provinces riotous mobs were burning the châteaux unchecked, is more typical of their spirit. With the ferocious fanaticism or the ruthless opportunism of the future organizers of the Terror they had nothing in common. As the Revolution developed they trembled at the anarchic forces they had helped to unchain, and tried in vain to curb them. The overthrow of the monarchy on the 10th of August and the massacres of September were not their work, though they claimed credit for the results achieved.

The crisis of their fate was not slow in coming. It was they who proposed the suspension of the king

and the summoning of the National Convention; but they had only consented to overthrow the kingship when they found that Louis XVI. was impervious to their counsels, and, the republic once established, they were anxious to arrest the revolutionary movement which they had helped to set in motion. As Daunou shrewdly observes in his *Mémoires*, they were too cultivated and too polished to retain their popularity long in times of disturbance, and were therefore the more inclined to work for the establishment of order, which would mean the guarantee of their own power.[1] Thus the Girondists, who had been the Radicals of the Legislative Assembly, became the Conservatives of the Convention. But they were soon to have practical experience of the fate that overtakes those who attempt to arrest in mid-career a revolution they themselves have set in motion. The ignorant populace, for whom the promised social millennium had by no means dawned, saw in an attitude seemingly so inconsistent obvious proof of corrupt motives, and there were plenty of prophets of misrule to encourage the delusion—orators of the clubs and the street corners, for whom the restoration of order would have meant well-deserved obscurity. Moreover, the *Septembriseurs*—Robespierre, Danton, Marat and their lesser satellites—realized that not only their influence but their safety depended on keeping the Revolution alive. Robespierre, who hated the Girondists, whose lustre had so long obscured his own, had proposed to include them in the proscription lists of September; the Mountain to a man desired their overthrow.

The crisis came in March 1793. The Girondists, who had a majority in the Convention, controlled the executive council and filled the ministry, believed themselves invincible. Their orators had no serious rivals in the hostile camp; their system was established in the purest reason. But the Montagnards made up by their fanatical, or desperate, energy and boldness for what they lacked in talent or in numbers. They had behind them the revolutionary Commune, the Sections and the National Guard of Paris, and they had gained control of the Jacobin club, where Brissot, absorbed in departmental work, had been superseded by Robespierre. And as the motive power of this formidable mechanism of force they could rely on the native suspiciousness of the Parisian populace, exaggerated now into madness by famine and the menace of foreign invasion. The Girondists played into their hands. At the trial of Louis XVI. the bulk of them had voted for the "appeal to the people," and so laid themselves open to the charge of "royalism"; they denounced the domination of Paris and summoned provincial levies to their aid, and so fell under suspicion of "federalism," though they rejected Buzot's proposal to transfer the Convention to Versailles. They strengthened the revolutionary Commune by decreeing its abolition, and then withdrawing the decree at the first sign of popular opposition; they increased the prestige of Marat by prosecuting him before the Revolutionary Tribunal, where his acquittal was a foregone conclusion. In the suspicious temper of the times this vacillating policy was doubly fatal. Marat never ceased his denunciations of the "*faction des hommes d'État*," by which France was being betrayed to her ruin, and his parrot cry of "*Nous sommes trahis!*" was re-echoed from group to group in the streets of Paris. The Girondists, for all their fine phrases, were sold to the enemy, as Lafayette, Dumouriez and a hundred others—once popular favourites—had been sold.

The hostility of Paris to the Girondists received a fateful advertisement by the election, on the 15th of February 1793, of the ex-Girondist Jean Nicolas Pache (1746-1823) to the mayoralty. Pache had twice been minister of war in the Girondist government; but his incompetence had laid him open to strong criticism, and on the 4th of February he had been superseded by a vote of the Convention. This was enough to secure him the suffrages of the Paris electors ten days later, and the Mountain was strengthened by the accession of an ally whose one idea was to use his new power to revenge himself on his former colleagues. Pache, with Chaumette, *procureur* of the Commune, and Hébert, deputy *procureur*, controlled the armed organization of the Paris Sections, and prepared to turn this against the Convention. The abortive *émeute* of the 10th of March warned the Girondists of their danger, but the Commission of Twelve appointed on the 18th of May, the arrest of Marat and Hébert, and other precautionary measures, were defeated by the popular risings of the 27th and 31st of May, and, finally, on the 2nd of June, Hanriot with the National Guards purged the Convention of the Girondists. Isnard's threat, uttered on the 25th of May, to march France upon Paris had been met by Paris marching upon the Convention.

The list drawn up by Hanriot, and endorsed by a decree of the intimidated Convention, included twenty-two Girondist deputies and ten members of the Commission of Twelve, who were ordered to be detained at their lodgings "under the safeguard of the people." Some submitted, among them Gensonné, Guadet, Vergniaud, Pétion, Birotteau and Boyer-Fonfrède. Others, including Brissot, Louvet, Buzot, Lasource, Grangeneuve, Larivière and Bergoing, escaped from Paris and, joined later by Guadet, Pétion and Birotteau, set to work to organize a movement of the provinces against the capital. This attempt to stir up civil war determined the wavering and frightened Convention. On the 13th of June it voted that the city of Paris had deserved well of the country, and ordered the imprisonment of the detained deputies, the filling up of their places in the Assembly by their *suppléants*, and the initiation of vigorous measures against the movement in the provinces. The excuse for the Terror that followed was the imminent peril of France, menaced on the east by the advance of the armies of the Coalition, on the west by the Royalist insurrection of La Vendée, and the need for preventing at all costs the outbreak of another civil war. The assassination of Marat by Charlotte Corday (*q.v.*) only served to increase the unpopularity of the Girondists and to seal their fate. On the 28th of July a decree of the Convention proscribed, as traitors and enemies of their country, twenty-one deputies, the final list of those sent for trial comprising the names of Antiboul, Boilleau the younger, Boyer-Fonfrède, Brissot, Carra, Duchastel, the younger Ducos, Dufriche de Valazé, Duprat, Fauchet, Gardien, Gensonné, Lacaze, Lasource, Lauze-Deperret, Lehardi, Lesterpt-Beauvais, the elder Minvielle, Sillery, Vergniaud and Viger, of whom five were deputies from the Gironde. The names of thirty-nine others

were included in the final *acte d'accusation*, accepted by the Convention on the 24th of October, which stated the crimes for which they were to be tried as their perfidious ambition, their hatred of Paris, their "federalism" and, above all, their responsibility for the attempt of their escaped colleagues to provoke civil war.

The trial of the twenty-one, which began before the Revolutionary Tribunal on the 24th of October, was a mere farce, the verdict a foregone conclusion. On the 31st they were borne to the guillotine in five tumbrils, the corpse of Dufriche de Valazé—who had killed himself—being carried with them. They met death with great courage, singing the refrain "*Plutôt la mort que l'esclavage!*" Of those who escaped to the provinces the greater number, after wandering about singly or in groups, were either captured and executed or committed suicide, among them Barbaroux, Buzot, Condorcet, Grangeneuve, Guadet, Kersaint, Pétion, Rabaut de Saint-Étienne and Rebecqui. Roland had killed himself at Rouen on the 15th of November, a week after the execution of his wife. Among the very few who finally escaped was Jean Baptiste Louvet, whose *Mémoires* give a thrilling picture of the sufferings of the fugitives. Incidentally they prove, too, that the sentiment of France was for the time against the Girondists, who were proscribed even in their chief centre, the city of Bordeaux. The survivors of the party made an effort to re-enter the Convention after the fall of Robespierre, but it was not until the 5th of March 1795 that they were formally reinstated. On the 3rd of October of the same year (11 Vendémiaire, year III.) a solemn fête in honour of the Girondist "martyrs of liberty" was celebrated in the Convention. See also the article FRENCH REVOLUTION and separate biographies.

Of the special works on the Girondists Lamartine's *Histoire des Girondins* (2 vols., Paris, 1847, new ed. 1902, in 6 vols.) is rhetoric rather than history and is untrustworthy; the *Histoire des Girondins*, by A. Gramier de Cassagnac (Paris, 1860) led to the publication of a *Protestation* by J. Guadet, a nephew of the Girondist orator, which was followed by his *Les Girondins, leur vie privée, leur vie publique, leur proscription et leur mort* (2 vols., Paris, 1861, new ed. 1890); with which cf. Alary, *Les Girondins par Guadet* (Bordeaux, 1863); also Charles Vatel, *Charlotte de Corday et les Girondins: pièces classées et annotées* (3 vols., Paris, 1864-1872); *Recherches historiques sur les Girondins* (2 vols., ib. 1873); Ducos, *Les Trois Girondines* (Madame Roland, Charlotte Corday, Madame Bouquey) *et les Girondins* (*ib.* 1896); Edmond Biré, *La Légende des Girondins* (Paris, 1881, new ed. 1896); also Helen Maria Williams, *State of Manners and Opinions in the French Republic towards the close of the 18th Century* (2 vols., London, 1801). Memoirs or fragments of memoirs also exist by particular Girondists, *e.g.* Barbaroux, Pétion, Louvet, Madame Roland. See, further, the bibliography to the article FRENCH REVOLUTION.

(W. A. P.)

1 Daunou, "Mémoires pour servir à l'hist. de la Convention Nationale," p. 409, vol. xii. of M. Fr. Barrière, *Bibl. des mém. rel à l'hist. de la France*, &c. (Paris, 1863).

GIRTIN, THOMAS (1775-1802), English painter and etcher, was the son of a well-to-do cordage maker in Southwark, London. His father died while Thomas was a child, and his widow married Mr Vaughan, a pattern-draughtsman. Girtin learnt drawing as a boy, and was apprenticed to Edward Doyes (1763-1804), the mezzotint engraver, and he soon made J. M. W. Turner's acquaintance. His architectural and topographical sketches and drawings soon established his reputation, his use of water-colour for landscapes being such as to give him the credit of having created modern water-colour painting, as opposed to mere "tinting." His etchings also were characteristic of his artistic genius. His early death from consumption (9th of November 1802) led indeed to Turner saying that "had Tom Girtin lived I should have starved." From 1794 to his death he was an exhibitor at the Royal Academy; and some fine examples of his work have been bequeathed by private owners to the British Museum and the Victoria and Albert Museum.

GIRVAN, a police burgh, market and fishing town of Ayrshire, Scotland, at the mouth of the Girvan, 21 m. S.W. of Ayr, and 63 m. S.W. of Glasgow by the Glasgow & South-Western railway. Pop. (1901) 4024. The principal industry was weaving, but the substitution of the power-loom for the hand-loom nearly put an end to it. The herring fishery has developed to considerable proportions, the harbour having been enlarged and protected by piers and a breakwater. Moreover, the town has grown in repute as a health and holiday resort, its situation being one of the finest in the west of Scotland. There is excellent sea-bathing, and a good golf-course. The vale of Girvan, one of the most fertile tracts in the shire, is made so by the Water of Girvan, which rises in the loch of Girvan Eye, pursues a very tortuous course of 36 m. and empties into the sea. Girvan is the point of communication with Ailsa Craig. About 13 m. S.W. at the mouth of the Stinchar is the fishing village of Ballantrae (pop. 511).

GIRY (Jean Marie Joseph), **ARTHUR** (1848-1899), French historian, was born at Trévoux (Ain) on the 29th of February 1848. After rapidly completing his classical studies at the *lycée* at Chartres, he spent some time in the administrative service and in journalism. He then entered the École des Chartes, where, under the influence of J. Quicherat, he developed a strong inclination to the study of the middle ages. The lectures at the École des Hautes Études, which he attended from its foundation in 1868, revealed his true bent; and henceforth he devoted himself almost entirely to scholarship. He began modestly by the study of the municipal charters of St Omer. Having been appointed assistant lecturer and afterwards full lecturer at the École des Hautes Études, it was to the town of St Omer that he devoted his first lectures and his first important work, *Histoire de la ville de Saint-Omer et de ses institutions jusqu'au XIV^e^ siècle* (1877). He, however, soon realized that the charters of one town can only be understood by comparing them with those of other towns, and he was gradually led to continue the work which Augustin Thierry had broadly outlined in his studies on the *Tiers État*. A minute knowledge of printed books and a methodical examination of departmental and communal archives furnished him with material for a long course of successful lectures, which gave rise to some important works on municipal history and led to a great revival of interest in the origins and significance of the urban communities in France. Giry himself published *Les Établissements de Rouen* (1883-1885), a study, based on very minute researches, of the charter granted to the capital of Normandy by Henry II., king of England, and of the diffusion of similar charters throughout the French dominions of the Plantagenets; a collection of *Documents sur les relations de la royauté avec les villes de France de 1180 à 1314* (1885); and *Étude sur les origines de la commune de Saint-Quentin* (1887).

About this time personal considerations induced Giry to devote the greater part of his activity to the study of diplomatic, which had been much neglected at the École des Chartes, but had made great strides in Germany. As assistant (1883) and successor (1885) to Louis de Mas Latrie, Giry restored the study of diplomatic, which had been founded in France by Dom Jean Mabillon, to its legitimate importance. In 1894 he published his *Manuel de diplomatique*, a monument of lucid and well-arranged erudition, which contained the fruits of his long experience of archives, original documents and textual criticism; and his pupils, especially those at the École des Hautes Études, soon caught his enthusiasm. With their collaboration he undertook the preparation of an inventory and, subsequently, of a critical edition of the Carolingian diplomas. By arrangement with E. Mühlbacher and the editors of the *Monumenta Germaniae historica*, this part of the joint work was reserved for Giry. Simultaneously with this work he carried on the publication of the annals of the Carolingian epoch on the model of the German *Jahrbücher*, reserving for himself the reign of Charles the Bald. Of this series his pupils produced in his lifetime *Les Derniers Carolingiens* (by F. Lot, 1891), *Eudes, comte de Paris et roi de France* (by E. Favre, 1893), and *Charles le Simple* (by Eckel, 1899). The biographies of Louis IV. and Hugh Capet and the history of the kingdom of Provence were not published until after his death, and his own unfinished history of Charles the Bald was left to be completed by his pupils. The preliminary work on the Carolingian diplomas involved such lengthy and costly researches that the Académie des Inscriptions et Belles-Lettres took over the expenses after Giry's death.

In the midst of these multifarious labours Giry found time for extensive archaeological researches, and made a special study of the medieval treatises dealing with the technical processes employed in the arts and industries. He prepared a new edition of the monk Theophilus's celebrated treatise, *Diversarum artium schedula*, and for several years devoted his Saturday mornings to laboratory research with the chemist Aimé Girard at the Conservatoire des Arts et Métiers, the results of which were utilized by Marcellin Berthelot in the first volume (1894) of his *Chimie au moyen âge*. Giry took an energetic part in the *Collection de textes relatifs à l'histoire du moyen âge*, which was due in great measure to his initiative. He was appointed director of the section of French history in *La Grande Encyclopédie*, and contributed more than a hundred articles, many of which, *e.g.* "Archives" and "Diplomatique," were original works. In collaboration with his pupil André Réville, he wrote the chapters on "L'Émancipation des villes, les communes et les bourgeoisies" and "Le Commerce et l'industrie au moyen âge" for the *Histoire générale* of Lavisse and Rambaud. Giry took a keen interest in politics, joining the republican party and writing numerous articles in the republican newspapers, mainly on historical subjects. He was intensely interested in the Dreyfus case, but his robust constitution was undermined by the anxieties and disappointments occasioned by the Zola trial and the Rennes court-martial, and he died in Paris on the 13th of November 1899.

For details of Giry's life and works see the funeral orations published in the *Bibliothèque de l'École des Chartes*, and afterwards in a pamphlet (1899). See also the biography by Ferdinand Lot in the *Annuaire de l'École des Hautes Études* for 1901; and the bibliography of his works by Henry Maistre in the *Correspondance historique et archéologique* (1899 and 1900).

GISBORNE, a seaport of New Zealand, in Cook county, provincial district of Auckland, on Poverty Bay of the east coast of North Island. Pop. (1901) 2733; (1906) 5664. Wool, frozen mutton and agricultural produce are exported from the rich district surrounding. Petroleum has been discovered in the neighbourhood, and about 40 m. from the town there are warm medicinal springs. Near the site of Gisborne Captain Cook landed in 1769, and gave Poverty Bay its name from his inability to obtain supplies owing to the hostility of the natives. Young Nick's Head, the southern horn of the bay, was

named from Nicholas Young, his ship's boy, who first observed it.

GISLEBERT (or GILBERT) **OF MONS** (*c.* 1150-1225), Flemish chronicler, became a clerk, and obtained the positions of provost of the churches of St Germanus at Mons and St Alban at Namur, in addition to several other ecclesiastical appointments. In official documents he is described as chaplain, chancellor or notary, of Baldwin V., count of Hainaut (d. 1195), who employed him on important business. After 1200 Gislebert wrote the *Chronicon Hanoniense*, a history of Hainaut and the neighbouring lands from about 1050 to 1195, which is specially valuable for the latter part of the 12th century, and for the life and times of Baldwin V.

The chronicle is published in Band xxi. of the *Monumenta Germaniae historica* (Hanover, 1826 fol.); and separately with introduction by W. Arndt (Hanover, 1869). Another edition has been published by L. Vanderkindere in the *Recueil de textes pour servir à l'étude de l'histoire de Belgique* (Brussels, 1904); and there is a French translation by G. Menilglaise (Tournai, 1874).

See W. Meyer, *Das Werk des Kanzlers Gislebert von Mons als verfassungsgeschichtliche Quelle* (Königsberg, 1888); K. Huygens, *Sur la valeur historique de la chronique Gislebert de Mons* (Ghent, 1889); and W. Wattenbach, *Deutschlands Geschichtsquellen*, Band ii. (Berlin, 1894).

GISORS, a town of France, in the department of Eure, situated in the pleasant valley of the Epte, 44. m. N.W. of Paris on the railway to Dieppe. Pop. (1906) 4345. Gisors is dominated by a feudal stronghold built chiefly by the kings of England in the 11th and 12th centuries. The outer enceinte, to which is attached a cylindrical donjon erected by Philip Augustus, king of France, embraces an area of over 7 acres. On a mound in the centre of this space rises an older donjon, octagonal in shape, protected by another enceinte. The outer ramparts and the ground they enclose have been converted into promenades. The church of St Gervais dates in its oldest parts—the central tower, the choir and parts of the aisles—from the middle of the 13th century, when it was founded by Blanche of Castile. The rest of the church belongs to the Renaissance period. The Gothic and Renaissance styles mingle in the west façade, which, like the interior of the building, is adorned with a profusion of sculptures; the fine carving on the wooden doors of the north and west portals is particularly noticeable. The less interesting buildings of the town include a wooden house of the Renaissance era, an old convent now used as an hôtel de ville, and a handsome modern hospital. There is a statue of General de Blanmont, born at Gisors in 1770. Among the industries of Gisors are felt manufacture, bleaching, dyeing and leather-dressing.

In the middle ages Gisors was capital of the Vexin. Its position on the frontier of Normandy caused its possession to be hotly contested by the kings of England and France during the 12th century, at the end of which it and the dependent fortresses of Neaufles and Dangu were ceded by Richard Cœur de Lion to Philip Augustus. During the wars of religion of the 16th century it was occupied by the duke of Mayenne on behalf of the League, and in the 17th century, during the Fronde, by the duke of Longueville. Gisors was given to Charles Auguste Fouquet in 1718 in exchange for Belle-Ile-en-Mer and made a duchy in 1742. It afterwards came into the possession of the count of Eu and the duke of Penthièvre.

GISSING, GEORGE ROBERT (1857-1903), English novelist, was born at Wakefield on the 22nd of November 1857. He was educated at the Quaker boarding-school of Alderley Edge and at Owens College, Manchester. His life, especially its earlier period, was spent in great poverty, mainly in London, though he was for a time also in the United States, supporting himself chiefly by private teaching. He published his first novel, *Workers in the Dawn*, in 1880. *The Unclassed* (1884) and *Isabel Clarendon* (1886) followed. *Demos* (1886), a novel dealing with socialistic ideas, was, however, the first to attract attention. It was followed by a series of novels remarkable for their pictures of lower middle class life. Gissing's own experiences had preoccupied him with poverty and its brutalizing effects on character. He made no attempt at popular writing, and for a long time the sincerity of his work was appreciated only by a limited public. Among his more characteristic novels were: *Thyrza* (1887), *A Life's Morning* (1888), *The Nether World* (1889), *New Grub Street* (1891), *Born in Exile* (1892), *The Odd Women* (1893), *In the Year of Jubilee* (1894), *The Whirlpool* (1897). Others, *e.g. The Town Traveller* (1901), indicate a humorous faculty, but the prevailing note of his novels is that of the struggling life of the shabby-genteel and lower classes and the conflict between education and

circumstances. The quasi-autobiographical *Private Papers of Henry Ryecroft* (1903) reflects throughout Gissing's studious and retiring tastes. He was a good classical scholar and had a minute acquaintance with the late Latin historians, and with Italian antiquities; and his posthumous *Veranilda* (1904), a historical romance of Italy in the time of Theodoric the Goth, was the outcome of his favourite studies. Gissing's powers as a literary critic are shown in his admirable study on Charles Dickens (1898). A book of travel, *By the Ionian Sea*, appeared in 1901. He died at St Jean de Luz in the Pyrenees on the 28th of December 1903.

See also the introductory essay by T. Seccombe to *The House of Cobwebs* (1906), a posthumous volume of Gissing's short stories.

GITSCHIN (Czech *Jičin*), a town of Bohemia, Austria, 65 m. N.E. of Prague by rail. Pop. (1900) 9790, mostly Czech. The parish church was begun by Wallenstein after the model of the pilgrims' church of Santiago de Compostela in Spain, but not completed till 1655. The castle, which stands next to the church, was built by Wallenstein and finished in 1630. It was here that the emperor Francis I. of Austria signed the treaty of 1813 by which he threw in his lot with the Allies against Napoleon. Wallenstein was interred at the neighbouring Carthusian monastery, but in 1639 the head and right hand were taken by General Banér to Sweden, and in 1702 the other remains were removed by Count Vincent of Waldstein to his hereditary burying ground at Münchengrätz. Gitschin was originally the village of Zidiněves and received its present name when it was raised to the dignity of a town by Wenceslaus II. in 1302. The place belonged to various noble Bohemian families, and in the 17th century came into the hands of Wallenstein, who made it the capital of the duchy of Friedland and did much to improve and extend it. His murder, and the miseries of the Thirty Years' War, brought it very low; and it passed through several hands before it was bought by Prince Trauttmannsdorf, to whose family it still belongs. On the 29th of June 1866 the Prussians gained here a great victory over the Austrians. This victory made possible the junction of the first and second Prussian army corps, and had as an ultimate result the Austrian defeat at Königgrätz.

GIUDICI, PAOLO EMILIANO (1812-1872), Italian writer, was born in Sicily. His *History of Italian Literature* (1844) brought him to the front, and in 1848 he became professor of Italian literature at Pisa, but after a few months was deprived of the chair on account of his liberal views in politics. On the re-establishment of the Italian kingdom he became professor of aesthetics (resigning 1862) and secretary of the Academy of Fine Arts at Florence, and in 1867 was elected to the chamber of deputies. He held a prominent place as an historian, his works including a *Storia del teatro* (1860), and *Storia dei comuni italiani* (1861), besides a translation of Macaulay's *History of England* (1856). He died at Tonbridge in England, on the 8th of September 1872.

A *Life* appeared at Florence in 1874.

GIULIO ROMANO, or Giulio Pippi (*c.* 1492-1546), the head of the Roman school of painting in succession to Raphael. This prolific painter, modeller, architect and engineer receives his common appellation from the place of his birth—Rome, in the Macello de' Corbi. His name in full was Giulio di Pietro de Filippo de' Giannuzzi—Giannuzzi being the true family name, and Pippi (which has practically superseded Giannuzzi) being an abbreviation from the name of his grandfather Filippo. The date of Giulio's birth is a little uncertain. Vasari (who knew him personally) speaks of him as fifty-four years old at the date of his death, 1st November 1546; thus he would have been born in 1492. Other accounts assign 1498 as the date of birth. This would make Giulio young indeed in the early and in such case most precocious stages of his artistic career, and would show him as dying, after an infinity of hard work, at the comparatively early age of forty-eight.

Giulio must at all events have been quite youthful when he first became the pupil of Raphael, and at Raphael's death in 1520 he was at the utmost twenty-eight years of age. Raphael had loved him as a son, and had employed him in some leading works, especially in the Loggie of the Vatican; the series there popularly termed "Raphael's Bible" is done in large measure by Giulio,—as for instance the subjects of the "Creation of Adam and Eve," "Noah's Ark," and "Moses in the Bulrushes." In the saloon of the "Incendio del Borgo," also, the figures of "Benefactors of the Church" (Charlemagne, &c.) are Giulio's handiwork. It would appear that in subjects of this kind Raphael simply furnished the design, and committed the execution of it to some assistant, such as Giulio,—taking heed, however, to bring it

up, by final retouching, to his own standard of style and type. Giulio at a later date followed out exactly the same plan; so that in both instances inferiorities of method, in the general blocking-out and even in the details of the work, are not to be precisely charged upon the *caposcuola*. Amid the multitude of Raphael's pupils, Giulio was eminent in pursuing his style, and showed universal aptitude; he did, among other things, a large amount of architectural planning for his chief. Raphael bequeathed to Giulio, and to his fellow-pupil Gianfrancesco Penni ("Il Fattore"), his implements and works of art; and upon them it devolved to bring to completion the vast fresco-work of the "Hall of Constantine" in the Vatican—consisting, along with much minor matter, of the four large subjects, the "Battle of Constantine," the "Apparition of the Cross," the "Baptism of Constantine" and the "Donation of Rome to the Pope." The two former compositions were executed by Pippi, the two latter by Penni. The whole of this onerous undertaking was completed within a period of only three years,—which is the more remarkable as, during some part of the interval since Raphael's decease, the Fleming, Adrian VI., had been pope, and his anti-aesthetic pontificate had left art and artists almost in a state of inanition. Clement VII. had now, however, succeeded to the popedom. By this time Giulio was regarded as the first painter in Rome; but his Roman career was fated to have no further sequel.

Towards the end of 1524 his friend the celebrated writer Baldassar Castiglione seconded with success the urgent request of the duke of Mantua, Federigo Gonzaga, that Giulio should migrate to that city, and enter the duke's service for the purpose of carrying out his projects in architecture and pictorial decoration. These projects were already considerable, and under Giulio's management they became far more extensive still. The duke treated his painter munificently as to house, table, horses and whatever was in request; and soon a very cordial attachment sprang up between them. In Pippi's multifarious work in Mantua three principal undertakings should be noted. (1) In the Castello he painted the "History of Troy," along with other subjects. (2) In the suburban ducal residence named the Palazzo del Te (this designation being apparently derived from the form of the roads which led towards the edifice) he rapidly carried out a rebuilding on a vastly enlarged scale,—the materials being brick and terra-cotta, as there is no local stone,—and decorated the rooms with his most celebrated works in oil and fresco painting—the story of Psyche, Icarus, the fall of the Titans, and the portraits of the ducal horses and hounds. The foreground figures of Titans are from 12 to 14 ft. high; the room, even in its structural details, is made to subserve the general artistic purpose, and many of its architectural features are distorted accordingly. Greatly admired though these pre-eminent works have always been, and at most times even more than can now be fully ratified, they have suffered severely at the hands of restorers, and modern eyes see them only through a dull and deadening fog of renovation. The whole of the work on the Palazzo del Te, which is of the Doric order of architecture, occupied about five years. (3) Pippi recast and almost rebuilt the cathedral of Mantua; erected his own mansion, replete with numerous antiques and other articles of vertu; reconstructed the street architecture to a very large extent, and made the city, sapped as it is by the shallows of the Mincio, comparatively healthy; and at Marmiruolo, some 5 m. distant from Mantua, he worked out other important buildings and paintings. He was in fact, for nearly a quarter of a century, a sort of Demiurgus of the arts of design in the Mantuan territory.

Giulio's activity was interrupted but not terminated by the death of Duke Federigo. The duke's brother, a cardinal who became regent, retained him in full employment. For a while he went to Bologna, and constructed the façade of the church of S. Petronio in that city. He was afterwards invited to succeed Antonio Sangallo as architect of St Peter's in Rome,—a splendid appointment, which, notwithstanding the strenuous opposition of his wife and of the cardinal regent, he had almost resolved to accept, when a fever overtook him, and, acting upon a constitution somewhat enfeebled by worry and labour, caused his death on the 1st of November 1546. He was buried in the church of S. Barnaba in Mantua. At the time of his death Giulio enjoyed an annual income of more than 1000 ducats, accruing from the liberalities of his patrons. He left a widow, and a son and daughter. The son, named Raffaello, studied painting, but died before he could produce any work of importance; the daughter, Virginia, married Ercole Malatesta.

Wide and solid knowledge of design, combined with a promptitude of composition that was never at fault, formed the chief motive power and merit of Giulio Romano's art. Whatever was wanted, he produced it at once, throwing off, as Vasari says, a large design in an hour; and he may in that sense, though not equally so when an imaginative or ideal test is applied, be called a great inventor. It would be difficult to name any other artist who, working as an architect, and as the plastic and pictorial embellisher of his architecture, produced a total of work so fully and homogeneously his own; hence he has been named "the prince of decorators." He had great knowledge of the human frame, and represented it with force and truth, though sometimes with an excess of movement; he was also learned in other matters, especially in medals, and in the plans of ancient buildings. In design he was more strong and emphatic than graceful, and worked a great deal from his accumulated stores of knowledge, without consulting nature direct. As a general rule, his designs are finer and freer than his paintings, whether in fresco or in oil—his easel pictures being comparatively few, and some of them the reverse of decent; his colouring is marked by an excess of blackish and heavy tints.

Giulio Romano introduced the style of Raphael into Mantua, and established there a considerable school of art, which surpassed in development that of his predecessor Mantegna, and almost rivalled that of Rome. Very many engravings—more than three hundred are mentioned—were made contemporaneously from his works; and this not only in Italy, but in France and Flanders as well. His plan of entrusting principally to assistants the pictorial execution of his cartoons has already been referred to; Primaticcio was one of the leading coadjutors. Rinaldo Mantovano, a man of great ability who died young, was the chief executant of the "Fall of the Giants"; he also co-operated with Benedetto

Pagni da Pescia in painting the remarkable series of horses and hounds, and the story of Psyche. Another pupil was Fermo Guisoni, who remained settled in Mantua. The oil pictures of Giulio Romano are not generally of high importance; two leading ones are the “Martyrdom of Stephen,” in the church of that saint in Genoa, and a “Holy Family” in the Dresden Gallery. Among his architectural works not already mentioned is the Villa Madama in Rome, with a fresco of Polyphemus, and boys and satyrs; the Ionic façade of this building may have been sketched out by Raphael.

Vasari gives a pleasing impression of the character of Giulio. He was very loving to his friends, genial, affable, well-bred, temperate in the pleasures of the table, but liking fine apparel and a handsome scale of living. He was good-looking, of middle height, with black curly hair and dark eyes, and an ample beard; his portrait, painted by himself, is in the Louvre.

Besides Vasari, Lanzi and other historians of art, the following works may be mentioned: C. D. Arco, *Vita di G. Pippi* (1828); G. C. von Murr, *Notice sur les estampes gravées après dessins de Jules Romain* (1865); R. Sanzio, two works on *Etchings and Paintings* (1800, 1836).

(W. M. R.)

GIUNTA PISANO, the earliest Italian painter whose name is found inscribed on an extant work. He is said to have exercised his art from 1202 to 1236. He may perhaps have been born towards 1180 in Pisa, and died in or soon after 1236; but other accounts give 1202 as the date of his birth, and 1258 or thereabouts for his death. There is some ground for thinking that his family name was Capiteno. The inscribed work above referred to, one of his earliest, is a “Crucifix,” long in the kitchen of the convent of St Anne in Pisa. Other Pisan works of like date are very barbarous, and some of them may be also from the hand of Giunta. It is said that he painted in the upper church of Assisi,—in especial a “Crucifixion” dated 1236, with a figure of Father Elias, the general of the Franciscans, embracing the foot of the cross. In the sacristy is a portrait of St Francis, also ascribed to Giunta; but it more probably belongs to the close of the 13th century. He was in the practice of painting upon cloth stretched on wood, and prepared with plaster.

GIURGEVO (*Giurgiu*), the capital of the department of Vlashca, Rumania; situated amid mud-flats and marshes on the left bank of the Danube. Pop. (1900) 13,977. Three small islands face the town, and a larger one shelters its port, Smarda, 2½ m. E. The rich corn-lands on the north are traversed by a railway to Bucharest, the first line opened in Rumania, which was built in 1869 and afterwards extended to Smarda. Steamers ply to Rustchuk, 2½ m. S.W. on the Bulgarian shore, linking the Rumanian railway system to the chief Bulgarian line north of the Balkans (Rustchuk-Varna). Thus Giurgevo, besides having a considerable trade with the home ports lower down the Danube, is the headquarters of commerce between Bulgaria and Rumania. It exports timber, grain, salt and petroleum; importing coal, iron and textiles. There are also large saw-mills.

Giurgevo occupies the site of Theodorapolis, a city built by the Roman emperor Justinian (A.D. 483-565). It was founded in the 14th century by Genoese merchant adventurers, who established a bank, and a trade in silks and velvets. They called the town, after the patron saint of Genoa, San Giorgio (St George); and hence comes its present name. As a fortified town, Giurgevo figured often in the wars for the conquest of the lower Danube; especially in the struggle of Michael the Brave (1593-1601) against the Turks, and in the later Russo-Turkish Wars. It was burned in 1659. In 1829, its fortifications were finally razed, the only defence left being a castle on the island of Slobosia, united to the shore by a bridge.

GIUSTI, GIUSEPPE (1809-1850), Tuscan satirical poet, was born at Monsummano, a small village of the Valdinievole, on the 12th of May 1809. His father, a cultivated and rich man, accustomed his son from childhood to study, and himself taught him, among other subjects, the first rudiments of music. Afterwards, in order to curb his too vivacious disposition, he placed the boy under the charge of a priest near the village, whose severity did perhaps more evil than good. At twelve Giusti was sent to school at Florence, and afterwards to Pistoia and to Lucca; and during those years he wrote his first verses. In 1826 he went to study law at Pisa; but, disliking the study, he spent eight years in the course, instead of the customary four. He lived gaily, however, though his father kept him short of money, and learned to know the world, seeing the vices of society, and the folly of certain laws and customs from which his country was suffering. The experience thus gained he turned to good account

in the use he made of it in his satire.

His father had in the meantime changed his place of abode to Pescia; but Giuseppe did worse there, and in November 1832, his father having paid his debts, he returned to study at Pisa, seriously enamoured of a woman whom he could not marry, but now commencing to write in real earnest in behalf of his country. With the poem called *La Ghigliottina* (the guillotine), Giusti began to strike out a path for himself, and thus revealed his great genius. From this time he showed himself the Italian Béranger, and even surpassed the Frenchman in richness of language, refinement of humour and depth of satirical conception. In Béranger there is more feeling for what is needed for popular poetry. His poetry is less studied, its vivacity perhaps more boisterous, more spontaneous; but Giusti, in both manner and conception, is perhaps more elegant, more refined, more penetrating. In 1834 Giusti, having at last entered the legal profession, left Pisa to go to Florence, nominally to practise with the advocate Capoquadri, but really to enjoy life in the capital of Tuscany. He fell seriously in love a second time, and as before was abandoned by his love. It was then he wrote his finest verses, by means of which, although his poetry was not yet collected in a volume, but for some years passed from hand to hand, his name gradually became famous. The greater part of his poems were published clandestinely at Lugano, at no little risk, as the work was destined to undermine the Austrian rule in Italy. After the publication of a volume of verses at Bastia, Giusti thoroughly established his fame by his *Gingillino*, the best in moral tone as well as the most vigorous and effective of his poems. The poet sets himself to represent the vileness of the treasury officials, and the base means they used to conceal the necessities of the state. The *Gingillino* has all the character of a classic satire. When first issued in Tuscany, it struck all as too impassioned and personal. Giusti entered heart and soul into the political movements of 1847 and 1848, served in the national guard, sat in the parliament for Tuscany; but finding that there was more talk than action, that to the tyranny of princes had succeeded the tyranny of demagogues, he began to fear, and to express the fear, that for Italy evil rather than good had resulted. He fell, in consequence, from the high position he had held in public estimation, and in 1848 was regarded as a reactionary. His friendship for the marquis Gino Capponi, who had taken him into his house during the last years of his life, and who published after Giusti's death a volume of illustrated proverbs, was enough to compromise him in the eyes of such men as Guerrazzi, Montanelli and Niccolini. On the 31st of May 1850 he died at Florence in the palace of his friend.

The poetry of Giusti, under a light trivial aspect, has a lofty civilizing significance. The type of his satire is entirely original, and it had also the great merit of appearing at the right moment, of wounding judiciously, of sustaining the part of the comedy that "castigat ridendo mores." Hence his verse, apparently jovial, was received by the scholars and politicians of Italy in all seriousness. Alexander Manzoni in some of his letters showed a hearty admiration of the genius of Giusti; and the weak Austrian and Bourbon governments regarded them as of the gravest importance.

His poems have often been reprinted, the best editions being those of Le Monnier, Carducci (1859; 3rd ed., 1879), Fioretti (1876) and Bragi (1890). Besides the poems and the proverbs already mentioned, we have a volume of select letters, full of vigour and written in the best Tuscan language, and a fine critical discourse on Giuseppe Parini, the satirical poet. In some of his compositions the elegiac rather than the satirical poet is seen. Many of his verses have been excellently translated into German by Paul Heyse. Good English translations were published in the *Athenaeum* by Mrs T. A. Trollope, and some by W. D. Howells are in his *Modern Italian Poets* (1887).

GIUSTINIANI, the name of a prominent Italian family which originally belonged to Venice, but established itself subsequently in Genoa also, and at various times had representatives in Naples, Corsica and several of the islands of the Archipelago.

In the Venetian line the following are most worthy of mention:—

1. Lorenzo (1380-1465), the Laurentius Justinianus of the Roman calendar, at an early age entered the congregation of the canons of St George in Alga, and in 1433 became general of that order. About the same time he was made by Eugenius IV. bishop of Venice; and his episcopate was marked by considerable activity in church extension and reform. On the removal of the patriarchate from Grado to Venice by Nicholas V. in 1451, Giustiniani was promoted to that dignity, which he held for fourteen years. He died on January 8, 1465, was canonized by Pope Alexander VIII., his festival (semi-duplex) being fixed by Innocent XII. for September 5th, the anniversary of his elevation to the bishopric. His works, consisting of sermons, letters and ascetic treatises, have been frequently reprinted,—the best edition being that of the Benedictine P. N. A. Giustiniani, published at Venice in 2 vols. folio, 1751. They are wholly devoid of literary merit. His life has been written by Bernard Giustiniani, by Maffei and also by the Bollandists.

2. Leonardo (1388-1446), brother of the preceding, was for some years a senator of Venice, and in 1443 was chosen procurator of St Mark. He translated into Italian Plutarch's *Lives of Cinna and Lucullus*, and was the author of some poetical pieces, amatory and religious—*strambotti* and *canzonetti*—as well as of rhetorical prose compositions. Some of the popular songs set to music by him became known as *Giustiniani*.

3. Bernardo (1408-1489), son of Leonardo, was a pupil of Guarino and of George of Trebizond, and entered the Venetian senate at an early age. He served on several important diplomatic missions both to France and Rome, and about 1485 became one of the council of ten. His orations and letters were published in 1492; but his title to any measure of fame he possesses rests upon his history of Venice, *De origine urbis Venetiarum rebusque ab ipsa gestis historia* (1492), which was translated into Italian by Domenichi in 1545, and which at the time of its appearance was undoubtedly the best work upon the subject of which it treated. It is to be found in vol. i. of the *Thesaurus* of Graevius.

4. Pietro, also a senator, lived in the 16th century, and wrote on *Historia rerum Venetarum* in continuation of that of Bernardo. He was also the author of chronicles *De gestis Petri Mocenigi* and *De bello Venetorum cum Carolo VIII.* The latter has been reprinted in the *Script. rer. Ital.* vol. xxi.

Of the Genoese branch of the family the most prominent members were the following:—

5. Paolo, di Moniglia (1444-1502), a member of the order of Dominicans, was, from a comparatively early age, prior of their convent at Genoa. As a preacher he was very successful, and his talents were fully recognized by successive popes, by whom he was made master of the sacred palace, inquisitor-general for all the Genoese dominions, and ultimately bishop of Scio and Hungarian legate. He was the author of a number of Biblical commentaries (no longer extant), which are said to have been characterized by great erudition.

6. Agostino (1470-1536) was born at Genoa, and spent some wild years in Valencia, Spain. Having in 1487 joined the Dominican order, he gave himself with great energy to the study of Greek, Hebrew, Chaldee and Arabic, and in 1514 began the preparation of a polyglot edition of the Bible. As bishop of Nebbio in Corsica, he took part in some of the earlier sittings of the Lateran council (1516-1517), but, in consequence of party complications, withdrew to his diocese, and ultimately to France, where he became a pensioner of Francis I., and was the first to occupy a chair of Hebrew and Arabic in the university of Paris. After an absence from Corsica for a period of five years, during which he visited England and the Low Countries, and became acquainted with Erasmus and More, he returned to Nebbio, about 1522, and there remained, with comparatively little intermission, till in 1536, when, while returning from a visit to Genoa, he perished in a storm at sea. He was the possessor of a very fine library, which he bequeathed to the republic of Genoa. Of his projected polyglot only the Psalter was published (*Psalterium Hebraeum, Graecum, Arabicum, et Chaldaicum*, Genoa, 1616). Besides the Hebrew text, the LXX. translation, the Chaldee paraphrase, and an Arabic version, it contains the Vulgate translation, a new Latin translation by the editor, a Latin translation of the Chaldee, and a collection of scholia. Giustiniani printed 2000 copies at his own expense, including fifty in vellum for presentation to the sovereigns of Europe and Asia; but the sale of the work did not encourage him to proceed with the New Testament, which he had also prepared for the press. Besides an edition of the book of Job, containing the original text, the Vulgate, and a new translation, he published a Latin version of the *Moreh Nevochim* of Maimonides (*Director dubitantium aut perplexorum*, 1520), and also edited in Latin the *Aureus libellus* of Aeneas Platonicus, and the *Timaeus* of Chalcidius. His annals of Genoa (*Castigatissimi annali di Genova*) were published posthumously in 1537.

The following are also noteworthy:—

7. Pompeio (1569-1616), a native of Corsica, who served under Alessandro Farnese and the marquis of Spinola in the Low Countries, where he lost an arm, and, from the artificial substitute which he wore, came to be known by the sobriquet Bras de Fer. He also defended Crete against the Turks; and subsequently was killed in a reconnaissance at Friuli. He left in Italian a personal narrative of the war in Flanders, which has been repeatedly published in a Latin translation (*Bellum Belgicum*, Antwerp, 1609).

8. Giovanni (1513-1556), born in Candia, translator of Terence's *Andria* and *Eunuchus*, of Cicero's *In Verrem*, and of Virgil's *Aeneid*, viii.

9. Orsatto (1538-1603), Venetian senator, translator of the *Oedipus Tyrannus* of Sophocles and author of a collection of *Rime*, in imitation of Petrarch. He is regarded as one of the latest representatives of the classic Italian school.

10. Geronimo, a Genoese, flourished during the latter half of the 16th century. He translated the *Alcestis* of Euripides and three of the plays of Sophocles; and wrote two original tragedies, *Jephte* and *Christo in Passione*.

11. Vincenzo, who in the beginning of the 17th century built the Roman palace and made the art collection which are still associated with his name (see *Galleria Giustiniana*, Rome, 1631). The collection was removed in 1807 to Paris, where it was to some extent broken up. In 1815 all that remained of it, about 170 pictures, was purchased by the king of Prussia and removed to Berlin, where it forms a portion of the royal museum.

GIUSTO DA GUANTO [Jodocus, or Justus, of Ghent] (fl. 1465-1475), Flemish painter. The public records of the city of Ghent have been diligently searched, but in vain, for a clue to the history of

Justus or Jodocus, whom Vasari and Guicciardini called Giusto da Guanto. Flemish annalists of the 16th century have enlarged upon the scanty statements of Vasari, and described Jodocus as a pupil of Hubert Van Eyck. But there is no source to which this fable can be traced. The registers of St Luke's gild at Ghent comprise six masters of the name of Joos or Jodocus who practised at Ghent in the 15th century. But none of the works of these masters has been preserved, and it is impossible to compare their style with that of Giusto. It was between 1465 and 1474 that this artist executed the "Communion of the Apostles" which Vasari has described, and modern critics now see to the best advantage in the museum of Urbino. It was painted for the brotherhood of Corpus Christi at the bidding of Frederick of Montefeltro, who was introduced into the picture as the companion of Caterino Zeno, a Persian envoy at that time on a mission to the court of Urbino. From this curious production it may be seen that Giusto, far from being a pupil of Hubert Van Eyck, was merely a disciple of a later and less gifted master, who took to Italy some of the peculiarities of his native schools, and forthwith commingled them with those of his adopted country. As a composer and draughtsman Giusto compares unfavourably with the better-known painters of Flanders; though his portraits are good, his ideal figures are not remarkable for elevation of type or for subtlety of character and expression. His work is technically on a level with that of Gerard of St John, whose pictures are preserved in the Belvedere at Vienna. Vespasian, a Florentine bookseller who contributed much to form the antiquarian taste of Frederick of Montefeltro, states that this duke sent to the Netherlands for a capable artist to paint a series of "ancient worthies" for a library recently erected in the palace of Urbino. It has been conjectured that the author of these "worthies," which are still in existence at the Louvre and in the Barberini palace at Rome, was Giusto. Yet there are notable divergences between these pictures and the "Communion of the Apostles." Still, it is not beyond the range of probability that Giusto should have been able, after a certain time, to temper his Flemish style by studying the masterpieces of Santi and *Melozzo*, and so to acquire the mixed manner of the Flemings and Italians which these portraits of worthies display. Such an assimilation, if it really took place, might justify the Flemings in the indulgence of a certain pride, considering that Raphael not only admired these worthies, but copied them in the sketch-book which is now the ornament of the Venetian Academy. There is no ground for presuming that Giusto ad Guanto is identical with Justus d'Allamagna who painted the "Annunciation" (1451) in the cloisters of Santa Maria di Castello at Genoa. The drawing and colouring of this wall painting shows that Justus d'Allamagna was as surely a native of south Germany as his homonym at Urbino was a born Netherlander.

GIVET, a town of northern France, in the department of Ardennes, 40 m. N. by E. of Mézières on the Eastern railway between the town and Namur. Pop. (1906) town, 5110; commune, 7468. Givet lies on the Meuse about 1 m. from the Belgian frontier, and was formerly a fortress of considerable importance. It is divided into three portions—the citadel called Charlemont and Grand Givet on the left bank of the river, and on the opposite bank Petit Givet, connected with Grand Givet by a stone bridge of five arches. The fortress of Charlemont, situated at the top of a precipitous rock 705 ft. high, was founded by the emperor Charles V. in the 16th century, and further fortified by Vauban at the end of the 17th century; it is the only survival of the fortifications of the town, the rest of which were destroyed in 1892. In Grand Givet there are a church and a town-hall built by Vauban, and a statue of the composer Étienne Méhul stands in the fine square named after him. Petit Givet, the industrial quarter, is traversed by a small tributary of the Meuse, the Houille, which is bordered by tanneries and glue factories. Pencils and tobacco-pipes are also manufactured. The town has considerable river traffic, consisting chiefly of coal, copper and stone. There is a chamber of arts and manufactures.

GIVORS, a manufacturing town of south-eastern France, in the department of Rhône, on the railway between Lyons and St Étienne, 14 m. S. of Lyon. Pop. (1906) 11,444. It is situated on the right bank of the Rhone, here crossed by a suspension bridge, at its confluence with the Gier and the canal of Givors, which starts at Grand Croix on the Gier, some 13 m. distant. The chief industries are metal-working, engineering-construction and glass-working. There are coal mines in the vicinity. On the hill overlooking the town are the ruins of the château of St Gerald and of the convent of St Ferréol, remains of the old town destroyed in 1594.

GJALLAR, in Scandinavian mythology, the horn of Heimdall, the guardian of the rainbow bridge by which the gods pass and repass between earth and heaven. This horn had to be blown whenever a

stranger approached the bridge.

GLABRIO. 1. Manius Acilius Glabrio, Roman statesman and general, member of a plebeian family. When consul in 191 B.C. he defeated Antiochus the Great of Syria at Thermopylae, and compelled him to leave Greece. He then turned his attention to the Aetolians, who had persuaded Antiochus to declare war against Rome, and was only prevented from crushing them by the intercession of T. Quinctius Flamininus. In 189 Glabrio was a candidate for the censorship, but was bitterly opposed by the nobles. He was accused by the tribunes of having concealed a portion of the Syrian spoils in his own house; his legate gave evidence against him, and he withdrew his candidature. It is probable that he was the author of the law which left it to the discretion of the pontiffs to insert or omit the intercalary month of the year.

Censorinus, *De die natali*, xx.; Macrobius, *Saturnalia*, i. 13; index to Livy; Appian, *Syr.* 17-21.

2. Manius Acilius Glabrio, Roman statesman and general, grandson of the famous jurist P. Mucius Scaevola. When praetor urbanus (70 B.C.) he presided at the trial of Verres. According to Dio Cassius (xxxvi. 38), in conjunction with L. Calpurnius Piso, his colleague in the consulship (67), he brought forward a severe law (Lex Acilia Calpurnia) against illegal canvassing at elections. In the same year he was appointed to supersede L. Lucullus in the government of Cilicia and the command of the war against Mithradates, but as he did absolutely nothing and was unable to control the soldiery, he was in turn superseded by Pompey according to the provisions of the Manilian law. Little else is known of him except that he declared in favour of the death punishment for the Catilinarian conspirators.

Dio Cassius xxxvi. 14, 16. 24; Cicero, *Pro lege Manilia*, 2. 9; Appian, *Mithrid*. 90.

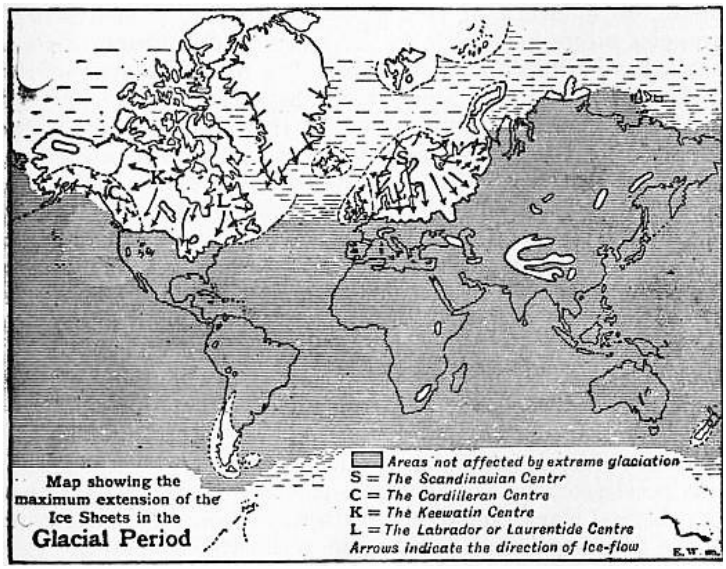
GLACE BAY, a city and port of entry of Cape Breton county, Nova Scotia, Canada, on the Atlantic Ocean, 14 m. E. of Sydney, with which it is connected both by steam and electric railway. It is the centre of the properties of the Dominion Coal Company (founded 1893), which produce most of the coal of Nova Scotia. Though it has a fair harbour, most of the shipping is done from Sydney in summer and from Louisburg in winter. Pop. (1892) 2000; (1901) 6945; (1906) 13,000.

GLACIAL PERIOD, in geology, the name usually given, by English and American writers, to that comparatively recent time when all parts of the world suffered a marked lowering of temperature, accompanied in northern Europe and North America by glacial conditions, not unlike those which now characterize the Polar regions. This period, which is also known as the “Great Ice Age” (German *Die Eiszeit*), is synchronous with the Pleistocene period, the earlier of the Post-Tertiary or Quaternary divisions of geological time. Although “Glacial period” and “Pleistocene” (*q.v.*) are often used synonymously it is convenient to consider them separately, inasmuch as not a few Pleistocene formations have no causal relationship with conditions of glaciation. Not until the beginning of the 19th century did the deposits now generally recognized as the result of ice action receive serious attention; the tendency was to regard such superficial and irregular material as mere rubbish. Early ideas upon the subject usually assigned floods as the formative agency, and this view is still not without its supporters (see Sir H. H. Howorth, *The Glacial Nightmare and the Flood*). Doubtless this attitude was in part due to the comparative rarity of glaciers and ice-fields where the work of ice could be directly observed. It was natural therefore that the first scientific references to glacial action should have been stimulated by the Alpine regions of Switzerland, which called forth the writings of J. J. Scheuchzer, B. F. Kuhn, H. B. de Saussure, F. G. Hugi, and particularly those of J. Venetz, J. G. von Charpentier and L. Aggasiz. Canon Rendu, J. Forbes and others had studied the cause of motion of glaciers, while keen observers, notably Sir James Hall, A. Brongniart and J. Playfair, had noted the occurrence of travelled and scratched stones.

The result of these efforts was the conception of great ice-sheets flowing over the land, grinding the rock surfaces and transporting rock débris in the manner to be observed in the existing glaciers. However, before this view had become established Sir C. Lyell evolved the “drift theory” to explain the widely spread phenomenon of transported blocks, boulder clay and the allied deposits; in this he was supported by Sir H. de la Beche, Charles Darwin, Sir R. I. Murchison and many others. According to the drift theory, the transport and distribution of “erratic blocks,” &c., had been effected by floating icebergs; this view naturally involved a considerable and widespread submergence of the land, an

assumption which appeared to receive support from the occasional presence of marine shells at high levels in the “drift” deposits. So great was the influence of those who favoured the drift theory that even to-day it cannot be said to have lost complete hold; we still speak of “drift” deposits in England and America, and the belief in one or more great submergences during the Glacial period is still held more firmly by certain geologists than the evidence would seem to warrant. The case against the drift theory was most clearly expressed by Sir A. C. Ramsay for England and Scotland, and by the Swedish scientist Otto Torell. Since then the labours of Professor James Geikie, Sir Archibald Geikie, Professor P. Kendall and others in England; von Verendt, H. Credner, de Geer, E. Geinitz, A. Helland, Jentzsch, K. Keilhack, A. Penck, H. Schröder, F. Wahnschaffe in Scandinavia and Germany; T. C. Chamberlin, W. Upham, G. F. Wright in North America, have all tended to confirm the view that it is to the movement of glaciers and ice-sheets that we must look as the predominant agent of transport and abrasion in this period. The three stages through which our knowledge of glacial work has advanced may thus be summarized: (1) the diluvial hypothesis, deposits formed by floods; (2) the drift hypothesis, deposits formed mainly by icebergs and floating ice; (3) the ice-sheet hypothesis, deposits formed directly or indirectly through the agency of flowing ice.

Evidences.—The evidence relied upon by geologists for the former existence of the great ice-sheets which traversed the northern regions of Europe and America is mainly of two kinds: (1) the peculiar erosion of the older rocks by ice and ice-borne stones, and (2) the nature and disposition of ice-borne rock débris. After having established the criteria by which the work of moving ice is to be recognized in regions of active glaciation, the task of identifying the results of earlier glaciation elsewhere has been carried on with unabated energy.



1. *Ice Erosion.*—Although there are certain points of difference between the work of glaciers and broad ice-sheets, the former being more or less restricted laterally by the valleys in which they flow, the general results of their passage over the rocky floor are essentially similar. Smooth rounded outlines are imparted to the rocks, markedly contrasting with the pinnacled and irregular surfaces produced by ordinary weathering; where these rounded surfaces have been formed on a minor scale the well-known features of *roches moutonnées* (German *Rundhöcker*) are created; on a larger scale we have the erosion-form known as “crag and tail,” when the ice-sheet has overridden ground with more pronounced contours, the side of the hill facing the advancing ice being rounded and gently curved (German *Stossseite*), and the opposite side (*Leeseite*) steep, abrupt and much less smooth. Such features are never associated with the erosion of water. The rounding of rock surfaces is regularly accompanied by grooving and striation (German *Schrammen, Schliffe*) caused by the grinding action of stones and boulders embedded in the moving ice. These “glacial striae” are of great value in determining the latest path of the vanished ice-sheets (see map). Several other erosion-features are generally associated with ice action; such are the circular-headed valleys, “cirques” or “corries” (German *Zirkus*) of mountain districts; the pot-holes, giants’ kettles (*Strudellöcher*, *Riesentöpfe*), familiarly exemplified in the Gletschergarten near Lucerne; the “rock-basins” (*Felsseebecken*) of mountainous regions are also believed to be assignable to this cause on account of their frequent association with other glacial phenomena, but it is more than probable that the action of running water (waterfalls, &c.)—influenced no doubt by the disposition of the ice—has had much to do with these forms of erosion. As regards rock-basins, geologists are still divided in opinion: Sir A. C. Ramsay, J. Geikie, Tyndall, Helland, H. Hess, A. Penck, and others have expressed themselves in favour of a glacial origin; while A. Heim, F. Stapff, T. Kjerulf, L. Rütimeyer and many others have strongly opposed this view.

2. Glacial deposits may be roughly classified in two groups: those that have been formed directly by the action of the ice, and those formed through the agency of water flowing under, upon, and from the ice-sheets, or in streams and lakes modified by the presence of the ice. To differentiate in practice between the results of these two agencies is a matter of some difficulty in the case of unstratified

deposits; but the boulder clay may be taken as the typical formation of the glacier or ice-sheet, whether it has been left as a *terminal moraine* at the limit of glaciation or as a *ground moraine* beneath the ice. A stratified form of boulder clay, which not infrequently rests upon, and is therefore younger than, the more typical variety, is usually regarded as a deposit formed by water from the material (*englacial*, *innenmorän*) held in suspension within the ice, and set free during the process of melting. Besides the innumerable boulders, large and small, embedded in the boulder clay, isolated masses of rock, often of enormous size, have been borne by ice-sheets far from their original home and stranded when the ice melted. These “erratic blocks,” “perched blocks” (German *Findlinge*) are familiar objects in the Alpine glacier districts, where they have frequently received individual names, but they are just as easily recognized in regions from which the glaciers that brought them there have long since been banished. Not only did the ice transport blocks of hard rock, granite and the like, but huge masses of stratified rock were torn from their bed by the same agency; the masses of chalk in the cliffs near Cromer are well known; near Berlin, at Firkenwald, there is a transported mass of chalk estimated to be at least 2,000,000 cubic metres in bulk, which has travelled probably 15 kilometres from its original site; a block of Lincolnshire oolite is recorded by C. Fox-Strangways near Melton in Leicestershire, which is 300 yds. long and 100 yds. broad if no more; and instances of a similar kind might be multiplied.

When we turn to the “fluvio-glacial” deposits we find a bewildering variety of stratified and partially bedded deposits of gravel, sand and clay, occurring separately or in every conceivable condition of association. Some of these deposits have received distinctive names; such are the “Kames” of Scotland, which are represented in Ireland by “Eskers,” and in Scandinavia by “Åsar.” Another type of hillocky deposit is exemplified by the “drums” or “drumlins.” Everywhere beyond the margin of the advancing or retreating ice-sheets these deposits were being formed; streams bore away coarse and fine materials and spread them out upon alluvial plains or upon the floors of innumerable lakes, many of which were directly caused by the damming of the ordinary water-courses by the ice. As the level of such lakes was changed new beach-lines were produced, such as are still evident in the great lake region of North America, in the parallel roads of Glen Roy, and the “Strandlinien” of many parts of northern Europe.

Viewed in relation to man’s position on the earth, no geological changes have had a more profound importance than those of the Glacial period. The whole of the glaciated region bears evidence of remarkable modification of topographic features; in parts of Scotland or Norway or Canada the old rocks are bared of soil, rounded and smoothed as far as the eye can see. The old soil and subsoil, the product of ages of ordinary weathering, were removed from vast areas to be deposited and concentrated in others. Old valleys were filled—often to a great depth, 300-400 ft.; rivers were diverted from their old courses, never to return; lakes of vast size were caused by the damming of old outlets (Lake Lahontan, Lake Agassiz, &c., in North America), while an infinite number of shifting lakelets—with their deposits—played an important part along the ice-front at all stages of its career. The influence of this period upon the present distribution of plant and animal life in northern latitudes can hardly be overestimated.

Much stress has been laid upon supposed great changes in the level of the land in northern regions during the Glacial period. The occurrence of marine shells at an elevation of 1350 ft. at Moel Tryfaen in north Wales, and at 1200 ft. near Macclesfield in Cheshire, has been cited as evidence of profound submergence by some geologists, though others see in these and similar occurrences only the transporting action of ice-sheets that have traversed the floor of the adjoining seas. Marine shells in stratified materials have been found on the coast of Scotland at 100 ft. and over, in S. Scandinavia at 600 to 800 ft., and in the “Champlain” deposits of North America at various heights. The dead shells of the “Yoldia clay” cover wide areas at the bottom of the North Atlantic at depths from 500 to 1300 fathoms, though the same mollusc is now found living in Arctic seas at the depth of 5 to 15 fathoms. This has been looked upon as a proof that in the N.W. European region the lithosphere stood about 2600 ft. higher than it does now (Brögger, Nansen, &c.), and it has been suggested that a union of the mainland of Europe with that of North America—forming a northern continental mass, “Prosarctis”—may have been achieved by way of Iceland, Jan Mayen Land and Greenland. The pre-glacial valleys and fjords of Norway and Scotland, with their deeply submerged seaward ends, are regarded as proofs of former elevation. The great depth of alluvium in some places (236 metres at Bremen) points in the same direction. Evidences of changes of level occur in early, middle and late Pleistocene formations, and the nature of the evidence is such that it is on the whole safer to assume the existence only of the more moderate degree of change.

The Cause of the Glacial Period.—Many attempts have been made to formulate a satisfactory hypothesis that shall conform with the known facts and explain the great change in climatic conditions which set in towards the close of the Tertiary era, and culminated during the Glacial period. Some of the more prominent hypotheses may be mentioned, but space will not permit of a detailed analysis of theories, most of which rest upon somewhat unsubstantial ground. The principal facts to be taken into consideration are (1) the great lowering of temperature over the whole earth; (2) the localization of extreme glaciation in north-west Europe and north-east America; and (3) the local retrogression of the ice-sheets, once or more times repeated.

Some have suggested the simple solution of a change in the earth’s axis, and have indicated that the pole may have travelled through some 15° to 20° of latitude; thus, the polar glaciation, as it now exists, might have been in this way transferred to include north-west Europe and North America; but modern views on the rigidity of the earth’s body, together with the lack of any evidence of the correlative

movement of climatic zones in other parts of the world, render this hypothesis quite untenable. On similar grounds a change in the earth's centre of gravity is unthinkable. Theories based upon the variations in the obliquity of the ecliptic or eccentricity of the earth's orbit, or on the passage of the solar system through cold regions of space, or upon the known variations in the heat emitted by the sun, are all insecure and unsatisfactory. The hypothesis elaborated by James Croll (*Phil. Mag.*, 1864, 28, p. 121; *Climate and Time*, 1875; and *Discussion on Climate and Cosmology*, 1889) was founded upon the assumption that with the earth's eccentricity at its maximum and winter in the north at aphelion, there would be a tendency in northern latitudes for the accumulation of snow and ice, which would be accentuated indirectly by the formation of fogs and a modification of the trade winds. The shifting of the thermal equator, and with it the direction of the trade winds, would divert some of the warm ocean currents from the cold regions, and this effect was greatly enhanced, he considered, by the configuration of the Atlantic Ocean. Croll's hypothesis was supported by Sir R. Ball (*The Cause of the Great Ice Age*, 1893), and it met with very general acceptance; but it has been destructively criticized by Professor S. Newcomb (*Phil. Mag.*, 1876, 1883, 1884) and by E. P. Culverwell (*Phil. Mag.*, 1894, p. 541, and *Geol. Mag.*, 1895, pp. 3 and 55). The difficulties in the way of Croll's theory are: (1) the fundamental assumption, that midwinter and midsummer temperatures are directly proportional to the sun's heat at those periods, is not in accordance with observed facts; (2) the glacial periods would be limited in duration to an appropriate fraction of the precessional period (21,000 years), which appears to be too short a time for the work that was actually done by ice agency; and (3) Croll's glacial periods would alternate between the northern and southern hemispheres, affecting first one then the other. Sir C. Lyell and others have advocated the view that great elevation of the land in polar regions would be conducive to glacial conditions; this is doubtless true, but the evidence that the Glacial period was primarily due to this cause is not well established. Other writers have endeavoured to support the elevation theory by combining with it various astronomical and meteorological agencies. More recently several hypotheses have been advanced to explain the glacial period as the result of changes in the atmosphere; F. W. Harmer ("The Influence of Winds upon the Climate during the Pleistocene Epoch," *Q.J.G.S.*, 1901, 57, p. 405) has shown the importance of the influence of winds in certain circumstances; Marsden Manson ("The Evolution of Climate," *American Geologist*, 1899, 24, p. 93) has laid stress upon the influence of clouds; but neither of these theories grapples successfully with the fundamental difficulties. Others again have requisitioned the variability in the amount of the carbon dioxide in the atmosphere—hypotheses which depend upon the efficiency of this gas as a thermal absorbent. The supply of carbon dioxide may be increased from time to time, as by the emanations from volcanoes (S. Arrhenius and A. G. Hogböm), or it may be decreased by absorption into sea-water, and by the carbonation of rocks. Professor T. C. Chamberlin based a theory of glaciation on the depletion of the carbon dioxide of the air ("An Attempt to frame a Working Hypothesis of the cause of Glacial Periods on an Atmospheric Basis," *Jl. Geol.*, 1899, vii. 752-771; see also Chamberlin and Salisbury, *Geology*, 1906, ii. 674 and iii. 432). The outline of this hypothesis is as follows: The general conditions for glaciation were (1) that the oceanic circulation was interrupted by the existence of land; (2) that vertical circulation of the atmosphere was accelerated by continental and other influences; (3) that the thermal blanketing of the earth was reduced by a depletion of the moisture and carbon dioxide in the atmosphere, and that hence the average temperature of the surface of the earth and of the body of the ocean was reduced, and diversity in the distribution of heat and moisture introduced. The localization of glaciation is assignable to the two great areas of permanent atmospheric depression that have their present centres near Greenland and the Aleutian Islands respectively. The periodicity of glacial advances and retreats, demanded by those who believe in the validity of so-called "interglacial" epochs, is explained by a series of complicated processes involving the alternate depletion and completion of the normal charge of carbon dioxide in the air.

Whatever may be the ultimate verdict upon this difficult subject, it is tolerably clear that no simple cause of glacial conditions is likely to be discovered, but rather it will appear that these conditions resulted from the interaction of a complicated series of factors; and further, until a greater degree of unanimity can be approached in the interpretation of observed facts, particularly as regards the substantiality of interglacial epochs, the very foundations of a sound working hypothesis are wanting.

Classification of Glacial Deposits—Interglacial Epochs.—Had the deposits of glaciated regions consisted solely of boulder clay little difficulty might have been experienced in dealing with their classification. But there are intercalated in the boulder clays those irregular stratified and partially stratified masses of sand, gravel and loam, frequently containing marine or freshwater shells and layers of peat with plant remains, which have given rise to the conception of "interglacial epochs"—pauses in the rigorous conditions of glaciation, when the ice-sheets dwindled almost entirely away, while plants and animals re-established themselves on the newly exposed soil. Glacialists may be ranged in two schools: those who believe that one or more phases of milder climatic conditions broke up the whole Glacial period into alternating epochs of glaciation and "deglaciation"; and those who believe that the intercalated deposits represent rather the *localized* recessional movements of the ice-sheets within one single period of glaciation. In addition to the stratified deposits and their contents, important evidence in favour of interglacial epochs occurs in the presence of weathered surfaces on the top of older boulder clays, which are themselves covered by younger glacial deposits.

The cause of the interglacial hypothesis has been most ardently championed in England by Professor James Geikie; who has endeavoured to show that there were in Europe six distinct glacial epochs within the Glacial period, separated by five epochs of more moderate temperature. These are enumerated below:

6th Glacial epoch, Upper Turbarian, indicated by the deposits of peat which underlie the lower raised

beaches.

5th *Interglacial epoch, Upper Forestian*.

5th Glacial epoch, Lower Turbarian, indicated by peat deposits overlying the lower forest-bed, by the raised beaches and carse-clays of Scotland, and in part by the *Littorina*-clays of Scandinavia.

4th *Interglacial epoch, Lower Forestian*, the lower forests under peat beds, the *Ancylus*-beds of the great freshwater Baltic lake and the *Littorina*-clays of Scandinavia.

4th Glacial epoch, Mecklenburgian, represented by the moraines of the last great Baltic glacier, which reach their southern limit in Mecklenburg; the 100-ft. terrace of Scotland and the *Yoldia*-beds of Scandinavia.

3rd *Interglacial epoch, Neudeckian*, intercalations of marine and freshwater deposits in the boulder clays of the southern Baltic coasts.

3rd Glacial epoch, Polandian, glacial and fluvio-glacial formations of the minor Scandinavian ice-sheet; and the "upper boulder clay" of northern and western Europe.

2nd *Interglacial epoch, Helvetian*, interglacial beds of Britain and lignites of Switzerland.

2nd Glacial epoch, Saxonian, deposits of the period of maximum glaciation when the northern ice-sheet reached the low ground of Saxony, and the Alpine glaciers formed the outermost moraines.

1st *Interglacial epoch, Norfolkian*, the forest-bed series of Norfolk.

1st Glacial epoch, Scanian, represented only in the south of Sweden, which was overridden by a large Baltic glacier. The Chillesford clay and Weybourne crag of Norfolk and the oldest moraines and fluvio-glacial gravels of the Arctic lands may belong to this epoch.

In a similar manner Professor Chamberlin and other American geologists have recognized the following stages in the glaciation of North America:

The Champlain, marine substage.
The Glacio-lacustrine substage.
The later Wisconsin (6th glacial).
The fifth interglacial.
The earlier Wisconsin (5th glacial).
The Peorian (*4th interglacial*).
The Iowan (4th glacial).
The Sangamon (*3rd interglacial*).
The Illinoian (3rd glacial).
The Yarmouth or Buchanan (*2nd interglacial*).
The Kansan (2nd glacial).
The Aftonian (*1st interglacial*).
The sub-Aftonian or Jerseyan (1st glacial).

Although it is admitted that no strict correlation of the European and North American stages is possible, it has been suggested that the Aftonian may be the equivalent of the Helvetian; the Kansan may represent the Saxonian; the Iowan, the Polandian; the Jerseyan, the Scanian; the early Wisconsin, the Mecklenburgian. But considering how fragmentary is much of the evidence in favour of these stages both in Europe and America, the value of such attempts at correlation must be infinitesimal. This is the more evident when it is observed that there are other geologists of equal eminence who are unable to accept so large a number of epochs after a close study of the local circumstances; thus, in the subjoined scheme for north Germany, after H. W. Munthe, there are three glacial and two interglacial epochs.

Post-Glacial epoch	The *Mya* time = beech-time. The *Littorina* time = oak-time. The *Ancylus* time = pine- and birch-time.
3rd Glacial epoch	Including the upper boulder clay, "younger Baltic moraine" with the *Yoldia* or *Dryas* phase in the retrogressive stage.
2nd *Interglacial* epoch including the *Cyprina*-clay.	
2nd Glacial epoch, the maximum glaciation.	
1st *Interglacial epoch*.	
1st Glacial epoch, "older boulder clay."	

Again, in the Alps four interglacial epochs have been recognized; while in England there are many who are willing to concede one such epoch, though even for this the evidence is not enough to satisfy all glacialists (G. W. Lamplugh, Address, Section C, *Brit. Assoc.*, York, 1906).

This great diversity of opinion is eloquent of the difficulties of the subject; it is impossible not to see that the discovery of interglacial epochs bears a close relationship to the origin of certain hypotheses of the cause of glaciation; while it is significant that those who have had to do the actual mapping of glacial deposits have usually greater difficulty in finding good evidence of such definite ameliorations of climate, than those who have founded their views upon the examination of numerous but isolated areas.

Extent of Glacial Deposits.—From evidence of the kind cited above, it appears that during the glacial

period a series of great ice-sheets covered enormous areas in North America and north-west Europe. The area covered during the maximum extension of the ice has been reckoned at 20 million square kilometres (nearly 8 million sq. m.) in North America and 6½ million square kilometres (about 2½ million sq. m.) in Europe.

In Europe three great centres existed from which the ice-streams radiated; foremost in importance was the region of Fennoscandia (the name for Scandinavia with Finland as a single geological region); from this centre the ice spread out far into Germany and Russia and westward, across the North Sea, to the shores of Britain. The southern boundary of the ice extended from the estuary of the Rhine in an irregular series of lobes along the Schiefergebirge, Harz, Thüringerwald, Erzgebirge and Riesengebirge, and the northern flanks of the Carpathians towards Cracow. Down the valley of the Dnieper a lobe of the ice-sheet projected as far as 40° 50′ N.; another lobe extended down the Don valley as far as 48° N.; thence the boundary runs north-easterly towards the Urals and the Kara Sea. The British Islands constituted the centre second in importance; Scotland, Ireland and all but the southern part of England were covered by a moving ice-cap. On the west the ice-sheets reached out to sea; on the east they were conterminous with those from Scandinavia. The third European centre was the Alpine region; it is abundantly clear from the masses of morainic detritus and perched blocks that here, in the time of maximum glaciation, the ice-covered area was enormously in excess of the shrivelled remnants, which still remain in the existing glaciers. All the valleys were filled with moving ice; thus the Rhone glacier at its maximum filled Lake Geneva and the plain between the Bernese Oberland and the Jura; it even overrode the latter and advanced towards Besançon. Extensive glaciation was not limited to the aforesaid regions, for all the areas of high ground had their independent glaciers strongly developed; the Pyrenees, the central highlands of France, the Vosges, Black Forest, Apennines and Caucasus were centres of minor but still important glaciation.

The greatest expansion of ice-sheets was located on the North American continent; here, too, there were three principal centres of outflow: the “Cordilleran” ice-sheet in the N.W., the “Keewatin” sheet, radiating from the central Canadian plains, and the eastern “Labrador” or “Laurentide” sheet. From each of these centres the ice poured outwards in every direction, but the principal flow in each case was towards the south-west. The southern boundary of the glaciated area runs as an irregular line along the 49° parallel in the western part of the continent, thence it follows the Mississippi valley down to its junction with the Ohio (southern limit 37° 30′ N.), eastward it follows the direction of that river and turns north-eastward in the direction of New Jersey. As in Europe, the mountainous regions of North America produced their own local glaciers; in the Rockies, the Olympics and Sierras, the Bighorn Mountains of Wyoming, the Uinta Mountains of Utah, &c. Although it was in the northern hemisphere that the most extensive glaciation took place, the effects of a general lowering of temperature seem to have been felt in the mountainous regions of all parts; thus in South America, New Zealand, Australia and Tasmania glaciers reached down the valleys far below the existing limits, and even where none are now to be found. In Asia the evidences of a former extension of glaciation are traceable in the Himalayas, and northward in the high ranges of China and Eastern Siberia. The same is true of parts of Turkestan and Lebanon. In Africa also, in British East Africa moraines are discovered 5400 ft. below their modern limit. In Iceland and Greenland, and even in the Antarctic, there appears to be evidence of a former greater extension of the ice. It is of interest to note that Alaska seems to be free from excessive glaciation, and that a remarkable “driftless” area lies in Wisconsin. The maximum glaciation of the Glacial period was clearly centred around the North Atlantic.

Glacial Epochs in the Older Geological Periods.—Since Ramsay drew attention to the subject in 1855 (“On the occurrence of angular, subangular, polished and striated fragments and boulders in the Permian Breccia of Shropshire, Worcestershire, &c., and on the probable existence of glaciers and icebergs in the Permian epoch,” *Q.J.G.S.*, 1855, pp. 185-205), a good deal of attention has been paid to such formations. It is now generally acknowledged that the Permo-carboniferous conglomerates with striated boulders and polished rock surfaces, such as are found in the Karoo formation of South Africa, the Talkir conglomerate of the Salt Range in India, and the corresponding formations in Australia, represent undeniable glacial conditions at that period on the great Indo-Australian continent. A glacial origin has been suggested for numerous other conglomeratic formations, such as the Pre-Cambrian Torridonian of Scotland, and “Geisaschichten” of Norway; the basal Carboniferous conglomerate of parts of England; the Permian breccias of England and parts of Europe; the Trias of Devonshire; the coarse conglomerates in the Tertiary Flysch in central Europe; and the Miocene conglomerates of the Ligurian Apennines. In regard to the glacial nature of all these formations there is, however, great divergence of opinion (see A. Heim, “Zur Frage der exotischen Blöcke in Flysch,” *Eclogae geologicae Helvetiae*, vol. ix. No. 3, 1907, pp. 413-424).

Authorities.—The literature dealing directly with the Glacial period has reached enormous dimensions; in addition to the works already mentioned the following may be taken as a guide to the general outline of the subject: J. Geikie, *The Great Ice Age* (3rd ed., London, 1904), also *Earth Sculpture* (1898); G. F. Wright, *The Ice Age in North America* (4th ed., New York, 1905) and *Man and the Glacial Period* (1892); F. E. Geinitz, *Die Eiszeit* (Braunschweig, 1906); A. Penck and E. Brückner, *Die Alpen im Eiszeitalter* (Leipzig, 1901-1906, uncompleted). Many references to the literature will be found in Sir A. Geikie’s *Textbook of Geology*, vol. ii. (4th ed., 1903); Chamberlin and Salisbury, *Geology*, vol. iii. (1906). As an example of glacial theories carried beyond the usual limits, see M. Gugenhan, *Die Ergletscherung der Erde von Pol zu Pol* (Berlin, 1906). See also *Zeitschrift für Gletscherkunde* (Berlin, 1906 and onwards quarterly); Sir H. H. Howorth (opposing accepted glacial theories), *The Glacial Nightmare and the Flood*, i., ii. (London, 1893), *Ice and Water*, i., ii. (London, 1905), *The Mammoth and the Flood* (London, 1887).

(J. A. H.)

GLACIER (adopted from the French; from *glace*, ice, Lat. *glacies*), a mass of compacted ice originating in a snow-field. Glaciers are formed on any portion of the earth's surface that is permanently above the snow-line. This line varies locally in the same latitudes, being in some places higher than in others, but in the main it may be described as an elliptical shell surrounding the earth with its longest diameter in the tropics and its shortest in the polar regions, where it touches sea-level. From the extreme regions of the Arctic and Antarctic circles this cold shell swells upwards into a broad dome, from 15,000 to 18,000 ft. high over the tropics, truncating, as it rises, a number of peaks and mountain ranges whose upper portions like all regions above this thermal shell receive all their moisture in the form of snow. Since the temperature above the snow-line is below freezing point evaporation is very slight, and as the snow is solid it tends to accumulate in snow-fields, where the snow of one year is covered by that of the next, and these are wrapped over many deeper layers that have fallen in previous years. If these piles of snow were rigid and immovable they would increase in height until the whole field rose above the zone of ordinary atmospheric precipitation, and the polar ice-caps would add a load to these regions that would produce far-reaching results. The mountain regions also would rise some miles in height, and all their features would be buried in domes of snow some miles in thickness. When, however, there is sufficient weight the mass yields to pressure and flows outwards and downwards. Thus a balance of weight and height is established, and the ice-field is disintegrated principally at the edges, the surplus in polar regions being carried off in the form of icebergs, and in mountain regions by streams that flow from the melting ends of the glaciers.

Formation.—The formation of glaciers is in all cases due to similar causes, namely, to periodical and intermittent falls of snow. After a snow-fall there is a period of rest during which the snow becomes compacted by pressure and assumes the well-known granular character seen in banks and patches of ordinary snow that lie longest upon the ground when the snow is melting. This is the *firn* or *névé*. The next fall of snow covers and conceals the névé, but the light fresh crystals of this new snow in turn become compacted to the coarsely crystalline granular form of the underlying layer and become névé in turn. The process goes on continually; the lower layers become subject to greater and greater pressure, and in consequence become gradually compacted into dense clear ice, which, however, retains its granular crystalline texture throughout. The upper layers of névé are usually stratified, owing to some individual peculiarity in the fall, or to the accumulation of dust or débris upon the surface before it is covered by fresh snow. This stratification is often visible on the emerging glacier, though it is to be distinguished from the foliation planes caused by shearing movement in the body of the glacier ice.

Types.—The snow-field upon which a glacier depends is always formed when snow-fall is greater than snow-waste. This occurs under varying conditions with a differently resulting type of glacier. There are limited fields of snow in many mountain regions giving rise to long tongues of ice moving slowly down the valleys and therefore called "valley glaciers." The greater part of Greenland is covered by an ice-cap extending over nearly 400,000 sq. m., forming a kind of enormous continuous glacier on its lower slopes. The Antarctic ice region is believed to extend over more than 3,000,000 sq. m. Each of these continental fields, besides producing block as distinguished from tongue glaciers, sends into the sea a great number of icebergs during the summer season. These ice-caps covering great regions are by far the most important types. Between these "polar" or "continental glaciers" and the "alpine" type there are many grades. Smaller detached ice-caps may rest upon high plateaus as in Iceland, or several tongues of ice coming down neighbouring valleys may splay out into convergent lobes on lower ground and form a "piedmont glacier" such as the Malaspina Glacier in Alaska. When the snow-field lies in a small depression the glacier may remain suspended in the hollow and advance no farther than the edge of the snow-field. This is called a "cliff-glacier," and is not uncommon in mountain regions. The end of a larger glacier, or the edge of an ice-sheet, may reach a precipitous cliff, where the ice will break from the edge of the advancing mass and fall in blocks to the lower ground, where a "reconstructed glacier" will be formed from the fragments and advance farther down the slope.

When a glacier originates upon a dome-shaped or a level surface the ice will deploy radially in all directions. When a snow-field is formed above steep valleys separated by high ridges the ice will flow downwards in long streams. If the valleys under the snow-fields are wide and shallow the resultant glaciers will broaden out and partially fill them, and in all cases, since the conditions of glacier formation are similar, the resultant form and the direction of motion will depend upon the amount of ice and the form of the surface over which the glacier flows. A glacier flowing down a narrow gorge to an open valley, or on to a plain, will spread at its foot into a fan-shaped lobe as the ice spreads outwards while moving downwards. An ice-cap is in the main thickest at the centre, and thins out at the edges. A valley glacier is thickest at some point between its source and its end, but nearer to its source than to its termination, but its thickness at various portions will depend upon the contour of the valley floor over which the glacier rides, and may reach many hundreds of feet. At its centre the Greenland ice-cap is estimated to be over 5000 ft. thick. In all cases the glacier ends where the waste of ice is greater than the supply, and since the relationship varies in different years, or cycles of years, the end of a glacier may advance or retreat in harmony with greater or less snow-fall or with cooler or hotter summers. There seems to be a cycle of inclusive contraction and expansion of from 35 to 40 or 50 years. At present the ends of the Swiss glaciers are cradled in a mass of moraine-stuff due to former extension of the glaciers, and investigations in India show that in some parts of the Himalayas the glaciers are retreating as they are in North America and even in the southern hemisphere (*Nature*, January 2, 1908, p. 201).

Movement.—The fact that a glacier moves is easily demonstrated; the cause of the movement is

pressure upon a yielding mass; the nature of the movement is still under discussion. Rows of stakes or stones placed in line across a glacier are found to change their position with respect to objects on the bank and also with regard to each other. The posts in the centre of the ice-stream gradually move away from those at the side, proving that the centre moves faster than the sides. It has also been proved that the surface portions move more rapidly than the deeper layers and that the motion is slowest at the sides and bottom where friction is greatest.

The rate of motion past the same spot is not uniform. Heat accelerates it, cold arrests it, and the pressure of a large amount of water stimulates the flow. The rate of flow under the same conditions varies at different parts of the glacier directly as the thickness of ice, the steepness of slope and the smoothness of rocky floor. Generally speaking, the rate of motion depends upon the amount of ice that forms the “head” pressure, the slope of the under surface and of the upper surface, the nature of the floor, the temperature and the amount of water present in the ice. The ordinary rate of motion is very slow. In Switzerland it is from 1 or 2 in. to 4 ft. per day, in Alaska 7 ft., in Greenland 50 to 60 ft., and occasionally 100 ft. per day in the height of summer under exceptional conditions of quantity of ice and of water and slope. Measurements of Swiss glaciers show that near the ice foot where wastage is great there is very little movement, and observations upon the inland border of Greenland ice show that it is almost stationary over long distances. In many aspects the motion of a body of ice resembles that of a body of water, and an alpine glacier is often called an ice-river, since like a river it moves faster in the centre than at the sides and at the top faster than at the bottom. A glacier follows a curve in the same way as a river, and there appear to be ice swirls and eddies as well as an upward creep on shelving curves recalling many features of stream action. The rate of motion of both ice-stream and river is accelerated by quantity and steepness of slope and retarded by roughness of bed, but here the comparison ends, for temperature does not affect the rate of water motion, nor will a liquid crack into crevasses as a glacier does, or move upwards over an adverse slope as a glacier always does when there is sufficient “head” of ice above it. So that although in many respects ice behaves as a viscous fluid the comparison with such a fluid is not perfect. The cause of glacier motion must be based upon some more or less complex considerations. The flakes of snow are gradually transformed into granules because the points and angles of the original flakes melt and evaporate more readily than the more solid central portions, which become aggregated round some master flake that continues to grow in the névé at the expense of its smaller neighbours, and increases in size until finally the glacier ice is composed of a mass of interlocked crystalline granules, some as large as a walnut, closely compacted under pressure with the principal crystalline axes in various directions. In the upper portions of the glacier movement due to pressure probably takes place by the gliding of one granule over another. In this connexion it must be noted that pressure lowers the melting point of ice while tension raises it, and at all points of pressure there is therefore a tendency to momentary melting, and also to some evaporation due to the heat caused by pressure, and at the intermediate tension spaces between the points of pressure this resultant liquid and vapour will be at once re-frozen and become solid. The granular movement is thus greatly facilitated, while the body of ice remains in a crystalline solid condition. In this connexion it is well to remember that the pressure of the glacier upon its floor will have the same result, but the effect here is a mass-effect and facilitates the gliding of the ice over obstacles, since the friction produces heat and the pressure lowers the melting point, so that the two causes tend to liquefy the portion where pressure is greatest and so to “lubricate” the prominences and enable the glacier to slide more easily over them, while the liquid thus produced is re-frozen when the pressure is removed.

In polar regions of very low temperature a very considerable amount of pressure must be necessary before the ice granules yield to momentary liquefaction at the points of pressure, and this probably accounts for the extreme thickness of the Arctic and Antarctic ice-caps where the slopes are moderate, for although equally low temperatures are found in high Alpine snow-fields the slopes there are exceedingly steep and motion is therefore more easily produced.

Observations made upon the Greenland glaciers indicate a considerable amount of “shearing” movement in the lower portions of a glacier. Where obstacles in the bed of the glacier arrest the movement of the ice immediately above it, or where the lower portion of the glacier is choked by débris, the upper ice glides over the lower in shearing planes that are sometimes strongly marked by débris caught and pushed forwards along these planes of foliation. It must be remembered that there is a solid push from behind upon the lower portion of a glacier, quite different from the pressure of a body of water upon any point, for the pressure of a fluid is equal in all directions, and also that this push will tend to set the crystalline granules in positions in which their crystalline axes are parallel along the gliding planes. The production of gliding planes is in some cases facilitated by the descent into the glacier of water melted during summer, where it expands in freezing and pushes the adjacent ice away from it, forming a surface along which movement is readily established.

If under all circumstances the glacier melted under pressure at the bottom, glacial abrasion would be nearly impossible, since every small stone and fragment of rock would rotate in a liquid shell as the ice moved forward, but since the pressure is not always sufficient to produce melting, the glacier sometimes remains dry at its base; rock fragments are held firmly; and a dry glacier may thus become a graving tool of enormous power. Whatever views may be adopted as to the causes of glacier motion, the peculiar character of glacier ice as distinct from homogeneous river or pond ice must be kept in view, as well as the characteristic tendency of water to expand in freezing, the lowering of the melting point of ice under pressure, the raising of the melting point under tension, the production of gliding or shearing planes under pressure from above, the presence in summer of a considerable quantity of water in the lower portions of the glacier which are thus loosened, the cracking of ice (as into

crevasses), under sudden strain, and the regelation of ice in contact. A result of this last process is that fissures are not permanent, but having been produced by the passage of ice over an obstruction, they subsequently become healed when the ice proceeds over a flatter bed. Finally it must be remembered that although glacier ice behaves in some sense like a viscous fluid its condition is totally different, since “a glacier is a crystalline rock of the purest and simplest type, and it never has other than the crystalline state.”

Characteristics.—The general appearance of a glacier varies according to its environment of position and temperature. The upper portion is hidden by névé and often by freshly fallen snow, and is smooth and unbroken. During the summer, when little snow falls, the body of the glacier moves away from the snow-field and a gaping crevasse of great depth is usually established called the *bergschrund*, which is sometimes taken as the upper limit of the glacier. The glacier as it moves down the valley may become “loaded” in various ways. Rock-falls send periodical showers of stones upon it from the heights, and these are spread out into long lines at the glacier sides as the ice moves downwards carrying the rock fragments with it. These are the “lateral moraines.” When two or more glaciers descending adjacent valleys converge into one glacier one or more sides of the higher valleys disappear, and the ice that was contained in several valleys is now carried by one. In the simplest case where two valleys converge into one the two inner lateral moraines meet and continue to stream down the larger valley as one “median moraine.” Where several valleys meet there are several such parallel median moraines, and so long as the ice remains unbroken these will be carried upon the surface of the glacier and finally tipped over the end. There is, however, differential heating of rock and ice, and if the stones carried are thin they tend to sink into the ice because they absorb heat readily and melt the ice under them. Dust has the same effect and produces “dust wells” that honeycomb the upper surface of the ice with holes into which the dust sinks. If the moraine rocks are thick they prevent the ice under them from melting in sunlight, and isolated blocks often remain supported upon ice-pillars in the form of ice tables, which finally collapse, so that such rocks may be scattered out of the line of the moraine. As the glacier descends into the lower valleys it is more strongly heated, and surface streams are established in consequence that flow into channels caused by unequal melting of the ice and finally plunge into crevasses. These crevasses are formed by strains established as the central parts drag away from the sides of the glacier and the upper surface from the lower, and more markedly by the tension due to a sudden bend in the glacier caused by an inequality in its bed which must be over-ridden. These crevasses are developed at right angles to the strain and often produce intersecting fissures in several directions. The morainic material is gradually dispersed by the inequalities produced, and is further distributed by the action of superficial streams until the whole surface is strewn with stones and débris, and presents, as in the lower portions of the Mer de Glace, an exceedingly dirty appearance. Many blocks of stone fall into the gaping crevasses and much loose rock is carried down as “englacial material” in the body of the glacier. Some of it reaches the bottom and becomes part of the “ground moraine” which underlies the glacier, at least from the *bergschrund* to the “snout,” where much of it is carried away by the issuing stream and spread finally on to the plains below. It appears that a very considerable amount of degradation is caused under the *bergschrund* by the mass of ice “plucking” and dragging great blocks of rock from the side of the mountain valley where the great head of ice rests in winter and whence it begins to move in summer. These blocks and many smaller fragments are carried downwards wedged in the ice and cause powerful abrasion upon the rocky floor, rasping and scoring the channel, producing conspicuous striae, polishing and rounding the rock surfaces, and grinding the contained fragments as well as the surface over which it passes into small fragments and fine powder, from which “boulder clay” or “till” is finally produced. Emerging, then, from the snow-field as pure granular ice the glacier gradually becomes strewn and filled with foreign material, not only from above but also, as is very evident in some Greenland glaciers, occasionally from below by masses of fragments that move upwards along gliding planes, or are forced upwards by slow swirls in the ice itself.

As a glacier is a very brittle body any abrupt change in gradient will produce a number of crevasses, and these, together with those produced by dragging strains, will frequently wedge the glacier into a mass of pinnacles or *séracs* that may be partially healed but are usually evident when the melting end of the glacier emerges suddenly from a steep valley. Here the streams widen the weaker portions and the moraine rocks fall from the end to produce the “terminal” moraine, which usually lies in a crescentic heap encircling the glacier snout, whence it can only be moved by a further advance of the glacier or by the ordinary slow process of atmospheric denudation.

In cases where no rock falls upon the surface there is a considerable amount of englacial material due to upturning either over accumulated ground débris or over structural inequalities in the rock floor. This is well seen at the steep sides and ends of Greenland glaciers, where material frequently comes to the surface of the melting ice and produces median and lateral moraines, besides appearing in enormous “eyes” surrounded in the glacial body by contorted and foliated ice and sometimes producing heaps and embankments as it is pushed out at the end of the melting ice.

The environment of temperature requires consideration. At the upper or dorsal portion of the glacier there is a zone of variable (winter and summer) temperature, beneath which, if the ice is thick enough, there is a zone of constant temperature which will be about the mean annual temperature of the region of the snow-field. Underlying this there is a more or less constant ventral or ground temperature, depending mainly upon the internal heat of the earth, which is conducted to the under surface of the glacier where it slowly melts the ice, the more readily because the pressure lowers the melting point considerably, so that streams of water run constantly from beneath many glaciers, adding their volume to the springs which issue from the rock. The middle zone of constant temperature is wedge-shaped in

"alpine" glaciers, the apex pointing downwards to the zone of waste. The upper zone of variable temperature is thinnest in the snow-field where the mean temperature is lowest, and entirely dominant in the snout end of the glacier where the zone of constant temperature disappears. Two temperature wedges are thus superposed base to point, the one being thickest where the other is thinnest, and both these lie upon the basal film of temperature where the escaping earth-heat is strengthened by that due to friction and pressure. The cold wave of winter may pass right through a thin glacier, or the constant temperature may be too low to permit of the ice melting at the base, in which cases the glacier is "dry" and has great eroding power. But in the lower warmer portions water running through crevasses will raise the temperature, and increase the strength of the downward heat wave, while the mean annual temperature being there higher, the combined result will be that the glacier will gradually become "wet" at the base and have little eroding power, and it will become more and more wet as it moves down the lower valley zone of ice-waste, until at last the balance is reached between waste and supply and the glacier finally disappears.

If the mean annual temperature be 20° F., and the mean winter temperature be −12° F., as in parts of Greenland, all the ice must be considerably below the melting point, since the pressure of ice a mile in depth lowers the melting point only to 30° F., and the earth-heat is only sufficient to melt ¼ in. of ice in a year. Therefore in these regions, and in snow-fields and high glaciers with an equal or lower mean temperature than 20° F., the glacier will be "dry" throughout, which may account for the great eroding power stated to exist near the *bergschrund* in glaciers of an alpine type, which usually have their origin on precipitous slopes.

A considerable amount of ice-waste takes place by water-drainage, though much is the result of constant evaporation from the ice surface. The lower end of a glacier is in summer flooded by streams of water that pour along cracks and plunge into crevasses, often forming "pot-holes" or *moulins* where stones are swirled round in a glacial "mill" and wear holes in the solid rock below. Some of these streams issue in a spout half way up the glacier's end wall, but the majority find their way through it and join the water running along the glacier floor and emerging where the glacier ends in a large glacial stream.

Results of Glacial Action.—A glacier is a degrading and an aggrading agent. Much difference of opinion exists as to the potency of a glacier to alter surface features, some maintaining that it is extraordinarily effective, and considering that a valley glacier forms a pronounced *cirque* at the region of its origin and that the cirque is gradually cut backward until a long and deep valley is formed (which becomes evident, as in the Rocky Mountains, in an upper valley with "reversed grade" when the glacier disappears), and also that the end of a glacier plunging into a valley or a fjord will gouge a deep basin at its region of impact. The Alaskan and Norwegian fjords and the rock basins of the Scottish lochs are adduced as examples. Other writers maintain that a glacier is only a modifying and not a dominant agent in its effects upon the land-surface, considering, for example, that a glacier coming down a lateral valley will preserve the valley from the atmospheric denudation which has produced the main valley over which the lateral valley "hangs," a result which the believers in strong glacial action hold to be due to the more powerful action of the main glacier as contrasted with the weaker action of that in the lateral valley. Both the advocates and the opponents of strenuous ice action agree that a **V**-shaped valley of stream erosion is converted to a **U**-shaped valley of glacial modification, and that rock surfaces are rounded into *roches moutonnées*, and are grooved and striated by the passage of ice shod with fragments of rock, while the subglacial material is ground into finer and finer fragments until it becomes mud and "rock-flour" as the glacier proceeds. In any case striking results are manifest in any formerly glaciated region. The high peaks rise into pinnacles, and ridges with "house-roof" structure, above the former glacier, while below it the contours are all rounded and typically subdued. A landscape that was formerly completely covered by a moving ice-cap has none but these rounded features of dome-shaped hills and **U**-shaped valleys that at least bear evidence to the great modifying power that a glacier has upon a landscape.

There is no conflict of opinion with regard to glacial aggradation and the distribution of superglacial, englacial and subglacial material, which during the active existence of a glacier is finally distributed by glacial streams that produce very considerable alluviation. In many regions which were covered by the Pleistocene ice-sheet the work of the glacier was arrested by melting before it was half done. Great deposits of till and boulder clay that lay beneath the glaciers were abandoned *in situ*, and remain as an unsorted mixture of large boulders, pebbles and mingled fragments, embedded in clay or sand. The lateral, median and terminal moraines were stranded where they sank as the ice disappeared, and together with perched blocks (*roches perchées*) remain as a permanent record of former conditions which are now found to have existed temporarily in much earlier geological times. In glaciated North America lateral moraines are found that are 500 to 1000 ft. high and in northern Italy 1500 to 2000 ft. high. The surface of the ground in all these places is modified into the characteristic glaciated landscape, and many formerly deep valleys are choked with glacial débris either completely changing the local drainage systems, or compelling the reappearing streams to cut new channels in a superposed drainage system. Kames also and eskers (*q.v.*) are left under certain conditions, with many puzzling deposits that are clearly due to some features of ice-work not thoroughly understood.

See L. Agassiz, *Études sur les glaciers* (Neuchâtel, 1840) and *Nouvelles Études ...* (Paris, 1847); N. S. Shaler and W. M. Davis, *Glaciers* (Boston, 1881); A. Penck, *Die Begletscherung der deutschen Alpen* (Leipzig, 1882); J. Tyndall, *The Glaciers of the Alps* (London, 1896); T. G. Bonney, *Ice-Work, Past and Present* (London, 1896); I. C. Russell, *Glaciers of North America* (Boston, 1897); E. Richter, *Neue Ergebnisse und Probleme der Gletscherforschung* (Vienna, 1899); F. Forel, *Essai sur les variations*

périodiques des glaciers (Geneva, 1881 and 1900); H. Hess, *Die Gletscher* (Brunswick, 1904).

(E. C. Sp.)

GLACIS, in military engineering (see Fortification and Siegecraft), an artificial slope of earth in the front of works, so constructed as to keep an assailant under the fire of the defenders to the last possible moment. On the natural ground-level, troops attacking any high work would be sheltered from its fire when close up to it; the ground therefore is raised to form a glacis, which is swept by the fire of the parapet. More generally, the term is used to denote any slope, natural or artificial, which fulfils the above requirements.

GLADBACH, the name of two towns in Germany distinguished as Bergisch-Gladbach and München-Gladbach.

1. Bergisch-Gladbach is in Rhenish Prussia, 8 m. N.E. of Cologne by rail. Pop. (1905) 13,410. It possesses four large paper mills and among its other industries are paste-board, powder, percussion caps, nets and machinery. Ironstone, peat and lime are found in the vicinity. The town has four Roman Catholic churches and one Protestant. The Stundenthalshöhe, a popular resort, is in the neighbourhood, and near Gladbach is Altenberg, with a remarkably fine church, built for the Cistercian abbey at this place.

2. München-Gladbach, also in Rhenish Prussia, 16 m. W.S.W. of Düsseldorf on the main line of railway to Aix-la-Chapelle. Pop. (1885) 44,230; (1905) 60,714. It is one of the chief manufacturing places in Rhenish Prussia, its principal industries being the spinning and weaving of cotton, the manufacture of silks, velvet, ribbon and damasks, and dyeing and bleaching. There are also tanneries, tobacco manufactories, machine works and foundries. The town possesses a fine park and has statues of the emperor William I. and of Prince Bismarck. There are ten Roman Catholic churches here, among them being the beautiful minster, with a Gothic choir dating from 1250, a nave dating from the beginning of the 13th century and a crypt of the 8th century. The town has two hospitals, several schools, and is the headquarters of important insurance societies. Gladbach existed before the time of Charlemagne, and a Benedictine monastery was founded near it in 793. It was thus called München-Gladbach or Monks' Gladbach, to distinguish it from another town of the same name. The monastery was suppressed in 1802. It became a town in 1336; weaving was introduced here towards the end of the 18th century, and having belonged for a long time to the duchy of Juliers it came into the possession of Prussia in 1815.

See Strauss, *Geschichte der Stadt München-Gladbach* (1895); and G. Eckertz, *Das Verbrüderungs und Todtenbuch der Abtei Gladbach* (1881).

GLADDEN, WASHINGTON (1836-), American Congregational divine, was born in Pottsgrove, Pennsylvania, on the 11th of February 1836. He graduated at Williams College in 1859, preached in churches in Brooklyn, Morrisania (New York City), North Adams, Massachusetts, and Springfield, Massachusetts, and in 1882 became pastor of the First Congregational Church of Columbus, Ohio. He was an editor of the *Independent* in 1871-1875, and a frequent contributor to it and other periodicals. He consistently and earnestly urged in pulpit and press the need of personal, civil and, particularly, social righteousness, and in 1900-1902 was a member of the city council of Columbus. Among his many publications, which include sermons, occasional addresses, &c., are: *Plain Thoughts on the Art of Living* (1868); *Workingmen and their Employers* (1876); *The Christian Way* (1877); *Things New and Old* (1884); *Applied Christianity* (1887); *Tools and the Man—Property and Industry under the Christian Law* (1893); *The Church and the Kingdom* (1894), arguing against a confusion and misuse of these two terms; *Seven Puzzling Bible Books* (1897); *How much is Left of the Old Doctrines* (1899); *Social Salvation* (1901); *Witnesses of the Light* (1903); the William Belden Noble Lectures (Harvard), being addresses on Dante, Michelangelo, Fichte, Hugo, Wagner and Ruskin; *The New Idolatry* (1905); *Christianity and Socialism* (1906), and *The Church and Modern Life* (1908). In 1909 he published his *Recollections*.

GLADIATORS (from Lat. *gladius*, sword), professional combatants who fought to the death in Roman public shows. That this form of spectacle, which is almost peculiar to Rome and the Roman provinces, was originally borrowed from Etruria is shown by various indications. On an Etruscan tomb discovered at Tarquinii there is a representation of gladiatorial games; the slaves employed to carry off the dead bodies from the arena wore masks representing the Etruscan Charon; and we learn from Isidore of Seville (*Origines*, x.) that the name for a trainer of gladiators (*lanista*) is an Etruscan word meaning butcher or executioner. These gladiatorial games are evidently a survival of the practice of immolating slaves and prisoners on the tombs of illustrious chieftains, a practice recorded in Greek, Roman and Scandinavian legends, and traceable even as late as the 19th century as the Indian *suttee*. Even at Rome they were for a long time confined to funerals, and hence the older name for gladiators was *bustuarii*; but in the later days of the republic their original significance was forgotten, and they formed as indispensable a part of the public amusements as the theatre and the circus.

The first gladiators are said, on the authority of Valerius Maximus (ii. 4. 7), to have been exhibited at Rome in the Forum Boarium in 264 B.C. by Marcus and Decimus Brutus at the funeral of their father. On this occasion only three pairs fought, but the taste for these games spread rapidly, and the number of combatants grew apace. In 174 Titus Flamininus celebrated his father's obsequies by a three-days' fight, in which 74 gladiators took part. Julius Caesar engaged such extravagant numbers for his aedileship that his political opponents took fright and carried a decree of the senate imposing a certain limit of numbers, but notwithstanding this restriction he was able to exhibit no less than 300 pairs. During the later days of the republic the gladiators were a constant element of danger to the public peace. The more turbulent spirits among the nobility had each his band of gladiators to act as a bodyguard, and the armed troops of Clodius, Milo and Catiline played the same part in Roman history as the armed retainers of the feudal barons or the condottieri of the Italian republics. Under the empire, notwithstanding sumptuary enactments, the passion for the arena steadily increased. Augustus, indeed, limited the shows to two a year, and forbade a praetor to exhibit more than 120 gladiators, yet allusions in Horace (*Sat.* ii. 3. 85) and Persius (vi. 48) show that 100 pairs was the fashionable number for private entertainments; and in the Marmor Ancyranum the emperor states that more than 10,000 men had fought during his reign. The imbecile Claudius was devoted to this pastime, and would sit from morning till night in his chair of state, descending now and then to the arena to coax or force the reluctant gladiators to resume their bloody work. Under Nero senators and even well-born women appeared as combatants; and Juvenal (viii. 199) has handed down to eternal infamy the descendant of the Gracchi who appeared without disguise as a *retiarius*, and begged his life from the *secutor*, who blushed to conquer one so noble and so vile.[1] Titus, whom his countrymen surnamed the Clement, ordered a show which lasted 100 days; and Trajan, in celebration of his triumph over Decebalus, exhibited 5000 pairs of gladiators. Domitian at the Saturnalia of A.D. 90 arranged a battle between dwarfs and women. Even women of high birth fought in the arena, and it was not till A.D. 200 that the practice was forbidden by edict. How widely the taste for these sanguinary spectacles extended throughout the Roman provinces is attested by monuments, inscriptions and the remains of vast amphitheatres. From Britain to Syria there was not a town of any size that could not boast its arena and annual games. After Italy, Gaul, North Africa and Spain were most famous for their amphitheatres; and Greece was the only Roman province where the institution never thoroughly took root.

Gladiators were commonly drawn either from prisoners of war, or slaves or criminals condemned to death. Thus in the first class we read of tattooed Britons in their war chariots, Thracians with their peculiar bucklers and scimitars, Moors from the villages round Atlas and negroes from central Africa, exhibited in the Colosseum. Down to the time of the empire only greater malefactors, such as brigands and incendiaries, were condemned to the arena; but by Caligula, Claudius and Nero this punishment was extended to minor offences, such as fraud and peculation, in order to supply the growing demand for victims. For the first century of the empire it was lawful for masters to sell their slaves as gladiators, but this was forbidden by Hadrian and Marcus Aurelius. Besides these three regular classes, the ranks were recruited by a considerable number of freedmen and Roman citizens who had squandered their estates and voluntarily took the *auctoramentum gladiatorium*, by which for a stated time they bound themselves to the *lanista*. Even men of birth and fortune not seldom entered the lists, either for the pure love of fighting or to gratify the whim of some dissolute emperor; and one emperor, Commodus, actually appeared in person in the arena.

Gladiators were trained in schools (*ludi*) owned either by the state or by private citizens, and though the trade of a *lanista* was considered disgraceful, to own gladiators and let them out for hire was reckoned a legitimate branch of commerce. Thus Cicero, in his letters to Atticus, congratulates his friend on the good bargain he had made in purchasing a band, and urges that he might easily recoup himself by consenting to let them out twice. Men recruited mainly from slaves and criminals, whose lives hung on a thread, must have been more dangerous characters than modern galley slaves or convicts; and, though highly fed and carefully tended, they were of necessity subject to an iron discipline. In the school of gladiators discovered at Pompeii, of the sixty-three skeletons buried in the cells many were in irons. But hard as was the gladiators' lot,—so hard that special precautions had to be taken to prevent suicide,—it had its consolations. A successful gladiator enjoyed far greater fame than any modern prize-fighter or athlete. He was presented with broad pieces, chains and jewelled helmets, such as may be seen in the museum at Naples; poets like Martial sang his prowess; his portrait was multiplied on vases, lamps and gems; and high-born ladies contended for his favours. Mixed, too, with the lowest dregs of the city, there must have been many noble barbarians condemned to the vile trade by the hard fate of war. There are few finer characters in Roman history than the

Thracian Spartacus, who, escaping with seventy of his comrades from the school of Lentulus at Capua, for three years defied the legions of Rome; and after Antony's defeat at Actium, the only part of his army that remained faithful to his cause were the gladiators whom he had enrolled at Cyzicus to grace his anticipated victory.

There were various classes of gladiators, distinguished by their arms or modes of fighting. The Samnites fought with the national weapons—a large oblong shield, a vizor, a plumed helmet and a short sword. The Thraces had a small round buckler and a dagger curved like a scythe; they were generally pitted against the Mirmillones, who were armed in Gallic fashion with helmet, sword and shield, and were so called from the fish (μορμύλος or μορμύρος) which served as the crest of their helmet. In like manner the Retiarius was matched with the Secutor: the former had nothing on but a short tunic or apron, and sought to entangle his pursuer, who was fully armed, with the cast-net (*jaculum*) that he carried in his right hand; and if successful, he despatched him with the trident (*tridens*, *fuscina*) that he carried in his left. We may also mention the Andabatae who are generally believed to have fought on horseback and wore helmets with closed vizors; the Dimachaeri of the later empire, who carried a short sword in each hand; the Essedarii, who fought from chariots like the ancient Britons; the Hoplomachi, who wore a complete suit of armour; and the Laquearii, who tried to lasso their antagonists.

Gladiators also received special names according to the time or circumstances in which they exercised their calling. The Bustuarii have already been mentioned; the Catervarii fought, not in pairs, but in bands; the Meridiani came forward in the middle of the day for the entertainment of those spectators who had not left their seats; the Ordinarii fought only in pairs, in the regular way; the Fiscales were trained and supported at the expense of the imperial treasury; the Paegniarii used harmless weapons, and their exhibition was a sham one; the Postulaticii were those whose appearance was asked as a favour from the giver of the show, in addition to those already exhibited.

The shows were announced some days before they took place by bills affixed to the walls of houses and public buildings, copies of which were also sold in the streets. These bills gave the names of the chief pairs of competitors, the date of the show, the name of the giver and the different kinds of combats. The spectacle began with a procession of the gladiators through the arena, after which their swords were examined by the giver of the show. The proceedings opened with a sham fight (*praelusio*, *prolusio*) with wooden swords and javelins. The signal for real fighting was given by the sound of the trumpet, those who showed fear being driven on to the arena with whips and red-hot irons. When a gladiator was wounded, the spectators shouted *Habet* (he is wounded); if he was at the mercy of his adversary, he lifted up his forefinger to implore the clemency of the people, with whom (in the later times of the republic) the giver left the decision as to his life or death. If the spectators were in favour of mercy, they waved their handkerchiefs; if they desired the death of the conquered gladiator, they turned their thumbs downwards.[2] The reward of victory consisted of branches of palm, sometimes of money. Gladiators who had exercised their calling for a long time, or such as displayed special skill and bravery, were presented with a wooden sword (*rudis*), and discharged from further service.

Both the estimation in which gladiatorial games were held by Roman moralists, and the influence that they exercised upon the morals and genius of the nation, deserve notice. The Roman was essentially cruel, not so much from spite or vindictiveness as from callousness and defective sympathies. This element of inhumanity and brutality must have been deeply ingrained in the national character to have allowed the games to become popular, but there can be no doubt that it was fed and fostered by the savage form which their amusements took. That the sight of bloodshed provokes a love of bloodshed and cruelty is a commonplace of morals. To the horrors of the arena we may attribute in part, not only the brutal treatment of their slaves and prisoners, but the frequency of suicide among the Romans. On the other hand, we should be careful not to exaggerate the effects or draw too sweeping inferences from the prevalence of this degrading amusement. Human nature is happily illogical; and we know that many of the Roman statesmen who gave these games, and themselves enjoyed these sights of blood, were in every other department of life irreproachable—indulgent fathers, humane generals and mild rulers of provinces. In the present state of society it is difficult to conceive how a man of taste can have endured to gaze upon a scene of human butchery. Yet we should remember that it is not so long since bear-baiting was prohibited in England, and we are only now attaining that stage of morality in respect of cruelty to animals that was reached in the 5th century, by the help of Christianity, in respect of cruelty to men. We shall not then be greatly surprised if hardly one of the Roman moralists is found to raise his voice against this amusement, except on the score of extravagance. Cicero in a well-known passage commends the gladiatorial games as the best discipline against the fear of death and suffering that can be presented to the eye. The younger Pliny, who perhaps of all Romans approaches nearest to our ideal of a cultured gentleman, speaks approvingly of them. Marcus Aurelius, though he did much to mitigate their horrors, yet in his writings condemns the monotony rather than the cruelty. Seneca is indeed a splendid exception, and his letter to Lentulus is an eloquent protest against this inhuman sport. But it is without a parallel till we come to the writings of the Christian fathers, Tertullian, Lactantius, Cyprian and Augustine. In the *Confessions* of the last there occurs a narrative which is worth quoting as a proof of the strange fascination which the games exercised even on a religious man and a Christian. He tells us how his friend Alipius was dragged against his will to the amphitheatre, how he strove to quiet his conscience by closing his eyes, how at some exciting crisis the shouts of the whole assembly aroused his curiosity, how he looked and was lost, grew drunk with the sight of blood, and returned again and again, knowing his guilt yet unable to abstain. The first Christian emperor was persuaded to issue an edict abolishing gladiatorial games (325), yet in 404 we read of an exhibition of gladiators to celebrate the triumph of Honorius over the Goths, and it is said that they were not totally extinct in the West till the time of Theodoric.

Gladiators formed admirable models for the sculptor. One of the finest pieces of ancient sculpture that has come down to us is the “Wounded Gladiator” of the National Museum at Naples. The so-called “Fighting Gladiator” of the Borghese collection, now in the Museum of the Louvre, and the “Dying Gladiator” of the Capitoline Museum, which inspired the famous stanza of *Childe Harold*, have been pronounced by modern antiquaries to represent, not gladiators, but warriors. In this connexion we may mention the admirable picture of Gérome which bears the title, “Ave, Caesar, morituri te salutant.”

The attention of archaeologists has been recently directed to the tesserae of gladiators. These tesserae, of which about sixty exist in various museums, are small oblong tablets of ivory or bone, with an inscription on each of the four sides. The first line contains a name in the nominative case, presumably that of the gladiator; the second line a name in the genitive, that of the *patronus* or *dominus*; the third line begins with the letters SP (for *spectatus* = approved), which shows that the gladiator had passed his preliminary trials; this is followed by a day of a Roman month; and in the fourth line are the names of the consuls of a particular year.

AUTHORITIES.—All needful information on the subject will be found in L. Friedländer’s *Darstellungen aus der Sittengeschichte Roms*, (part ii, 6th ed., 1889), and in the section by him on “The Games” in Marquardt’s *Römische Staatsverwaltung*, iii. (1885) p. 554; see also article by G. Lafaye in Daremberg and Saglio, *Dictionnaire des antiquités*. See also F. W. Ritschl, *Tesserae gladiatoriae* (1864) and P. J. Meier, *De gladiatura Romana quaestiones selectae* (1881). The articles by Lipsius on the *Saturnalia* and *amphitheatrum* in Graevius, *Thesaurus antiquitatum Romanarum*, ix., may still be consulted with advantage.

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1 See A. E. Housman on the passage in *Classical Review* (November 1904).

2 A different account is given by Mayor on Juvenal iii. 36, who says: “Those who wished the death of the conquered gladiator turned their thumbs towards their breasts, as a signal to his opponents to stab him; those who wished him to be spared, turned their thumbs downwards, as a signal for dropping the sword.”

GLADIOLUS, a genus of monocotyledonous plants, belonging to the natural order Iridaceae. They are herbaceous plants growing from a solid fibrous-coated bulb (or corm), with long narrow plaited leaves and a terminal one-sided spike of generally bright-coloured irregular flowers. The segments of the limb of the perianth are very unequal, the perianth tube is curved, funnel-shaped and widening upwards, the segments equalling or exceeding the tube in length. There are about 150 known species, a large number of which are South African, but the genus extends into tropical Africa, forming a characteristic feature of the mountain vegetation, and as far north as central Europe and western Asia. One species *G. illyricus* (sometimes regarded as a variety of *G. communis*) is found wild in England, in the New Forest and the Isle of Wight. Some of the species have been cultivated for a long period in English flower-gardens, where both the introduced species and the modern varieties bred from them are very ornamental and popular. *G. segetum* has been cultivated since 1596, and *G. byzantinus* since 1629, while many additional species were introduced during the latter half of the 18th century. One of the earlier of the hybrids originated in gardens was the beautiful *G. Colvillei*, raised in the nursery of Mr Colville of Chelsea in 1823 from *G. tristis* fertilized by *G. cardinalis*. In the first decade of the 19th century, however, the Hon. and Rev. W. Herbert had successfully crossed the showy *G. cardinalis* with the smaller but more free-flowering *G. blandus*, and the result was the production of a race of great beauty and fertility. Other crosses were made with *G. tristis*, *G. oppositiflorus*, *G. hirsutus*, *G. alatus* and *G. psittacinus*; but it was not till after the production of *G. gandavensis* that the gladiolus really became a general favourite in gardens. This fine hybrid was raised in 1837 by M. Bedinghaus, gardener to the duc d’Aremberg, at Enghien, crossing *G. psittacinus* and *G. cardinalis*. There can, however, be little doubt that before the *gandavensis* type had become fairly fixed the services of other species were brought into force, and the most likely of these were *G. oppositiflorus* (which shows in the white forms), *G. blandus* and *G. ramosus*. Other species may also have been used, but in any case the *gandavensis* gladiolus, as we now know it, is the result of much crossing and inter-crossing between the best forms as they developed (J. Weathers, *Practical Guide to Garden Plants*). Since that time innumerable varieties have appeared only to sink into oblivion upon being replaced by still finer productions.

The modern varieties of gladioli have almost completely driven the natural species out of gardens, except in botanical collections. The most gorgeous groups—in addition to the *gandavensis* type—are those known under the names of *Lemoinei*, *Childsi*, *nanceianus* and *brenchleyensis*. The last-named was raised by a Mr Hooker at Brenchley in 1848, and although quite distinct in appearance from *gandavensis*, it undoubtedly had that variety as one of its parents. Owing to the brilliant scarlet colour of the flowers, this is always a great favourite for planting in beds. The *Lemoinei* forms originated at Nancy, in France, by fertilizing *G. purpureo-auratus* with pollen from *G. gandavensis*, the first flower appearing in 1877, and the plants being put into commerce in 1880. The *Childsi* gladioli first appeared in 1882, having been raised at Baden-Baden by Herr Max Leichtlin from the best forms of *G. gandavensis* and *G. Saundersi*. The flowers of the best varieties are of great size and substance, often measuring 7 to 9 in. across, while the range of colour is marvellous, with shades of grey, purple, scarlet, salmon, crimson, rose, white, pink, yellow, &c., often beautifully mottled and blotched in the throat. The plants are vigorous in growth, often reaching a height of 4 to 5 ft. *G. nanceianus* was raised

at Nancy by MM. Lemoine and were first put into commerce in 1889. Next to the *Childsi* group they are the most beautiful, and have the blood of the best forms of *G. Saundersi* and *G. Lemoinei* in their veins. The plants are quite as hardy as the *gandavensis* hybrids, and the colours of the flowers are almost as brilliant and varied in hue as those of the *Childsi* section.

A deep and rather stiff sandy loam is the best soil for the gladiolus, and this should be trenched up in October and enriched with well-decomposed manure, consisting partly of cow dung, the manure being disposed altogether below the corms, a layer at the bottom of the upper trench, say 9 in. from the surface, and another layer at double that depth. The corms should be planted in succession at intervals of two or three weeks through the months of March, April and May; about 3 to 5 in. deep and at least 1 ft. apart, a little pure soil or sand being laid over each before the earth is closed in about them, an arrangement which may be advantageously followed with bulbous plants generally. In hot summer weather they should have a good mulching of well-decayed manure, and, as soon as the flower spikes are produced, liquid manure may occasionally be given them with advantage.

The gladiolus is easily raised from seeds, which should be sown in March or April in pots of rich soil placed in slight heat, the pots being kept near the glass after they begin to grow, and the plants being gradually hardened to permit their being placed out-of-doors in a sheltered spot for the summer. Modern growers often grow the seeds in the open in April on a nicely prepared bed in drills about 6 in. apart and ½ in. deep, covering them with finely sifted gritty mould. The seed bed is then pressed down evenly and firmly, watered occasionally and kept free from weeds during the summer. In October they will have ripened off, and must be taken out of the soil, and stored in paper bags in a dry room secure from frost. They will have made little bulbs from the size of a hazel nut downwards, according to their vigour. In the spring they should be planted like the old bulbs, and the larger ones will flower during the season, while the smaller ones must be again harvested and planted out as before. The time occupied from the sowing of the seed until the plant attains its full strength is from three to four years. The approved sorts, which are identified by name, are multiplied by means of bulblets or offsets or “spawn,” which form around the principal bulb or corm; but in this they vary greatly, some kinds furnishing abundant increase and soon becoming plentiful, while others persistently refuse to yield offsets. The stately habit and rich glowing colours of the modern gladioli render them exceedingly valuable as decorative plants during the late summer months. They are, moreover, very desirable and useful flowers for cutting for the purpose of room decoration, for while the blossoms themselves last fresh for some days if cut either early in the morning or late in the evening, the undeveloped buds open in succession, if the stalks are kept in water, so that a cut spike will go on blooming for some time.

GLADSHEIM (Old Norse *Gladsheimr*), in Scandinavian mythology, the region of joy and home of Odin. Valhalla, the paradise whither the heroes who fell in battle were escorted, was situated there.

GLADSTONE, JOHN HALL (1827-1902), English chemist, was born at Hackney, London, on the 7th of March 1827. From childhood he showed great aptitude for science; geology was his favourite subject, but since this in his father’s opinion did not afford a career of promise, he devoted himself to chemistry, which he studied under Thomas Graham at University College, London, and Liebig at Giessen, where he graduated as Ph.D. in 1847. In 1850 he became chemical lecturer at St Thomas’s hospital, and three years later was elected a fellow of the Royal Society at the unusually early age of twenty-six. From 1858 to 1861 he served on the royal commission on lighthouses, and from 1864 to 1868 was a member of the war office committee on gun-cotton. From 1874 to 1877 he was Fullerian professor of chemistry at the Royal Institution, in 1874 he was chosen first president of the Physical Society, and in 1877-1879 he was president of the Chemical Society. In 1897 the Royal Society recognized his fifty years of scientific work by awarding him the Davy medal. Dr Gladstone’s researches were large in number and wide in range, dealing to a great extent with problems that lie on the border-line between physics and chemistry. Thus a number of his inquiries, and those not the least important, were partly chemical, partly optical. He determined the optical constants of hundreds of substances, with the object of discovering whether any of the elements possesses more than one atomic refraction. Again, he investigated the connexion between the optical behaviour, density and chemical composition of ethereal oils, and the relation between molecular magnetic rotation and the refraction and dispersion of nitrogenous compounds. So early as 1856 he showed the importance of the spectroscope in chemical research, and he was one of the first to notice that the Fraunhofer spectrum at sunrise and sunset differs from that at midday, his conclusion being that the earth’s atmosphere must be responsible for many of its absorption lines, which indeed were subsequently traced to the oxygen and water-vapour in the air. Another portion of his work was of an electro-chemical character. His studies, with Alfred Tribe (1840-1885) and W. Hibbert, in the chemistry of the storage battery, have added largely to our knowledge, while the “copper-zinc couple,” with which his name is associated together with that of Tribe, among other things, afforded a simple means of preparing certain organo-metallic compounds, and thus promoted research in branches of organic chemistry

where those bodies are especially useful. Mention may also be made of his work on phosphorus, on explosive substances, such as iodide of nitrogen, gun-cotton and the fulminates, on the influence of mass in the process of chemical reactions, and on the effect of carbonic acid on the germination of plants. Dr Gladstone always took a great interest in educational questions, and from 1873 to 1894 he was a member of the London School Board. He was also a member of the Christian Evidence Society, and an early supporter of the Young Men's Christian Association. His death occurred suddenly in London on the 6th of October 1902.

GLADSTONE, WILLIAM EWART (1809-1898), British statesman, was born on the 29th of December 1809 at No. 62 Rodney Street, Liverpool. His forefathers were Gledstanes of Gledstanes, in the upper ward of Lanarkshire; or in Scottish phrase, Gledstanes of that Ilk. As years went on their estates dwindled, and by the beginning of the 17th century Gledstanes was sold. The adjacent property of Arthurshiel remained in the hands of the family for nearly a hundred years longer. Then the son of the last Gledstanes of Arthurshiel removed to Biggar, where he opened the business of a maltster. His grandson, Thomas Gladstone (for so the name was modified), became a corn-merchant at Leith. He happened to send his eldest son, John, to Liverpool to sell a cargo of grain there, and the energy and aptitude of the young man attracted the favourable notice of a leading corn-merchant of Liverpool, who recommended him to settle in that city. Beginning his commercial career as a clerk in his patron's house, John Gladstone lived to become one of the merchant-princes of Liverpool, a baronet and a member of parliament. He died in 1851 at the age of eighty-seven. Sir John Gladstone was a pure Scotsman, a Lowlander by birth and descent. He married Anne, daughter of Andrew Robertson of Stornoway, sometime provost of Dingwall. Provost Robertson belonged to the Clan Donachie, and by this marriage the robust and business-like qualities of the Lowlander were blended with the poetic imagination, the sensibility and fire of the Gael.

John and Anne Gladstone had six children. The fourth son, William Ewart, was named after a merchant of Liverpool who was his father's friend. He seems to have been a remarkably good child, and much beloved at home. In 1818 or 1819 Mrs Gladstone, who belonged to the Evangelical school, said in a letter to a friend, that she believed her son William had been "truly converted to God." After some tuition at the vicarage of Seaforth, a watering-place near Liverpool, the boy went to Eton in 1821. His tutor was the Rev. Henry Hartopp Knapp. His brothers, Thomas and Robertson Gladstone, were already at Eton. Thomas was in the fifth form, and William, who was placed in the middle remove of the fourth form, became his eldest brother's fag. He worked hard at his classical lessons, and supplemented the ordinary business of the school by studying mathematics in the holidays. Mr Hawtrey, afterwards headmaster, commended a copy of his Latin verses, and "sent him up for good"; and this experience first led the young student to associate intellectual work with the ideas of ambition and success. He was not a fine scholar, in that restricted sense of the term which implies a special aptitude for turning English into Greek and Latin, or for original versification in the classical languages. "His composition," we read, "was stiff," but he was imbued with the substance of his authors; and a contemporary who was in the sixth form with him recorded that "when there were thrilling passages of Virgil or Homer, or difficult passages in the *Scriptores Graeci*, to translate, he or Lord Arthur Hervey was generally called up to edify the class with quotation or translation." By common consent he was pre-eminently God-fearing, orderly and conscientious. "At Eton," said Bishop Hamilton of Salisbury, "I was a thoroughly idle boy, but I was saved from some worse things by getting to know Gladstone." His most intimate friend was Arthur Hallam, by universal acknowledgment the most remarkable Etonian of his day; but he was not generally popular or even widely known. He was seen to the greatest advantage, and was most thoroughly at home, in the debates of the Eton Society, learnedly called "The Literati," and vulgarly "Pop," and in the editorship of the *Eton Miscellany*. He left Eton at Christmas 1827. He read for six months with private tutors, and in October 1828 went up to Christ Church, where, in the following year, he was nominated to a studentship.

Childhood and education.

At Oxford Gladstone read steadily, but not laboriously, till he neared his final schools. During the latter part of his undergraduate career he took a brief but brilliant share in the proceedings of the Union, of which he was successively secretary and president. He made his first speech on the 11th of February 1830. Brought up in the nurture and admonition of Canning, he defended Roman Catholic emancipation, and thought the duke of Wellington's government unworthy of national confidence. He opposed the removal of Jewish disabilities, arguing, we are told by a contemporary, "on the part of the Evangelicals," and pleaded for the gradual extinction, in preference to the immediate abolition, of slavery. But his great achievement was a speech against the Whig Reform Bill. One who heard this famous discourse says: "Most of the speakers rose, more or less, above their usual level, but when Mr Gladstone sat down we all of us felt that an epoch in our lives had occurred. It certainly was the finest speech of his that I ever heard." Bishop Charles Wordsworth said that his experience of Gladstone at this time "made me (and I doubt not others also) feel no less sure than of my own existence that Gladstone, our then Christ Church undergraduate, would one day rise to be prime minister of England." In December 1831 Gladstone crowned his career by taking a double first-class. Lord Halifax (1800-1885) used to say, with reference to the increase in the amount of reading requisite for the highest honours: "My double-first must have been a better thing than Peel's; Gladstone's must have

been better than mine.”

Now came the choice of a profession. Deeply anxious to make the best use of his life, Gladstone turned his thoughts to holy orders. But his father had determined to make him a politician. Quitting Oxford in the spring of 1832, Gladstone spent six months in Italy, learning the language and studying art. In the following September he was suddenly recalled to England, to undertake his first parliamentary campaign. The fifth duke of Newcastle was one of the chief potentates of the High Tory party. His frank claim to “do what he liked with his own” in the representation of Newark has given him a place in political history. But that claim had been rudely disputed by the return of a Radical lawyer at the election of 1831. The Duke was anxious to obtain a capable candidate to aid him in regaining his ascendancy over the rebellious borough. His son, Lord Lincoln, had heard Gladstone’s speech against the Reform Bill delivered in the Oxford Union, and had written home that “a man had uprisen in Israel.” At his suggestion the duke invited Gladstone to stand for Newark in the Tory interest against Mr Serjeant Wilde, afterwards Lord Chancellor Truro. The last of the Unreformed parliaments was dissolved on the 3rd of December 1832. Gladstone, addressing the electors of Newark, said that he was bound by the opinions of no man and no party, but felt it a duty to watch and resist that growing desire for change which threatened to produce “along with partial good a melancholy preponderance of mischief.” The first principle to which he looked for national salvation was, that the “duties of governors are strictly and peculiarly religious, and that legislatures, like individuals, are bound to carry throughout their acts the spirit of the high truths they have acknowledged.” The condition of the poor demanded special attention; labour should receive adequate remuneration; and he thought favourably of the “allotment of cottage grounds.” He regarded slavery as sanctioned by Holy Scripture, but the slaves ought to be educated and gradually emancipated. The contest resulted in his return at the head of the poll.

Entry into parliament.

The first Reformed parliament met on the 29th of January 1833, and the young member for Newark took his seat for the first time in an assembly which he was destined to adorn, delight and astonish for more than half a century. His maiden speech was delivered on the 3rd of June in reply to what was almost a personal challenge. The colonial secretary, Mr Stanley, afterwards Lord Derby, brought forward a series of resolutions in favour of the extinction of slavery in the British colonies. On the first night of the debate Lord Howick, afterwards Lord Grey, who had been under-secretary for the Colonies, and who opposed the resolutions as proceeding too gradually towards abolition, cited certain occurrences on Sir John Gladstone’s plantation in Demerara to illustrate his contention that the system of slave-labour in the West Indies was attended by great mortality among the slaves. Gladstone in his reply—his first speech in the House—avowed that he had a pecuniary interest in the question, “and, if he might say so much without exciting suspicion, a still deeper interest in it as a question of justice, of humanity and of religion.” If there had recently been a high mortality on his father’s plantation, it was due to the age of the slaves rather than to any peculiar hardship in their lot. It was true that the particular system of cultivation practised in Demerara was more trying than some others; but then it might be said that no two trades were equally conducive to health. Steel-grinding was notoriously unhealthy, and manufacturing processes generally were less favourable to life than agricultural. While strongly condemning cruelty, he declared himself an advocate of emancipation, but held that it should be effected gradually, and after due preparation. The slaves must be religiously educated, and stimulated to profitable industry. The owners of emancipated slaves were entitled to receive compensation from parliament, because it was parliament that had established this description of property. “I do not,” said Gladstone, “view property as an abstract thing; it is the creature of civil society. By the legislature it is granted, and by the legislature it is destroyed.” On the following day King William IV. wrote to Lord Althorp: “The king rejoices that a young member has come forward in so promising a manner as Viscount Althorp states Mr W. E. Gladstone to have done.” In the same session Gladstone spoke on the question of bribery and corruption at Liverpool, and on the temporalities of the Irish Church. In the session of 1834 his most important performance was a speech in opposition to Hume’s proposal to throw the universities open to Dissenters.

The question of slavery.

On the 10th of November 1834 Lord Althorp succeeded to his father’s peerage, and thereby vacated the leadership of the House of Commons. The prime minister, Lord Melbourne, submitted to the king a choice of names for the chancellorship of the exchequer and leadership of the House of Commons; but his majesty announced that, having lost the services of Lord Althorp as leader of the House of Commons, he could feel no confidence in the stability of Lord Melbourne’s government, and that it was his intention to send for the duke of Wellington. The duke took temporary charge of affairs, but Peel was felt to be indispensable. He had gone abroad after the session, and was now in Rome. As soon as he could be brought back he formed an administration, and appointed Gladstone to a junior lordship of the treasury. Parliament was dissolved on the 29th of December. Gladstone was returned unopposed, this time in conjunction with the Liberal lawyer whom he had beaten at the last election. The new parliament met on the 19th of February 1835. The elections had given the Liberals a considerable majority. Immediately after the meeting of parliament Gladstone was promoted to the under-secretaryship for the colonies, where his official chief was Lord Aberdeen. The administration was not long-lived. On the 30th of March Lord John Russell moved a resolution in favour of an inquiry into the temporalities of the Irish Church, with the intention of applying the surplus to general education without distinction of religious creed. This was carried against ministers by a majority of thirty-three. On the 8th of April Sir Robert Peel resigned, and the under-secretary for the colonies of course followed his chief into private life.

Released from the labours of office, Gladstone, living in chambers in the Albany, practically divided

his time between his parliamentary duties and study. Then, as always, his constant companions were Homer and Dante, and it is recorded that he read the whole of St Augustine, in twenty-two octavo volumes. He used to frequent the services at St James's, Piccadilly, and Margaret chapel, since better known as All Saints', Margaret Street. On the 20th of June 1837 King William IV. died, and Parliament, having been prorogued by the young queen in person, was dissolved on the 17th of the following month. Simply on the strength of his parliamentary reputation Gladstone was nominated, without his consent, for Manchester, and was placed at the bottom of the poll; but, having been at the same time nominated at Newark, was again returned. The year 1838 claims special note in a record of Gladstone's life, because it witnessed the appearance of his famous work on *The State in its Relations with the Church*. He had left Oxford just before the beginning of that Catholic revival which has transfigured both the inner spirit and the outward aspect of the Church of England. But the revival was now in full strength. The *Tracts for the Times* were saturating England with new influences. The movement counted no more enthusiastic or more valuable disciple than Gladstone. Its influence had reached him through his friendships, notably with two Fellows of Merton—Mr James Hope, who became Mr Hope-Scott of Abbotsford, and the Rev. H. E. Manning, afterwards cardinal archbishop. *The State in its Relations with the Church* was his practical contribution to a controversy in which his deepest convictions were involved. He contended that the Church, as established by law, was to be "maintained for its truth," and that this principle, if good for England, was good also for Ireland.

Literary work.

On the 25th of July 1839 Gladstone was married at Hawarden to Miss Catherine Glynne, sister, and in her issue heir, of Sir Stephen Glynne, ninth and last baronet of that name. In 1840 he published *Church Principles considered in their Results*.

Parliament was dissolved in June 1841. Gladstone was again returned for Newark. The general election resulted in a Tory majority of eighty. Sir Robert Peel became prime minister, and made the member for Newark vice-president of the Board of Trade. An inevitable change is from this time to be traced in the topics of Gladstone's parliamentary speaking. Instead of discoursing on the corporate conscience of the state and the endowments of the Church, the importance of Christian education, and the theological unfitness of the Jews to sit in parliament, he is solving business-like problems about foreign tariffs and the exportation of machinery; waxing eloquent over the regulation of railways, and a graduated tax on corn; subtle on the monetary merits of half-farthings, and great in the mysterious lore of *quassia* and *cocculus indicus*. In 1842 he had a principal hand in the preparation of the revised tariff, by which duties were abolished or sensibly diminished in the case of 1200 duty-paying articles. In defending the new scheme he spoke incessantly, and amazed the House by his mastery of detail, his intimate acquaintance with the commercial needs of the country, and his inexhaustible power of exposition. In 1843 Gladstone, succeeding Lord Ripon as president of the Board of Trade, became a member of the cabinet at the age of thirty-three. He has recorded the fact that "the very first opinion which he ever was called upon to give in cabinet" was an opinion in favour of withdrawing the bill providing education for children in factories, to which vehement opposition was offered by the Dissenters, on the ground that it was too favourable to the Established Church.

Enters the cabinet.

At the opening of the session of 1845 the government, in pursuance of a promise made to Irish members that they would deal with the question of academical education in Ireland, proposed to establish non-sectarian colleges in that country and to make a large addition to the grant to the Roman Catholic College of Maynooth. Gladstone resigned office, in order, as he announced in the debate on the address, to form "not only an honest, but likewise an independent and an unsuspected judgment," on the plan to be submitted by the government with respect to Maynooth. His subsequent defence of the proposed grant, on the ground that it would be improper and unjust to exclude the Roman Catholic Church in Ireland from a "more indiscriminating support" which the state might give to various religious beliefs, was regarded by men of less sensitive conscience as only proving that there had been no adequate cause for his resignation. Before he resigned he completed a second revised tariff, carrying considerably further the principles on which he had acted in the earlier revision of 1842.

Maynooth grant: resignation.

In the autumn of 1845 the failure of the potato crop in Ireland threatened a famine, and convinced Sir Robert Peel that all restrictions on the importation of food must be at once suspended. He was supported by only three members of the cabinet, and resigned on the 5th of December. Lord John Russell, who had just announced his conversion to total and immediate repeal of the Corn Laws, declined the task of forming an administration, and on the 20th of December Sir Robert Peel resumed office. Lord Stanley refused to re-enter the government, and his place as secretary of state for the colonies was offered to and accepted by Gladstone. He did not offer himself for re-election at Newark, and remained outside the House of Commons during the great struggle of the coming year. It was a curious irony of fate which excluded him from parliament at this crisis, for it seems unquestionable that he was the most advanced Free Trader in Sir Robert Peel's Cabinet. The Corn Bill passed the House of Lords on the 28th of June 1846, and on the same day the government were beaten in the House of Commons on an Irish Coercion Bill. Lord John Russell became prime minister, and Gladstone retired for a season into private life. Early in 1847 it was announced that one of the two members for the university of Oxford intended to retire at the general election, and Gladstone was proposed for the vacant seat. The representation of the university had been pronounced by Canning to be the most coveted prize of public life, and Gladstone himself confessed that he "desired it with an almost passionate fondness." Parliament was dissolved on the 23rd of July 1847. The nomination at Oxford took place on the 29th of July, and at the close of the

Free trade.

poll Sir Robert Inglis stood at the head, with Gladstone as his colleague.

The three years 1847, 1848, 1849 were for Gladstone a period of mental growth, of transition, of development. A change was silently proceeding, which was not completed for twenty years. "There have been," he wrote in later days to Bishop Wilberforce, "two great deaths, or transmigrations of spirit, in my political existence—one, very slow, the breaking of ties with my original party." This was now in progress. In the winter of 1850-1851 Gladstone spent between three and four months at Naples, where he learned that more than half the chamber of deputies, who had followed the party of Opposition, had been banished or imprisoned; that a large number, probably not less than 20,000, of the citizens had been imprisoned on charges of political disaffection, and that in prison they were subjected to the grossest cruelties. Having made careful investigations, Gladstone, on the 7th of April 1851, addressed an open letter to Lord Aberdeen, bringing an elaborate, detailed and horrible indictment against the rulers of Naples, especially as regards the arrangements of their prisons and the treatment of persons confined in them for political offences. The publication of this letter caused a wide sensation in England and abroad, and profoundly agitated the court of Naples. In reply to a question in the House of Commons, Lord Palmerston accepted and adopted Gladstone's statement, expressed keen sympathy with the cause which he had espoused, and sent a copy of his letter to the queen's representative at every court of Europe. A second letter and a third followed, and their effect, though for a while retarded, was unmistakably felt in the subsequent revolution which created a free and united Italy.

Naple prisons.

In February 1852 the Whig government was defeated on a Militia Bill, and Lord John Russell was succeeded by Lord Derby, formerly Lord Stanley, with Mr Disraeli, who now entered office for the first time, as chancellor of the exchequer and leader of the House of Commons. Mr Disraeli introduced and carried a makeshift budget, and the government tided over the session, and dissolved parliament on the 1st of July 1852. There was some talk of inducing Gladstone to join the Tory government, and on the 29th of November Lord Malmesbury dubiously remarked, "I cannot make out Gladstone, who seems to me a dark horse." In the following month the chancellor of the exchequer produced his second budget. The government redeemed their pledge to do something for the relief of the agricultural interest by reducing the duty on malt. This created a deficit, which they repaired by doubling the duty on inhabited houses. The voices of criticism were heard simultaneously on every side. The debate waxed fast and furious. In defending his proposals Mr Disraeli gave full scope to his most characteristic gifts; he pelted his opponents right and left with sarcasms, taunts and epigrams. Gladstone delivered an unpremeditated reply, which has ever since been celebrated. Tradition says that he "foamed at the mouth." The speech of the chancellor of the exchequer, he said, must be answered "on the moment." It must be "tried by the laws of decency and propriety." He indignantly rebuked his rival's language and demeanour. He tore his financial scheme to ribbons. It was the beginning of a duel which lasted till death removed one of the combatants from the political arena. "Those who had thought it impossible that any impression could be made upon the House after the speech of Mr Disraeli had to acknowledge that a yet greater impression was produced by the unprepared reply of Mr Gladstone." The House divided, and the government were left in a minority of nineteen. Lord Derby resigned.

Gladstone and Disraeli.

The new government was a coalition of Whigs and Peelites. Lord Aberdeen became prime minister, and Gladstone chancellor of the exchequer. Having been returned again for the university of Oxford, he entered on the active duties of a great office for which he was pre-eminently fitted by an unique combination of financial, administrative and rhetorical gifts. His first budget was introduced on the 18th of April 1853. It tended to make life easier and cheaper for large and numerous classes; it promised wholesale remissions of taxation; it lessened the charges on common processes of business, on locomotion, on postal communication, and on several articles of general consumption. The deficiency thus created was to be met by a "succession-duty," or application of the legacy-duty to real property; by an increase of the duty on spirits; and by the extension of the income-tax, at 5d. in the pound, to all incomes between £100 and £150. The speech in which these proposals were introduced held the House spellbound. Here was an orator who could apply all the resources of a burnished rhetoric to the elucidation of figures; who could sweep the widest horizon of the financial future, and yet stoop to bestow the minutest attention on the microcosm of penny stamps and post-horses. Above all, the chancellor's mode of handling the income-tax attracted interest and admiration. It was a searching analysis of the financial and moral grounds on which the impost rested, and a historical justification and eulogy of it. Yet, great as had been the services of the tax at a time of national danger, Gladstone could not consent to retain it as a part of the permanent and ordinary finances of the country. It was objectionable on account of its unequal incidence, of the harassing investigation into private affairs which it entailed, and of the frauds to which it inevitably led. Therefore, having served its turn, it was to be extinguished in 1860. The scheme astonished, interested and attracted the country. The queen and Prince Albert wrote to congratulate the chancellor of the exchequer. Public authorities and private friends joined in the chorus of eulogy. The budget demonstrated at once its author's absolute mastery over figures and the persuasive force of his expository gift. It established the chancellor of the exchequer as the paramount financier of his day, and it was only the first of a long series of similar performances, different, of course, in detail, but alike in their bold outlines and brilliant handling. Looking back on a long life of strenuous exertion, Gladstone declared that the work of preparing his proposals about the succession-duty and carrying them through Parliament was by far the most laborious task which he ever performed.

Chancellor of the exchequer.

War between Great Britain and Russia was declared on the 27th of March 1854, and it thus fell to

the lot of the most pacific of ministers, the devotee of retrenchment, and the anxious cultivator of all industrial arts, to prepare a war budget, and to meet as well as he might the exigencies of a conflict which had so cruelly dislocated all the ingenious devices of financial optimism. No amount of skill in the manipulation of figures, no ingenuity in shifting fiscal burdens, could prevent the addition of forty-one millions to the national debt, or could countervail the appalling mismanagement at the seat of war. Gladstone declared that the state of the army in the Crimea was a "matter for weeping all day and praying all night." As soon as parliament met in January 1855 J. A. Roebuck, the Radical member for Sheffield, gave notice that he would move for a select committee "to inquire into the condition of our army before Sevastopol, and into the conduct of those departments of the government whose duty it has been to minister to the wants of that army." On the same day Lord John Russell, without announcing his intention to his colleagues, resigned his office as president of the council sooner than attempt the defence of the government. Gladstone, in defending the government against Roebuck, rebuked in dignified and significant terms the conduct of men who, "hoping to escape from punishment, ran away from duty." On the division on Mr Roebuck's motion the government was beaten by the unexpected majority of 157.

Lord Palmerston became prime minister. The Peelites joined him, and Gladstone resumed office as chancellor of the exchequer. A shrewd observer at the time pronounced him indispensable. "Any other chancellor of the exchequer would be torn in bits by him." The government was formed on the understanding that Mr Roebuck's proposed committee was to be resisted. Lord Palmerston soon saw that further resistance was useless; his Peelite colleagues stuck to their text, and, within three weeks after resuming office, Gladstone, Sir James Graham and Mr Sidney Herbert resigned. Gladstone once said of himself and his Peelite colleagues, during the period of political isolation, that they were like roving icebergs on which men could not land with safety, but with which ships might come into perilous collision. He now applied himself specially to financial criticism, and was perpetually in conflict with the chancellor of the exchequer, Sir George Cornewall Lewis.

In 1858 Lord Palmerston was succeeded by Lord Derby at the head of a Conservative administration, and Gladstone accepted the temporary office of high commissioner extraordinary to the Ionian Islands. Returning to England for the session of 1859, he found himself involved in the controversy which arose over a mild Reform Bill introduced by the government. They were defeated on the second reading of the bill, Gladstone voting with them. A dissolution immediately followed, and Gladstone was again returned unopposed for the university of Oxford. As soon as the new parliament met a vote of want of confidence in the ministry was moved in the House of Commons. In the critical division which ensued Gladstone voted with the government, who were left in a minority. Lord Derby resigned. Lord Palmerston became prime minister, and asked Gladstone to join him as chancellor of the exchequer. To vote confidence in an imperilled ministry, and on its defeat to take office with the rivals who have defeated it, is a manœuvre which invites the reproach of tergiversation. But Gladstone risked the reproach, accepted the office and had a sharp tussle for his seat. He emerged from the struggle victorious, and entered on his duties with characteristic zeal. The prince consort wrote: "Gladstone is now the real leader in the House of Commons, and works with an energy and vigour altogether incredible."

Budget of 1860.

The budget of 1860 was marked by two distinctive features. It asked the sanction of parliament for the commercial treaty which Cobden had privately arranged with the emperor Napoleon, and it proposed to abolish the duty on paper. The French treaty was carried, but the abolition of the paper-duty was defeated in the House of Lords. Gladstone justly regarded the refusal to remit a duty as being in effect an act of taxation, and therefore as an infringement of the rights of the House of Commons. The proposal to abolish the paper-duty was revived in the budget of 1861, the chief proposals of which, instead of being divided, as in previous years, into several bills, were included in one. By this device the Lords were obliged to acquiesce in the repeal of the paper-duty.

During Lord Palmerston's last administration, which lasted from 1859 to 1865, Gladstone was by far the most brilliant and most conspicuous figure in the cabinet. Except in finance, he was not able to accomplish much, for he was met and thwarted at every turn by his chief's invincible hostility to change; but the more advanced section of the Liberal party began to look upon him as their predestined leader. In 1864, in a debate on a private member's bill for extending the suffrage, he declared that the burden of proof lay on those "who would exclude forty-nine fiftieths of the working-classes from the franchise." In 1865, in a debate on the condition of the Irish Church Establishment, he declared that the Irish Church, as it then stood, was in a false position, inasmuch as it ministered only to one-eighth or one-ninth of the whole community. But just in proportion as Gladstone advanced in favour with the Radical party he lost the confidence of his own constituents. Parliament was dissolved in July 1865, and the university elected Mr Gathorne Hardy in his place.

Leader of House of Commons.

Gladstone at once turned his steps towards South Lancashire, where he was returned with two Tories above him. The result of the general election was to retain Lord Palmerston's government in power, but on the 18th of October the old prime minister died. He was succeeded by Lord Russell, and Gladstone, retaining the chancellorship of the exchequer, became for the first time leader of the House of Commons. Lord Russell, backed by Gladstone, persuaded his colleagues to consent to a moderate Reform Bill, and the task of piloting this measure through the House of Commons fell to Gladstone. The speech in which he wound up the debate on the second reading was one of the finest, if not indeed the very finest, which he ever delivered. But it was of no practical avail. The government were defeated on an

amendment in committee, and thereupon resigned. Lord Derby became prime minister, with Disraeli as chancellor of the exchequer and leader of the House of Commons. On the 18th of March 1867 the Tory Reform Bill, which ended in establishing Household Suffrage in the boroughs, was introduced, and was read a second time without a division. After undergoing extensive alterations in committee at the hands of the Liberals and Radicals, the bill became law in August.

At Christmas 1867 Lord Russell announced his final retirement from active politics, and Gladstone was recognized by acclamation as leader of the Liberal party. Nominally he was in Opposition; but his party formed the majority of the House of Commons, and could beat the government whenever they chose to mass their forces. Gladstone seized the opportunity to give effect to convictions which had long been forming in his mind. Early in the session he brought in a bill abolishing compulsory church-rates, and this passed into law. On the 16th of March, in a debate raised by an Irish member, he declared that in his judgment the Irish Church, as a State Church, must cease to exist. Immediately afterwards he embodied this opinion in a series of resolutions concerning the Irish Church Establishment, and carried them against the government. Encouraged by this triumph, he brought in a Bill to prevent any fresh appointments in the Irish Church, and this also passed the Commons, though it was defeated in the Lords. Parliament was dissolved on the 11th of November. A single issue was placed before the country—Was the Irish Church to be, or not to be, disestablished? The response was an overwhelming affirmative. Gladstone, who had been doubly nominated, was defeated in Lancashire, but was returned for Greenwich. He chose this moment for publishing a *Chapter of Autobiography*, in which he explained and justified his change of opinion with regard to the Irish Church.

Leader of Liberal party.

On the 2nd of December Disraeli, who had succeeded Lord Derby as premier in the preceding February, announced that he and his colleagues, recognizing their defeat, had resigned without waiting for a formal vote of the new parliament. On the following day Gladstone was summoned to Windsor, and commanded by the queen to form an administration. The great task to which the new prime minister immediately addressed himself was the disestablishment of the Irish Church. The queen wrote to Archbishop Tait that the subject of the Irish Church “made her very anxious,” but that Mr Gladstone “showed the most conciliatory disposition.” “The government can do nothing that would tend to raise a suspicion of their sincerity in proposing to disestablish the Irish Church, and to withdraw all state endowments from all religious communions in Ireland; but, were these conditions accepted, all other matters connected with the question might, the queen thinks, become the subject of discussion and negotiation.” The bill was drawn and piloted on the lines thus indicated, and became law on the 26th of July. In the session of 1870 Gladstone’s principal work was the Irish Land Act, of which the object was to protect the tenant against eviction as long as he paid his rent, and to secure to him the value of any improvements which his own industry had made. In the following session Religious Tests in the universities were abolished, and a bill to establish secret voting was carried through the House of Commons. This was thrown out by the Lords, but became law a year later. The House of Lords threw out a bill to abolish the purchase of commissions in the army. Gladstone found that purchase existed only by royal sanction, and advised the queen to issue a royal warrant cancelling, on and after the 1st of November following, all regulations authorizing the purchase of commissions.

Prime Minister: Irish Church disestablishment.

In 1873 Gladstone set his hand to the third of three great Irish reforms to which he had pledged himself. His scheme for the establishment of a university which should satisfy both Roman Catholics and Protestants met with general disapproval. The bill was thrown out by three votes, and Gladstone resigned. The queen sent for Disraeli, who declined to take office in a minority of the House of Commons, so Gladstone was compelled to resume. But he and his colleagues were now, in Disraelitish phrase, “exhausted volcanoes.” Election after election went wrong. The government had lost favour with the public, and was divided against itself. There were resignations and rumours of resignations. When the session of 1873 had come to an end Gladstone took the chancellorship of the exchequer, and, as high authorities contended, vacated his seat by doing so. The point was obviously one of vital importance; and we learn from Lord Selborne, who was lord chancellor at the time, that Gladstone “was sensible of the difficulty of either taking his seat in the usual manner at the opening of the session, or letting ... the necessary arrangements for business in the House of Commons be made in the prime minister’s absence. A dissolution was the only escape.” On the 23rd of January 1874 Gladstone announced the dissolution in an address to his constituents, declaring that the authority of the government had now “sunk below the point necessary for the due defence and prosecution of the public interest.” He promised that, if he were returned to power, he would repeal the income-tax. This bid for popularity failed, the general election resulting in a Tory majority of forty-six. Gladstone kept his seat for Greenwich, but was only second on the poll. Following the example of Disraeli in 1868, he resigned without meeting parliament.

A Dissolution of 1874.

For some years he had alluded to his impending retirement from public life, saying that he was “strong against going on in politics to the end.” He was now sixty-four, and his life had been a continuous experience of exhausting labour. On the 12th of March 1874 he informed Lord Granville that he could give only occasional attendance in the House of Commons during the current session, and that he must “reserve his entire freedom to divest himself of all the responsibilities of leadership at no distant date.” His most important intervention in the debates of 1874 was when he opposed Archbishop Tait’s Public Worship Bill. This was read a second time without a division, but in committee Gladstone enjoyed some signal triumphs over his late solicitor-general, Sir William Harcourt, who had warmly espoused the cause of the government and the bill. At the beginning of 1875 Gladstone carried into effect the resolution which he

Temporary retirement.

had announced a year before, and formally resigned the leadership of the Liberal party. He was succeeded by Lord Hartington, afterwards duke of Devonshire. The learned leisure which Gladstone had promised himself when released from official responsibility was not of long duration. In the autumn of 1875 an insurrection broke out in Bulgaria, and the suppression of it by the Turks was marked by massacres and outrages. Public indignation was aroused by what were known as the "Bulgarian atrocities," and Gladstone flung himself into the agitation against Turkey with characteristic zeal. At public meetings, in the press, and in parliament he denounced the Turkish government and its champion, Disraeli, who had now become Lord Beaconsfield. Lord Hartington soon found himself pushed aside from his position of titular leadership. For four years, from 1876 to 1880, Gladstone maintained the strife with a courage, a persistence and a versatility which raised the enthusiasm of his followers to the highest pitch. The county of Edinburgh, or Midlothian, which he contested against the dominant influence of the duke of Buccleuch, was the scene of the most astonishing exertions. As the general election approached the only question submitted to the electors was—Do you approve or condemn Lord Beaconsfield's foreign policy? The answer was given at Easter 1880, when the Liberals were returned by an overwhelming majority over Tories and Home Rulers combined. Gladstone was now member for Midlothian, having retired from Greenwich at the dissolution.

Midlothian campaign.

When Lord Beaconsfield resigned, the queen sent for Lord Hartington, the titular leader of the Liberals, but he and Lord Granville assured her that no other chief than Gladstone would satisfy the party. Accordingly, on the 23rd of April he became prime minister for the second time. His second administration, of which the main achievement was the extension of the suffrage to the agricultural labourers, was harassed by two controversies, relating to Ireland and Egypt, which proved disastrous to the Liberal party. Gladstone alienated considerable masses of English opinion by his efforts to reform the tenure of Irish land, and provoked the Irish people by his attempts to establish social order and to repress crime. A bill to provide compensation for tenants who had been evicted by Irish landlords passed the Commons, but was shipwrecked in the Lords, and a ghastly record of outrage and murder stained the following winter. A Coercion Bill and a Land Bill passed in 1881 proved unsuccessful. On the 6th of May 1882 the newly appointed chief secretary for Ireland, Lord Frederick Cavendish, and his under-secretary, Mr Burke, were stabbed to death in the Phoenix Park at Dublin. A new Crimes Act, courageously administered by Lord Spencer and Sir George Trevelyan, abolished exceptional crime in Ireland, but completed the breach between the British government and the Irish party in parliament.

The bombardment of the forts at Alexandria and the occupation of Egypt in 1882 were viewed with great disfavour by the bulk of the Liberal party, and were but little congenial to Gladstone himself. The circumstances of General Gordon's untimely death awoke an outburst of indignation against those who were, or seemed to be, responsible for it. Frequent votes of censure were proposed by the Opposition, and on the 8th of June 1885 the government were beaten on the budget. Gladstone resigned. The queen offered him the dignity of an earldom, which he declined. He was succeeded by Lord Salisbury.

The general election took place in the following November. When it was over the Liberal party was just short of the numerical strength which was requisite to defeat the combination of Tories and Parnellites. A startling surprise was at hand. Gladstone had for some time been convinced of the expediency of conceding Home Rule to Ireland in the event of the Irish constituencies giving unequivocal proof that they desired it. His intentions were made known only to a privileged few, and these, curiously, were not his colleagues. The general election of 1885 showed that Ireland, outside Ulster, was practically unanimous for Home Rule. On the 17th of December an anonymous paragraph was published, stating that if Mr Gladstone returned to office he was prepared to "deal in a liberal spirit with the demand for Home Rule." It was clear that if Gladstone meant what he appeared to mean, the Parnellites would support him, and the Tories must leave office. The government seemed to accept the situation. When parliament met they executed, for form's sake, some confused manœuvres, and then they were beaten on an amendment to the address in favour of Municipal Allotments. On the 1st of February 1886 Gladstone became, for the third time, prime minister. Several of his former colleagues declined to join him, on the ground of their absolute hostility to the policy of Home Rule; others joined on the express understanding that they were only pledged to consider the policy, and did not fetter their further liberty of action. On the 8th of April Gladstone brought in his bill for establishing Home Rule, and eight days later the bill for buying out the Irish landlords. Meanwhile two members of his cabinet, feeling themselves unable to support these measures, resigned. Hostility to the bills grew apace. Gladstone was implored to withdraw them, or substitute a resolution in favour of Irish autonomy; but he resolved to press at least the Home Rule Bill to a second reading. In the early morning of the 8th of June the bill was thrown out by thirty. Gladstone immediately advised the queen to dissolve parliament. Her Majesty strongly demurred to a second general election within seven months; but Gladstone persisted, and she yielded. Parliament was dissolved on the 26th of June. In spite of Gladstone's skilful appeal to the constituencies to sanction the principle of Home Rule, as distinct from the practical provisions of his late bill, the general election resulted in a majority of considerably over 100 against his policy, and Lord Salisbury resumed office. Throughout the existence of the new parliament Gladstone never relaxed his extraordinary efforts, though now nearer eighty than seventy, on behalf of the cause of self-government for Ireland. The fertility of argumentative resource, the copiousness of rhetoric, and the physical energy which he threw into the enterprise, would have been remarkable at any stage of his public life; continued into his eighty-fifth year they were little less than miraculous. Two incidents of domestic interest, one happy and the other sad, belong to that period of political storm and stress. On the 25th of July 1889

First Home Rule Bill.

Gladstone celebrated the fiftieth anniversary of his marriage, and on the 4th of July 1891 his eldest son, William Henry, a man of fine character and accomplishments, died, after a lingering illness, in his fifty-second year.

The crowning struggle of Gladstone's political career was now approaching its climax. Parliament was dissolved on the 28th of June 1892. The general election resulted in a majority of forty for Home Rule, heterogeneously composed of Liberals, Labour members and Irish. As soon as the new parliament met a vote of want of confidence in Lord Salisbury's government was moved and carried. Lord Salisbury resigned, and on the 15th of August 1892 Gladstone kissed hands as first lord of the treasury. He was the first English statesman that had been four times prime minister. Parliament reassembled in January 1893. Gladstone brought in his new Home Rule Bill on the 13th of February. It passed the House of Commons, but was thrown out by the House of Lords on the second reading on the 8th of September 1893. Gladstone's political work was now, in his own judgment, ended. He made his last speech in the House of Commons on the 1st of March 1894, acquiescing in some amendments introduced by the Lords into the Parish Councils Bill; and on the 3rd of March he placed his resignation in the queen's hands. He never set foot again in the House of Commons, though he remained a member of it till the dissolution of 1895. He paid occasional visits to friends in London, Scotland and the south of France; but the remainder of his life was spent for the most part at Hawarden. He occupied his leisure by writing a rhymed translation of the Odes of Horace, and preparing an elaborately annotated edition of Butler's *Analogy* and *Sermons*. He had also contemplated some addition to the Homeric studies which he had always loved, but this design was never carried into effect, for he was summoned once again from his quiet life of study and devotion to the field of public controversy. The Armenian massacres in 1894 and 1895 revived all his ancient hostility to "the governing Turk." He denounced the massacres and their perpetrators at public meetings held at Chester on the 6th of August 1895, and at Liverpool on the 24th of September 1896. In March 1897 he recapitulated the hideous history in an open letter to the duke of Westminster.

Second Home Rule Bill.

But the end, though not yet apprehended, was at hand. Since his retirement from office Gladstone's physical vigour, up to that time unequalled, had shown signs of impairment. Towards the end of the summer of 1897 he began to suffer from an acute pain, which was attributed to facial neuralgia, and in November he went to Cannes. In February 1898 he returned to England and went to Bournemouth. There he was informed that the pain had its origin in a disease which must soon prove fatal. He received the information with simple thankfulness, and only asked that he might die at home. On the 22nd of March he returned to Hawarden, and there he died on the 19th of May 1898. During the night of the 25th of May his body was conveyed from Hawarden to London and the coffin was placed on a bier in Westminster Hall. Throughout the 26th and 27th a vast train of people, officially estimated at 250,000, and drawn from every rank and class, moved in unbroken procession past the bier. On the 28th of May the coffin, preceded by the two Houses of Parliament and escorted by the chief magnates of the realm, was carried from Westminster Hall to Westminster Abbey. The heir-apparent and his son, the prime minister and the leader of the House of Commons, were among those who bore the pall. The body was buried in the north transept of the abbey, where, on the 19th of June 1900, Mrs Gladstone's body was laid beside it.

Death.

Mr and Mrs Gladstone had four sons and four daughters, of whom one died in infancy. The eldest son, W. H. Gladstone (1840-1891), was a member of parliament for many years, and married the daughter of Lord Blantyre, his son William (b. 1885) inheriting the family estates. The fourth son, Herbert John (b. 1854), sat in parliament for Leeds from 1880 to 1910, and filled various offices, being home secretary 1905-1910; in 1910 he was created Viscount Gladstone, on being appointed governor-general of united South Africa. The eldest daughter, Agnes, married the Rev. E. C. Wickham, headmaster of Wellington, 1873-1893, and later Dean of Lincoln. Another daughter married the Rev. Harry Drew, rector of Hawarden. The youngest, Helen, was for some years vice-principal of Newnham College, Cambridge.

Family.

After a careful survey of Mr Gladstone's life, enlightened by personal observation, it is inevitable to attempt some analysis of his character. First among his moral attributes must be placed his religiousness. From those early days when a fond mother wrote of him as having been "truly converted to God," down to the verge of ninety years, he lived in the habitual contemplation of the unseen world, and regulated his private and public action by reference to a code higher than that of mere prudence or worldly wisdom. A second characteristic, scarcely less prominent than the first, was his love of power. His ambition had nothing in common with the vulgar eagerness for place and pay and social standing. Rather it was a resolute determination to possess that control over the machine of state which should enable him to fulfil without let or hindrance the political mission with which he believed that Providence had charged him. The love of power was supported by a splendid fearlessness. No dangers were too threatening for him to face, no obstacles too formidable, no tasks too laborious, no heights too steep. The love of power and the supporting courage were allied with a marked imperiousness. Of this quality there was no trace in his manner, which was courteous, conciliatory and even deferential; nor in his speech, which breathed an almost exaggerated humility. But the imperiousness showed itself in the more effectual form of action; in his sudden resolves, his invincible insistence, his recklessness of consequences to himself and his friends, his habitual assumption that the civilized world and all its units must agree with him, his indignant astonishment at the bare thought of dissent or resistance, his incapacity to believe that an overruling Providence would permit him to be frustrated or defeated. He had by nature what he himself called a "vulnerable temper and impetuous moods." But so absolute was his lifelong self-

Character.

mastery that he was hardly ever betrayed into saying that which, on cooler reflection, needed to be recalled. It was easy enough to see the “vulnerable temper” as it worked within, but it was never suffered to find audible expression. It may seem paradoxical, but it is true, to say that Mr Gladstone was by nature conservative. His natural bias was to respect things as they were. In his eyes, institutions, customs, systems, so long as they had not become actively mischievous, were good because they were old. It is true that he was sometimes forced by conviction or fate or political necessity to be a revolutionist on a large scale; to destroy an established Church; to add two millions of voters to the electorate; to attack the parliamentary union of the kingdoms. But these changes were, in their inception, distasteful to their author. His whole life was spent in unlearning the prejudices in which he was educated. His love of freedom steadily developed, and he applied its principles more and more courageously to the problems of government. But it makes some difference to the future of a democratic state whether its leading men are eagerly on the look-out for something to revolutionize, or approach a constitutional change by the gradual processes of conviction and conversion.

Great as were his eloquence, his knowledge and his financial skill, Gladstone was accustomed to say of himself that the only quality in which, so far as he knew, he was distinguished from his fellow-men was his faculty of concentration. Whatever were the matter in hand, he so concentrated himself on it, and absorbed himself in it, that nothing else seemed to exist for him.

A word must be said about physical characteristics. In his prime Gladstone was just six feet high, but his inches diminished as his years increased, and in old age the unusual size of his head and breadth of his shoulders gave him a slightly top-heavy appearance. His features were strongly marked; the nose trenchant and hawk-like, and the mouth severely lined. His flashing eyes were deep-set, and in colour resembled the onyx with its double band of brown and grey. His complexion was of an extreme pallor, and, combined with his jet-black hair, gave in earlier life something of an Italian aspect to his face. His dark eyebrows were singularly flexible, and they perpetually expanded and contracted in harmony with what he was saying. He held himself remarkably upright, and even from his school-days at Eton had been remarked for the rapid pace at which he habitually walked. His voice was a baritone, singularly clear and far-reaching. In the Waverley Market at Edinburgh, which is said to hold 20,000 people, he could be heard without difficulty; and as late as 1895 he said to the present writer: “What difference does it make to me whether I speak to 400 or 4000 people?” His physical vigour in old age earned him the popular nickname of the Grand Old Man.

Lord Morley of Blackburn’s *Life of Gladstone* was published in 1903.

(G. W. E. R.)

GLADSTONE, a seaport of Clinton county, Queensland, Australia, 328 m. by rail N.E. of Brisbane. Pop. (1901) 1566. It possesses a fine, well-sheltered harbour reputed one of the best in Queensland, at the mouth of the river Boyne. Gold, manganese, copper and coal are found in the neighbourhood. Gladstone, founded in 1847, became a municipality in 1863.

See J. F. Hogan, *The Gladstone Colony* (London, 1898).

GLAGOLITIC, an early Slavonic alphabet: also the liturgy written therein, and the people (Dalmatians and Roman Catholic Montenegrins) among whom it has survived by special licence of the Pope (see Slavs for table of letters).

GLAIR (from Fr. *glaire*, probably from Lat. *clarus*, clear, bright), the white of an egg, and hence a term used for a preparation made of this and used, in bookbinding and in gilding, to retain the gold and as a varnish. The adjective “glairy” is used of substances having the viscous and transparent consistency of the white of an egg.

GLAISHER, JAMES (1809-1903); English meteorologist and aeronaut, was born in London on the 7th of April 1809. After serving for a few years on the Ordnance Survey of Ireland, he acted as an

assistant at the Cambridge and Greenwich observatories successively, and when the department of meteorology and magnetism was formed at the latter, he was entrusted with its superintendence, which he continued to exercise for thirty-four years, until his retirement from the public service. In 1845 he published his well-known dew-point tables, which have gone through many editions. In 1850 he established the Meteorological Society, acting as its secretary for many years, and in 1866 he assisted in the foundation of the Aeronautical Society of Great Britain. He was appointed a member of the royal commission on the warming and ventilation of dwellings in 1875, and for twelve years from 1880 acted as chairman of the executive committee of the Palestine Exploration Fund. But his name is best known in connexion with the series of balloon ascents which he made between 1862 and 1866, mostly in company with Henry Tracey Coxwell. Many of these ascents were arranged by a committee of the British Association, of which he was a member, and were strictly scientific in character, the object being to carry out observations on the temperature, humidity, &c., of the atmosphere at high elevations. In one of them, that which took place at Wolverhampton on the 5th of September 1862, Glaisher and his companion attained the greatest height that had been reached by a balloon carrying passengers. As no automatically recording instruments were available, and Glaisher was unable to read the barometer at the highest point owing to loss of consciousness, the precise altitude can never be known, but it is estimated at about 7 m. from the earth. He died on the 7th of February 1903 at Croydon.

GLAMIS, a village and parish of Forfarshire, Scotland, 5¾ m. W. by S. of Forfar by the Caledonian railway. Pop. of parish (1901) 1351. The name is sometimes spelled Glammis and the *i* is mute: it is derived from the Gaelic, *glamhus*, “a wide gap,” “a vale.” The chief object in the village is the sculptured stone, traditionally supposed to be a memorial of Malcolm II., although Fordun’s statement that the king was slain in the castle is now rejected. About a mile from the station stands Glamis Castle, the seat of the earl of Strathmore and Kinghorne, a fine example of the Scottish Baronial style, enriched with certain features of the French château. In its present form it dates mostly from the 17th century, but the original structure was as old as the 11th century, for Macbeth was Thane of Glamis. Several of the early Scots kings, especially Alexander III., used it occasionally as a residence. Robert II. bestowed the thanedom on John Lyon, who had married the king’s second daughter by Elizabeth Mure and was thus the founder of the existing family. Patrick Lyon became hostage to England for James I. in 1424. When, in 1537, Janet Douglas, widow of the 6th Lord Glamis, was burned at Edinburgh as a witch, for conspiring to procure James V.’s death, Glamis was forfeited to the crown, but it was restored to her son six years later when her innocence had been established. The 3rd earl of Strathmore entertained the Old Chevalier and eighty of his immediate followers in 1715. After discharging the duties of hospitality the earl joined the Jacobites at Sheriffmuir and fell on the battlefield. Sir Walter Scott spent a night in the “hoary old pile” when he was about twenty years old, and gives a striking relation of his experiences in his *Demonology and Witchcraft*. The hall has an arched ceiling and several historical portraits, including those of Claverhouse, Charles II. and James II. of England. At Cossans, in the parish of Glamis, there is a remarkable sculptured monolith, and other examples occur at the Hunters’ Hill and in the old kirkyard of Eassie.

GLAMORGANSHIRE (Welsh *Morganwg*), a maritime county occupying the south-east corner of Wales, and bounded N.W. by Carmarthenshire, N. by Carmarthenshire and Breconshire, E. by Monmouthshire and S. and S.W. by the Bristol Channel and Carmarthen Bay. The contour of the county is largely determined by the fact that it lies between the mountains of Breconshire and the Bristol Channel. Its extreme breadth from the sea inland is 29 m., while its greatest length from east to west is 53 m. Its chief rivers, the Rhymney, Taff, Neath (or Nêdd) and Tawe or Tawy, have their sources in the Breconshire mountains, the two first trending towards the south-east, while the two last trend to the south-west, so that the main body of the county forms a sort of quarter-circle between the Taff and the Neath. Near the apex of the angle formed by these two rivers is the loftiest peak in the county, the great Pennant scarp of Craig y Llyn or Carn Moesyn, 1970 ft. high, which in the Glacial period diverted the ice-flow from the Beacons into the valley on either side of it. To the south and south-east of this peak extend the great coal-fields of mid-Glamorgan, their surface forming an irregular plateau with an average elevation of 600 to 1200 ft. above sea-level, but with numerous peaks about 1500 ft. high, or more; Mynydd y Caerau, the second highest being 1823 ft. Out of this plateau have been carved, to the depth of 500 to 800 ft. below its general level, three distinct series of narrow valleys, those in each series being more or less parallel. The rivers which give their names to these valleys include the Cynon, the Great and Lesser Rhondda (tributaries of the Taff) and the Ely flowing to the S.E., the Ogwr or Ogmore (with its tributaries the Garw and Llynfi) flowing south through Bridgend, and the Avan bringing the waters of the Corwg and Gwynfi to the south-west into Swansea Bay at Aberavon. To the south of this central hill country, which is wet, cold and sterile, and whose steep slopes form the southern edge of the coal-field, there stretches out to the sea a gently undulating

plain, compendiously known as the “Vale of Glamorgan,” but in fact consisting of a succession of small vales of such fertile land and with such a mild climate that it has been styled, not inaptly, the “Garden of Wales.” To the east of the central area referred to and divided from it by a spur of the Brecknock mountains culminating in Carn Bugail, 1570 ft. high, is the Rhymney, which forms the county’s eastern boundary. On the west other spurs of the Beacons divide the Neath from the Tawe (which enters the sea at Swansea), and the Tawe from the Loughor, which, with its tributary the Amman, separates the county on the N.W. from Carmarthenshire, in which it rises, and falling into Carmarthen Bay forms what is known as the Burry estuary, so called from a small stream of that name in the Gower peninsula. The rivers are all comparatively short, the Taff, in every respect the chief river, being only 33 m. long.

Down to the middle of the 19th century most of the Glamorgan valleys were famous for their beautiful scenery, but industrial operations have since destroyed most of this beauty, except in the so-called “Vale of Glamorgan,” the Vale of Neath, the “combes” and limestone gorges of Gower and the upper reaches of the Taff and the Tawe. The Vale of Neath is *par excellence* the waterfall district of South Wales, the finest falls being the Cilhepste fall, the Sychnant and the three Clungwyns on the Mellte and its tributaries near the Vale of Neath railway from Neath to Hirwaun, Scwd Einon Gam and Scwd Gladys on the Pyrddin on the west side of the valley close by, with Melin Court and Abergarwed still nearer Neath. There are also several cascades on the Dulais, and in the same district, though in Breconshire, is Scwd Henrhyd on the Llech near Colbren Junction. Almost the only part of the county which is now well timbered is the Vale of Neath. There are three small lakes, Llyn Fawr and Llyn Fach near Craig y Llyn and Kenfig Pool amid the sand-dunes of Margam. The rainfall of the county varies from an average of about 25 in. at Porthcawl and other parts of the Vale of Glamorgan to about 37 in. at Cardiff, 40 in. at Swansea and to upwards of 70 in. in the northern part of the county, the fall being still higher in the adjoining parts of Breconshire whence Cardiff, Swansea, Merthyr and a large area near Neath draw their main supplies of water.

The county has a coast-line of about 83 m. Its two chief bays are the Burry estuary and Swansea, one on either side of the Gower Peninsula, which has also a number of smaller inlets with magnificent cliff scenery. The rest of the coast is fairly regular, the chief openings being at the mouths of the Ogmore and the Taff respectively. The most conspicuous headlands are Whiteford Point, Worms Head and Mumbles Head in Gower, Nash Point and Lavernock Point on the eastern half of the coast.

Geology.—The Silurian rocks, the oldest in the county, form a small inlier about 2 sq. m. in area at Rumney and Pen-y-lan, north of Cardiff, and consist of mudstones and sandstones of Wenlock and Ludlow age; a feeble representative of the Wenlock Limestone also is present. They are conformably succeeded by the Old Red Sandstone which extends westwards as far as Cowbridge as a deeply eroded anticline largely concealed by Trias and Lias. The Old Red Sandstone consists in the lower parts of red marls and sandstones, while the upper beds are quartzitic and pebbly, and form bold scarps which dominate the low ground formed by the softer beds below. Cefn-y-bryn, another anticline of Old Red Sandstone (including small exposures of Silurian rocks), forms the prominent backbone of the Gower peninsula. The next formation is the Carboniferous Limestone which encircles and underlies the great South Wales coal-field, on the south of which, west of Cardiff, it forms a bold escarpment of steeply-dipping beds surrounding the Old Red Sandstone anticline. It shows up through the Trias and Lias in extensive inliers near Bridgend, while in Gower it dips away from the Old Red Sandstone of Cefn-y-bryn. On the north of the coal-field it is just reached near Merthyr Tydfil. The Millstone Grit, which consists of grits, sandstones and shales, crops out above the limestone and serves to introduce the Coal Measures, which lie in the form of a great trough extending east and west across the county and occupying most of its surface. The coal seams are most numerous in the lower part of the series; the Pennant Sandstone succeeds and occupies the inner parts of the basin, forming an elevated moorland region deeply trenched by the teeming valleys (*e.g.* the Rhondda) which cross the coal-field from north to south. Above the Pennant Sandstone still higher coals come in. Taken generally, the coals are bituminous in the south-east and anthracitic in the north-west.

After the Coal Measures had been deposited, the southern part of the region was subjected to powerful folding; the resulting anticlines were worn down during a long period of detrition, and then submerged slowly beneath a Triassic lake in which accumulated the Keuper conglomerates and marls which spread over the district west of Cardiff and are traceable on the coast of Gower. The succeeding Rhaetic and Lias which form most of the coastal plain (the fertile Vale of Glamorgan) from Penarth to near Bridgend were laid down by the Jurassic sea. A well-marked raised beach is traceable in Gower. Sand-dunes are present locally around Swansea Bay. Moraines, chiefly formed of gravel and clay, occupy many of the Glamorgan valleys; and these, together with the striated surfaces which may be observed at higher levels, are clearly glacial in origin. In the Coal Measures and the newer Limestones and Triassic, Rhaetic and Liassic conglomerates, marls and shales, many interesting fossils have been disinterred: these include the remains of an air-breathing reptile (*Anthracespeton*). Bones of the cave-bear, lion, mammoth, reindeer, rhinoceros, along with flint weapons and tools, have been discovered in some caves of the Gower peninsula.

Agriculture.—The low-lying land on the south from Caerphilly to Margam is very fertile, the soil being a deep rich loam; and here the standard of agriculture is fairly high, and there prevails a well-defined tenant-right custom, supposed to be of ancient origin but probably dating only from the beginning of the 19th century. Everywhere on the Coal Measures the soil is poor, while vegetation is also injured by the smoke from the works, especially copper smoke. Leland (*c.* 1535) describes the lowlands as growing good corn and grass but little wood, while the mountains had “redde dere, kiddes plenty, oxen and sheep.” The land even in the “Vale” seems to have been open and unenclosed till the end of the 15th or beginning of the 16th century, while enclosure spread to the uplands still later. About one-fifth

of the total area is still common land, more than half of which is unsuitable for cultivation. The total area under cultivation in 1905 was 269,271 acres or about one-half of the total area of the county. The chief crops raised (giving them in the order of their respective acreages) are oats, barley, turnips and swedes, wheat, potatoes and mangolds. A steady decrease of the acreage under grain-crops, green-crops and clover has been accompanied by an increase in the area of pasture. Dairying has been largely abandoned for stock-raising, and very little “Caerphilly cheese” is now made in that district. In 1905 Glamorgan had the largest number of horses in agriculture of any Welsh county except those of Carmarthen and Cardigan. Good sheep and ponies are reared in the hill-country. Pig-keeping is much neglected, and despite the mild climate very little fruit is grown. The average size of holdings in 1905 was 47.3 acres, there being only 46 holdings above 300 acres, and 1719 between 50 and 500 acres.

Mining and Manufactures.—Down to the middle of the 18th century the county had no industry of any importance except agriculture. The coal which underlies practically the whole surface of the county except the Vale of Glamorgan and West Gower was little worked till about 1755, when it began to be used instead of charcoal for the smelting of iron. By 1811, when there were 25 blast furnaces in the county, the demand for coal for this purpose had much increased, but it was in the most active period of railway construction that it reached its maximum. Down to about 1850, if not later, the chief collieries were owned by the ironmasters and were worked for their own requirements, but when the suitability of the lower seams in the district north of Cardiff for steam purposes was realized, an export trade sprang up and soon assumed enormous proportions, so that “the port of Cardiff” (including Barry and Penarth), from which the bulk of the steam coal was shipped, became the first port in the world for the shipment of coal. The development of the anthracite coal-field lying to the north and west of Swansea (from which port it is mostly shipped) dates mainly from the closing years of the 19th century, when the demand for this coal grew rapidly. There are still large areas in the Rhymney Valley on the east, and in the districts of Neath and Swansea on the west, whose development has only recently been undertaken. In connexion with the coal industry, patent fuel (made from small coal and tar) is largely manufactured at Cardiff, Port Talbot and Swansea, the shipments from Swansea being the largest in the kingdom. Next in importance to coal are the iron, steel and tin-plate industries, and in the Swansea district the smelting of copper and a variety of other ores.

The manufacture of iron and steel is carried on at Dowlais, Merthyr Tydfil, Cardiff, Port Talbot, Briton Ferry, Pontardawe, Swansea, Gorseinon and Gowerton. During the last quarter of the 19th century the use of the native ironstone was almost wholly given up, and the necessary ore is now imported, mainly from Spain. As a result several of the older inland works, such as those of Aberdare, Ystalyfera and Brynaman have been abandoned, and new works have been established on or near the sea-board; *e.g.* the Dowlais company in 1891 opened large works at Cardiff. The tin-plate industry is mainly confined to the west of the county, Swansea being the chief port for the shipment of tin-plates, though there are works near Llantrisant and at Melin Griffith near Cardiff, the latter being the oldest in the county. Copper-smelting is carried on on a large scale in the west of the county, at Port Talbot, Cwmavon, Neath and Swansea, and on a small scale at Cardiff, the earliest works having been established at Neath in 1584 and at Swansea in 1717. There are nickel works at Clydach near Swansea, the nickel being imported in the form of “matte” from Canada. Swansea has almost a monopoly of the manufacture of spelter or zinc. Lead, silver and a number of other metals or their by-products are treated in or near Swansea, which is often styled the “metallurgical capital of Wales.” Limestone and silica quarries are worked, while sandstone and clay are also raised. Swansea and Nantgarw were formerly famous for their china, coarse ware is still made chiefly at Ewenny and terra-cotta at Pencoed. Large numbers of people are employed in engineering works and in the manufacture of machines, chains, conveyances, tools, paper and chemicals. The textile factories are few and unimportant.

Fisheries.—Fisheries exist all along the coast; by lines, draught-nets, dredging, trawling, fixed nets and by hand. There is a fleet of trawlers at Swansea. The principal fish caught are cod, herring, pollock, whiting, flukes, brill, plaice, soles, turbot, oysters, mussels, limpets, cockles, shrimps, crabs and lobsters. There are good fish-markets at Swansea and Cardiff.

Communications.—The county has ample dock accommodation. The various docks of Cardiff amount to 210 acres, including timber ponds; Penarth has a dock and basin of 26 acres and a tidal harbour of 55 acres. Barry docks cover 114 acres; Swansea has 147 acres, including its new King’s Dock; and Port Talbot 90 acres. There are also docks at Briton Ferry and Porthcawl, but they are not capable of admitting deep-draft vessels.

Besides its ports, Glamorgan has abundant means of transit in many railways, of which the Great Western is the chief. Its trunk line traversing the country between the mountains and the sea passes through Cardiff, Bridgend and Landore (on the outskirts of Swansea), and throws off numerous branches to the north. The Taff Vale railway serves all the valley of the Taff and its tributaries, and has also extensions to Barry and (through Llantrisant and Cowbridge) to Aberthaw. The Rhymney railway likewise serves the Rhymney Valley, and has a joint service with the Great Western between Cardiff and Merthyr Tydfil—the latter town being also the terminus of the Brecon and Merthyr and a branch of the North-Western from Abergavenny. The Barry railway visits Cardiff and then travels in a north-westerly direction to Pontypridd and Porth, while it sends another branch along the coast through Llantwit Major to Bridgend. Swansea is connected with Merthyr by the Great Western, with Brecon by the Midland, with Craven Arms and Mid-Wales generally by the London & North-Western, with the Rhondda Valley by the Rhondda and Swansea Bay (now worked by the Great Western) and with Mumbles by the Mumbles railway. The Port Talbot railway runs to Blaengarw, and the Neath and Brecon railway (starting from Neath) joins the Midland at Colbren Junction. The canals of the county are the Glamorgan canal from Cardiff to Merthyr Tydfil (25½ m.), with a branch (7 m.) to Aberdare, the Neath canal (13 m.) from Briton Ferry to Abernant, Glyn Neath (whence a tramway formerly connected

it with Aberdare), the Tennant canal connecting the rivers Neath and Tawe, and the Swansea canal (16½ m.), running up the Swansea Valley from Swansea to Abercrave in Breconshire. Comparatively little use is now made of these canals, excepting the lower portions of the Glamorgan canal.

Population and Administration.—The area of the ancient county with which the administrative county is conterminous is 518,863 acres, with a population in 1901 of 859,931 persons. In the three decades between 1831 and 1861 it increased 35.2, 35.4 and 37.1% respectively, and in 1881-1891, 34.4, its average increase in the other decennial periods subsequent to 1861 being about 25%. The county is divided into five parliamentary divisions (viz. Glamorganshire East, South and Middle, Gower and Rhondda); it also includes the Cardiff district of boroughs (consisting of Cardiff, Cowbridge and Llantrisant), which has one member; the greater part of the parliamentary borough of Merthyr Tydfil (which mainly consists of the county borough of Merthyr, the urban district of Aberdare and part of Mountain Ash), and returns two members; and the two divisions of Swansea District returning one member each, one division consisting of the major part of Swansea town, the other comprising the remainder of Swansea and the boroughs of Aberavon, Kenfig, Llwchwr and Neath. There are six municipal boroughs: Aberavon (pop. in 1901, 7553), Cardiff (164,333), Cowbridge (1202), Merthyr Tydfil (69,228), Neath (13,720) and Swansea (94,537). Cardiff (which in 1905 was created a city), Merthyr Tydfil and Swansea are county boroughs. The following are urban districts: Aberdare (43,365), Barry (27,030), Bridgend (6062), Briton Ferry (6973), Caerphilly (15,835), Glyncorrwg (6452), Maesteg (15,012), Margam (9014), Mountain Ash (31,093); Ogmore and Garw (19,907), Oystermouth (4461), Penarth (14,228), Pontypridd (32,316); Porthcawl (1872) and Rhondda, previously known as Ystradyfodwg (113,735). Glamorgan is in the S. Wales circuit, and both assizes and quarter-sessions are held at Cardiff and Swansea alternately. All the municipal boroughs have separate commissions of the peace, and Cardiff and Swansea have also separate courts of quarter-sessions. The county has thirteen other petty sessional divisions, Cardiff, the Rhondda (with Pontypridd) and the Merthyr and Aberdare district have stipendiary magistrates. There are 165 civil parishes. Excepting the districts of Gower and Kilvey, which are in the diocese of St David’s, the whole county is in the diocese of Llandaff. There are 159 ecclesiastical parishes or districts situated wholly or partly within the county.

History.—The earliest known traces of man within the area of the present county are the human remains found in the famous bone-caves of Gower, though they are scanty as compared with the huge deposits of still earlier animal remains. To a later stage, perhaps in the Neolithic period, belongs a number of complete skeletons discovered in 1903 in sand-blown tumuli at the mouth of the Ogmore, where many flint implements were also found. Considerably later, and probably belonging to the Bronze Age (though finds of bronze implements have been scanty), are the many cairns and tumuli, mainly on the hills, such as on Garth Mountain near Cardiff, Crug-yr-avan and a number east of the Tawe; the stone circles often found in association with the tumuli, that of Carn Llecharth near Pontardawe being one of the most complete in Wales; and the fine cromlechs of Cefn Bryn in Gower (known as Arthur’s Stone), of St Nicholas and of St Lythan’s near Cardiff.

In Roman times the country from the Neath to the Wye was occupied by the Silures, a pre-Celtic race, probably governed at that time by Brythonic Celts. West of the Neath and along the fringe of the Brecknock Mountains were probably remnants of the earlier Goidelic Celts, who have left traces in the place-names of the Swansea valley (*e.g. llwch*, “a lake”) and in the illegible Ogham inscription at Loughor, the only other Ogham stone in the county being at Kenfig, a few miles to the east of the Neath estuary. The conquest of the Silures by the Romans was begun about A.D. 50 by Ostorius Scapula and completed some 25 years later by Julius Frontinus, who probably constructed the great military road, called Via Julia Maritima, from Gloucester to St David’s, with stations at Cardiff, Bovium (variously identified with Boverton, Cowbridge and Ewenny), Nidum (identified with Neath) and Leucarum or Loughor. The important station of Gaer on the Usk near Brecon was connected by two branch roads, one running from Cardiff through Gelligaer (where there was a strong hill fort) and Merthyr Tydfil, and another from Neath through Capel Colbren. Welsh tradition credits Glamorgan with being the first home of Christianity, and Llandaff the earliest bishopric in Britain, the name of three reputed missionaries of the 2nd century being preserved in the names of parishes in south Glamorgan. What is certain, however, is that the first two bishops of Llandaff, St Dubricius and St Teilo, lived during the first half of the 6th century, to which period also belongs the establishment of the great monastic settlements of Llancarvan by Cadoc, of Llandough by Oudoceus and of Llantwit Major by Illtutus, the last of which flourished as a seat of learning down to the 12th century. A few moated mounds such as at Cardiff indicate that, after the withdrawal of the Romans, the coasts were visited by sporadic bands of Saxons, but the Scandinavians who came in the 9th and succeeding centuries left more abundant traces both in the place-names of the coast and in such camps as that on Sully Island, the Bulwarks at Porthkerry and Hardings Down in Gower. Meanwhile the native tribes of the district had regained their independence under a line of Welsh chieftains, whose domain was consolidated into a principality known as Glywyssing, till about the end of the 10th century when it acquired the name of Morganwg, that is the territory of Morgan, a prince who died in A.D. 980; it then comprised the whole country from the Neath to the Wye, practically corresponding to the present diocese of Llandaff. Gwlad Morgan, later softened into Glamorgan, never had much vogue and meant precisely the same as Morganwg, though the two terms became differentiated a few centuries later.

The Norman conquest of Morganwg was effected in the closing years of the 11th century by Robert Fitzhamon, lord of Gloucester. His followers settled in the low-lying lands of the “Vale,” which became known as the “body” of the shire, while in the hill country, which consisted of ten “members,” corresponding to its ancient territorial divisions, the Welsh retained their customary laws and much of their independence. Glamorgan, whose bounds were now contracted between the Neath and the Rhymney, then became a lordship marcher, its status and organization being that of a county palatine;

its lord possessed *jura regalia*, and his chief official was from the first a *vice-comes*, or sheriff, who presided over a county court composed of his lord's principal tenants. The inhabitants of Cardiff in which, as the *caput baroniae*, this court was held (though sometimes ambulatory), were soon granted municipal privileges, and in time Cowbridge, Kenfig, Llantrisant, Aberavon and Neath also became chartered market-towns. The manorial system was introduced throughout the "Vale," the manor in many cases becoming the parish, and the owner building for its protection first a castle and then a church. The church itself became Normanized, and monasteries were established—the Cistercian abbey of Neath and Margam in 1129 and 1147 respectively, the Benedictine priory of Ewenny in 1141 and that of Cardiff in 1147. Dominican and Franciscan houses were also founded at Cardiff in the following century.

Gower (with Kilvey) or the country west of the morass between Neath and Swansea had a separate history. It was conquered about 1100 by Henry de Newburgh, 1st earl of Warwick, by whose descendants and the powerful family of De Breos it was successively held as a marcher lordship, organized to some extent on county lines, till 1469. Swansea (which was the *caput baroniae* of Gower) and Loughor received their earlier charters from the lords of Gower (see GOWER).

For the first two centuries after Fitzhamon's time the lordship of Glamorgan was held by the earls of Gloucester, a title conferred by Henry I. on his natural son Robert, who acquired Glamorgan by marrying Fitzhamon's daughter. To the 1st earl's patronage of Geoffrey of Monmouth and other men of letters, at Cardiff Castle of which he was the builder, is probably due the large place which Celtic romance, especially the Arthurian cycle, won for itself in medieval literature. The lordship passed by descent through the families of Clare (who held it from 1217 to 1317), Despenser, Beauchamp and Neville to Richard III., on whose fall it escheated to the crown. From time to time, the Welsh of the hills, often joined by their countrymen from other parts, raided the Vale, and even Cardiff Castle was seized about 1153 by Ivor Bach, lord of Senghenydd, who for a time held its lord a prisoner. At last Caerphilly Castle was built to keep them in check, but this provoked an invasion in 1270 by Prince Llewelyn ap Griffith, who besieged the castle and refused to retire except on conditions. In 1316 Llewelyn Bren headed a revolt in the same district, but being defeated was put to death by Despenser, whose great unpopularity with the Welsh made Glamorgan less safe as a retreat for Edward II. a few years later. In 1404 Glendower swept through the county, burning castles and laying waste the possessions of the king's supporters. By the Act of Union of 1535 the county of Glamorgan was incorporated as it now exists, by the addition to the old county of the lordship of Gower and Kilvey, west of the Neath. By another act of 1542 the court of great sessions was established, and Glamorgan, with the counties of Brecon and Radnor, formed one of its four Welsh circuits from thence till 1830, when the English assize system was introduced into Wales. In the same year the county was given one parliamentary representative, increased to two in 1832 and to five in 1885. The boroughs were also given a member. In 1832 Cardiff (with Llantrisant and Cowbridge), the Swansea group of boroughs and the parliamentary borough of Merthyr Tydfil were given one member each, increased to two, in the case of Merthyr Tydfil in 1867. In 1885 the Swansea group was divided into two constituencies with a member each.

The lordship of Glamorgan, shorn of its quasi-regal status, was granted by Edward VI. to William Herbert, afterwards 1st earl of Pembroke, from whom it has descended to the present marquess of Bute.

The rule of the Tudors promoted the rapid assimilation of the inhabitants of the county, and by the reign of Elizabeth even the descendants of the Norman knights had largely become Welsh both in speech and sentiment. Welsh continued to be the prevalent speech almost throughout the county, except in the peninsular part of Gower and perhaps Cardiff, till the last quarter of the 19th century. Since then it has lost ground in the maritime towns and the south-east corner of the county generally, while fairly holding its own, despite much English migration, in the industrial districts to the north. In 1901 about 56% of the total population above three years of age was returned as speaking English only, 37% as speaking both English and Welsh, and about 6½% as speaking Welsh only.

In common with the rest of Wales the county was mainly Royalist in the Civil War, and indeed stood foremost in its readiness to pay ship-money, but when Charles I. visited Cardiff in July 1645 he failed to recruit his army there, owing to the dissatisfaction of the county, which a few months later declared for the parliament. There was, however, a subsequent Royalist revolt in Glamorgan in 1648, but it was signally crushed by Colonel Horton at the battle of St Fagan's (8th of May).

The educational gap caused by final disappearance of the great university of Llantwit Major, founded in the 6th century, and by the dissolution of the monasteries was to some extent filled by the foundation, by the Stradling family, of a grammar school at Cowbridge which, refounded in 1685 by Sir Leoline Jenkins, is still carried on as an endowed school. The only other ancient grammar school is that of Swansea, founded by Bishop Gore in 1682, and now under the control of the borough council. Besides the University College of South Wales and Monmouthshire established at Cardiff in 1883, and a technical college at Swansea, there is a Church of England theological college (St Michael's) at Llandaff (previously at Aberdare), a training college for school-mistresses at Swansea, schools for the blind at Cardiff and Swansea and for the deaf at Cardiff, Swansea and Pontypridd.

Antiquities.—The antiquities of the county not already mentioned include an unusually large number of castles, all of which, except the castles of Morlais (near Merthyr Tydfil), Castell Coch and Llantrisant, are between the hill country and the sea. The finest specimen is that of Caerphilly, but there are also more or less imposing ruins at Oystermouth, Coity, Newcastle (at Bridgend),

Llanblethian, Pennard and Swansea. Among the restored castles, resided in by their present owners, are St Donat's, "the latest and most complete of the structures built for defence," Cardiff, the residence of the marquess of Bute, St Fagan's, Dunraven, Fonmon and Penrice. Of the monastic buildings, that of Ewenny is best preserved, Neath and Margam are mere ruins, while all the others have disappeared. Almost all the older churches possess towers of a somewhat military character, and most of them, except in Gower, retain some Norman masonry. Coity, Coychurch and Ewenny (all near Bridgend) are fine examples of cross churches with embattled towers characteristic of the county. There are interesting monumental effigies at St Mary's, Swansea, Oxwich, Ewenny, Llantwit Major, Llantrisant, Coity and other churches in the Vale. There are from twenty-five to thirty sculptured stones, of which some sixteen are both ornamented and inscribed, five of the latter being at Margam and three at Llantwit Major, and dating from the 9th century if not earlier.

AUTHORITIES.—The records of the *Curia comitatus* or County Court of Glamorgan are supposed to have perished, so also have the records of Neath. With these exceptions, the records of the county have been well preserved. A collection edited by G. T. Clark under the title *Cartae et alia munimenta quae ad dominium de Glamorgan pertinent* was privately printed by him in four volumes (1885-1893). *A Descriptive Catalogue of the Penrice and Margam Abbey MSS. in the Possession of Miss Talbot of Margam* (6 vols.) was privately issued (1893-1905) under the editorship of Dr de Gray Birch, who has also published histories of the Abbeys of Neath and Margam. The *Book of Llan Dâf* (edited by Dr Gwenogvryn Evans, 1903) contains documents illustrative of the early history of the diocese of Llandaff. Cardiff has published its *Records* in 5 vols., and there is a volume of Swansea charters. There is no complete history of the county, except a modest but useful one in Welsh—*Hanes Morganwg*, by D. W. Jones (Dafydd Morganwg) (1874); the chief contributions are Rice Merrick's *Booke of Glamorganshire's Antiquities*, written in 1578; *The Land of Morgan* (1883) (a history of the lordship of Glamorgan), by G. T. Clark, whose *Genealogies of Glamorgan* (1886) and *Medieval Military Architecture* (1884) are also indispensable; see also T. Nicholas, *Annals and Antiquities of the Counties and County Families of Wales* (2 vols., 1872). For Gower, see GOWER.

(D. LL. T.)

GLANDERS, or FARCY (*Equinia*), a specific infective and contagious disease, caused by a tissue parasite (*Bacillus mallei*), to which certain animals, chiefly the horse, ass and mule, are liable, and which is communicable from them to man. Glanders in the domesticated animals is dealt with under VETERINARY SCIENCE; it is happily a rare form of disease in man, there being evidently less affinity for its development in the human subject than in the equine species. For the pathology see the article PARASITIC DISEASES. It occurs chiefly among those who from their occupation are frequently in contact with horses, such as grooms, coachmen, cavalry soldiers, veterinary surgeons, &c.; the bacillus is communicated from a glandered animal either through a wound or scratch or through application to the mucous membrane of the nose or mouth. A period of incubation, lasting from three to five days, generally follows the introduction of the virus into the human system. This period, however, appears sometimes to be of much longer duration, especially where there has been no direct inoculation of the poison. The first symptoms are a general feeling of illness, accompanied with pains in the limbs and joints resembling those of acute rheumatism. If the disease has been introduced by means of an abraded surface, pain is felt at that point, and inflammatory swelling takes place there, and extends along the neighbouring lymphatics. An ulcer is formed at the point of inoculation which discharges an offensive ichor, and blebs appear in the inflamed skin, along with diffuse abscesses, as in phlegmonous erysipelas. Sometimes the disease stops short with these local manifestations, but more commonly goes on rapidly accompanied with symptoms of grave constitutional disturbance. Over the whole surface of the body there appear numerous red spots or pustules, which break and discharge a thick mucous or sanguineous fluid. Besides these there are larger swellings lying deeper in the subcutaneous tissue, which at first are extremely hard and painful, and to which the term farcy "buds" or "buttons" is applied. These ultimately open and become extensive sloughing ulcers.

The mucous membranes participate in the same lesions as are present in the skin, and this is particularly the case with the interior of the nose, where indeed, in many instances, the disease first of all shows itself. This organ becomes greatly swollen and inflamed, while from one or both nostrils there exudes a copious discharge of highly offensive purulent or sanguineous matter. The lining membrane of the nostrils is covered with papules similar in character to those on the skin, which form ulcers, and may lead to the destruction of the cartilaginous and bony textures of the nose. The diseased action extends into the throat, mouth and eyes, while the whole face becomes swollen and erysipelatous, and the lymphatic glands under the jaws inflame and suppurate. Not unfrequently the bronchial tubes become affected, and cough attended with expectoration of matter similar to that discharged from the nose is the consequence. The general constitutional symptoms are exceedingly severe, and advance with great rapidity, the patient passing into a state of extreme prostration. In the acute form of the disease recovery rarely if ever occurs, and the case generally terminates fatally in a period varying from two or three days to as many weeks.

A chronic form of glanders and farcy is occasionally met with, in which the symptoms, although essentially the same as those above described, advance much more slowly, and are attended with relatively less urgent constitutional disturbance. Cases of recovery from this form are on record; but in

general the disease ultimately proves fatal by exhaustion of the patient, or by a sudden supervention, which is apt to occur, of the acute form. On the other hand, acute glanders is never observed to become chronic.

In the treatment of this malady in human beings reliance is mainly placed on the maintenance of the patient's strength by strong nourishment and tonic remedies. Cauterization should be resorted to if the point of infection is early known. Abscesses may be opened and antiseptic lotions used. In all cases of the outbreak of glanders it is of the utmost consequence to prevent the spread of the disease by the destruction of affected animals and the cleansing and disinfection of infected localities.

GLANVILL (or GLANVIL), **JOSEPH** (1636-1680); English philosopher, was born at Plymouth in 1636, and was educated at Exeter and Lincoln colleges, Oxford, where he graduated as M.A. in 1658. After the Restoration he was successively rector of Wimbush, Essex, vicar of Frome Selwood, Somersetshire, rector of Streat and Walton. In 1666 he was appointed to the abbey church, Bath; in 1678 he became prebendary of Worcester Cathedral, and acted as chaplain in ordinary to Charles II. from 1672. He died at Bath in November 1680. Glanvill's first work (a passage in which suggested the theme of Matthew Arnold's *Scholar Gipsy*), *The Vanity of Dogmatizing, or Confidence in Opinions, manifested in a Discourse of the shortness and uncertainty of our Knowledge, and its Causes, with Reflexions on Peripateticism, and an Apology for Philosophy* (1661), is interesting as showing one special direction in which the new method of the Cartesian philosophy might be developed. Pascal had already shown how philosophical scepticism might be employed as a bulwark for faith, and Glanvill follows in the same track. The philosophic endeavour to cognize the whole system of things by referring all events to their causes appears to him to be from the outset doomed to failure. For if we inquire into this causal relation we find that though we know isolated facts, we cannot perceive any such connexion between them as that the one should give rise to the other. In the words of Hume, "they seem conjoined but never connected." All causes then are but secondary, *i.e.* merely the occasions on which the one first cause operates. It is singular enough that Glanvill who had not only shown, but even exaggerated, the infirmity of human reason, himself provided an example of its weakness; for, after having combated scientific dogmatism, he not only yielded to vulgar superstitions, but actually endeavoured to accredit them both in his revised edition of the *Vanity of Dogmatizing*, published as *Scepsis scientifica* (1665, ed. Rev. John Owen, 1885), and in his *Philosophical Considerations concerning the existence of Sorcerers and Sorcery* (1666). The latter work appears to have been based on the story of the drum which was alleged to have been heard every night in a house in Wiltshire (Tedworth, belonging to a Mr Mompesson), a story which made much noise in the year 1663, and which is supposed to have furnished Addison with the idea of his comedy the *Drummer*. At his death Glanvill left a piece entitled *Sadducismus Triumphatus* (printed in 1681, reprinted with some additions in 1682, German trans. 1701). He had there collected twenty-six relations or stories of the same description as that of the drum, in order to establish, by a series of facts, the opinion which he had expressed in his *Philosophical Considerations*. Glanvill supported a much more honourable cause when he undertook the defence of the Royal Society of London, under the title of *Plus Ultra, or the Progress and Advancement of Science since the time of Aristotle* (1668), a work which shows how thoroughly he was imbued with the ideas of the empirical method.

Besides the works already noticed, Glanvill wrote *Lux orientalis* (1662); *Philosophia pia* (1671); *Essays on Several Important Subjects in Philosophy and Religion* (1676); *An Essay concerning Preaching; and Sermons*. See C. Rémusat, *Hist. de la phil. en Angleterre*, bk. iii. ch. xi.; W. E. H. Lecky, *Rationalism in Europe* (1865), i. 120-128; Hallam's *Literature of Europe*, iii. 358-362; Tulloch's *Rational Theology*, ii. 443-455.

GLANVILL, RANULF DE (sometimes written GLANVIL, GLANVILLE) (d. 1190), chief justiciar of England and reputed author of a book on English law, was born at Stratford in Suffolk, but in what year is unknown. There is but little information regarding his early life. He first comes to the front as sheriff of Yorkshire from 1163 to 1170. In 1173 he became sheriff of Lancashire and custodian of the honour of Richmond. In 1174 he was one of the English leaders at the battle of Alnwick, and it was to him that the king of the Scots, William the Lion, surrendered. In 1175 he was reappointed sheriff of Yorkshire, in 1176 he became justice of the king's court and a justice itinerant in the northern circuit, and in 1180 chief justiciar of England. It was with his assistance that Henry II. completed his judicial reforms, though the principal of them had been carried out before he came into office. He became the king's right-hand man, and during Henry's frequent absences was in effect viceroy of England. After the death of Henry in 1189, Glanvill was removed from his office by Richard I., and imprisoned till he had paid a ransom, according to one authority, of £15,000. Shortly after obtaining his freedom he took the cross, and he died at the siege of Acre in 1190. At the instance, it may be, of Henry II., Glanvill wrote or superintended the writing of the *Tractatus de legibus et consuetudinibus regni Angliae*, which is a

practical treatise on the forms of procedure in the king's court. As the source of our knowledge regarding the earliest form of the *curia regis*, and for the information it affords regarding ancient customs and laws, it is of great value to the student of English history. It is now generally agreed that the work of Glanvill is of earlier date than the Scottish law book known from its first words as *Regiam Majestatem*, a work which bears a close resemblance to his.

The treatise of Glanvill was first printed in 1554. An English translation, with notes and introduction by John Beames, was published at London in 1812. A French version is found in various MSS., but has not yet been printed. (See also ENGLISH LAW: *History of*.)

GLAPTHORNE, HENRY (fl. 1635-1642), English poet and dramatist, wrote in the reign of Charles I. All that is known of him is gathered from his own work. He published *Poëms* (1639), many of them in praise of an unidentified "Lucinda"; a poem in honour of his friend Thomas Beedome, whose *Poems Divine and Humane* he edited in 1641; and *Whitehall* (1642), dedicated to his "noble friend and gossip, Captain Richard Lovelace." The first volume contains a poem in honour of the duke of York, and *Whitehall* is a review of the past glories of the English court, containing abundant evidences of the writer's devotion to the royal cause. *Argalus and Parthenia* (1639) is a pastoral tragedy founded on an episode in Sidney's *Arcadia*; *Albertus Wallenstein* (1639), his only attempt at historical tragedy, represents Wallenstein as a monster of pride and cruelty. His other plays are *The Hollander* (written 1635; printed 1640), a romantic comedy of which the scene is laid in Genoa; *Wit in a Constable* (1640), which is probably a version of an earlier play, and owes something to Shakespeare's *Much Ado about Nothing*; and *The Ladies Priviledge* (1640). *The Lady Mother* (1635) has been identified (Fleay, *Biog. Chron. of the Drama*) with *The Noble Trial*, one of the plays destroyed by Warburton's cook, and Mr A. H. Bullen prints it in vol. ii. of his *Old English Plays* as most probably Glapthorne's work. *The Paraside, or Revenge for Honour* (1654), entered at Stationers' Hall in 1653 as Glapthorne's, was printed in the next year with George Chapman's name on the title-page. It should probably be included among Glapthorne's plays, which, though they hardly rise above the level of contemporary productions, contain many felicitous isolated passages.

The *Plays and Poems of Henry Glapthorne* (1874) contains an unsigned memoir, which, however, gives no information about the dramatist's life. There is no reason for supposing that the George Glapthorne of whose trial details are given was a relative of the poet.

GLARUS (Fr. *Glaris*), one of the Swiss cantons, the name being taken from that of its chief town. Its area is 266.8 sq. m., of which 173.1 sq. m. are classed as "productive" (forests covering 41 sq. m.), but it also contains 13.9 sq. m. of glaciers, ranking as the fifth Swiss canton in this respect. It is thus a mountain canton, the loftiest point in it being the Tödi (11,887 ft.), the highest summit that rises to the north of the upper Aar and Vorder Rhine valleys. It is composed of the upper valley of the Linth, that is the portion which lies to the south of a line drawn from the Lake of Zürich to the Walensee. This river rises in the glaciers of the Tödi, and has carved out for itself a deep bed, so that the floor of the valley is comparatively level, and therefore is occupied by a number of considerable villages. Glacier passes only lead from its head to the Grisons, save the rough footpath over the Kisten Pass, while a fine new carriage road over the Klausen Pass gives access to the canton of Uri. The upper Linth valley is sometimes called the Grossthal (main valley) to distinguish it from its chief (or south-eastern) tributary, the Sernf valley or Kleinthal, which joins it at Schwanden, a little above Glarus itself. At the head of the Kleinthal a mule track leads to the Grisons over the Panixer Pass, as also a footpath over the Segnes Pass. Just below Glarus town, another glen (coming from the south-west) joins the main valley, and is watered by the Klön, while from its head the Pragel Pass (a mule path, converted into a carriage road) leads over to the canton of Schwyz. The Klön glen (uninhabited save in summer) is separated from the main glen by the fine bold mass of the Glärnisch (9580 ft.), while the Sernf valley is similarly cut off from the Grossthal by the high ridge running northwards from the Hausstock (10,342 ft.) over the Kärpfstock (9177 ft.). The principal lakes, the Klönthalersee and the Muttensee, are of a thoroughly Alpine character, while there are several fine waterfalls near the head of the main valley, such as those formed by the Sandbach, the Schreienbach and the Fätschbach. The Pantenbrücke, thrown over the narrow cleft formed by the Linth, is one of the grandest sights of the Alps below the snow-line. There is a sulphur spring at Stachelberg, near Linthal village, and an iron spring at Elm, while in the Sernf valley there are the Plattenberg slate quarries, and just south of Elm those of the Tschingelberg, whence a terrific landslip descended to Elm (11th September 1881), destroying many houses and killing 115 persons. A railway runs through the whole canton from north to south past Glarus to Linthal village (16¼ m.), while from Schwanden there is an electric line (opened in 1905) up to Elm (8¾ m.).

In 1900 the population of the canton was 32,349 (a decrease on the 33,825 of 1888, this being the only Swiss canton which shows a decrease), of whom 31,797 were German-speaking, while there were

24,403 Protestants, 7918 Romanists (many in Näfels) and 3 Jews. After the capital, Glarus (*q.v.*), the largest villages are Näfels (2557 inhabitants), Ennenda (2494 inhabitants, opposite Glarus, of which it is practically a suburb), Netstal (2003 inhabitants), Mollis (1912 inhabitants) and Linththal (1894 inhabitants). The slate industry is now the most important as the cotton manufacture has lately very greatly fallen off, this being the real reason of the diminution in the number of the population. There is little agriculture, for it is a pastoral region (owing to its height) and contains 87 mountain pastures (though the finest of all within the limits of the canton, the Urnerboden, or the Glarus side of the Klausen Pass, belongs to Uri), which can support 8054 cows, and are of an estimated capital value of about £246,000. One of the most characteristic products (though inferior qualities are manufactured elsewhere in Switzerland) is the cheese called *Schabzieger*, *Kräuterkäse*, or green cheese, made of skim milk (*Zieger* or *sérac*), whether of goats or cows, mixed with buttermilk and coloured with powdered *Steinklee* (*Melilotus officinalis*) or *blauer Honigklee* (*Melilotus caerulea*). The curds are brought down from the huts on the pastures, and, after being mixed with the dried powder, are ground in a mill, then put into shapes and pressed. The cheese thus produced is ripe in about a year, keeps a long time and is largely exported, even to America. The ice formed on the surface of the Klönthalersee in winter is stored up on its shore and exported. A certain number of visitors come to the canton in the summer, either to profit by one or other of the mineral springs mentioned above, or simply to enjoy the beauties of nature, especially at Obstalden, above the Walensee. The canton forms but a single administrative district and contains 28 communes. It sends to the Federal *Ständerath* 2 representatives (elected by the *Landsgemeinde*) and 2 also to the Federal *Nationalrath*. The canton still keeps its primitive democratic assembly or *Landsgemeinde* (meeting annually in the open air at Glarus on the first Sunday in May), composed of all male citizens of 20 years of age. It acts as the sovereign body, so that no “referendum” is required, while any citizen can submit a proposal. It names the executive of 6 members, besides the Landammann or president, all holding office for three years. The communes (forming 18 electoral circles) elect for three years the *Landrath*, a sort of standing committee composed of members in the proportion of 1 for every 500 inhabitants or fraction over 250. The present constitution dates from 1887.

(W. A. B. C.)

GLARUS (Fr. *Glaris*), the capital of the Swiss canton of the same name. It is a clean, modern little town, built on the left bank of the Linth (opposite it is the industrial suburb of Ennenda on the right bank), at the north-eastern foot of the imposing rock peak of the Vorder Glärnisch (7648 ft.), while on the east rises the Schild (6400 ft.). It now contains but few houses built before 1861, for on the 10/11 May 1861 practically the whole town was destroyed by fire that was fanned by a violent *Föhn* or south wind, rushing down from the high mountains through the natural funnel formed by the Linth valley. The total loss is estimated at about half a million sterling, of which about £100,000 were made up by subscriptions that poured in from every side. It possesses the broad streets and usual buildings of a modern town, the parish church being by far the most stately and well-situated building; it is used in common by the Protestants and Romans. Zwingli, the reformer, was parish priest here from 1506 to 1516, before he became a Protestant. The town is 1578 ft. above the sea-level, and in 1900 had a population of 4877, almost all German-speaking, while 1248 were Romanists. For the Linth canals (1811 and 1816) see Linth.

The District of Glarus is said to have been converted to Christianity in the 6th century by the Irish monk, Fridolin, whose special protector was St Hilary of Poitiers; the former was the founder, and both were patrons, of the Benedictine nunnery of Säckingen, on the Rhine between Constance and Basel, that about the 9th century became the owner of the district which was then named after St Hilary. The Habsburgs, protectors of the nunnery, gradually drew to themselves the exercise of all the rights of the nuns, so that in 1352 Glarus joined the Swiss Confederation. But the men of Glarus did not gain their complete freedom till after they had driven back the Habsburgs in the glorious battle of Näfels (1388), the complement of Sempach, so that the Habsburgers gave up their rights in 1398, while those of Säckingen were bought up in 1395, on condition of a small annual payment. Glarus early adopted Protestantism, but there were many struggles later on between the two parties, as the chief family, that of Tschudi, adhered to the old faith. At last it was arranged that, besides the common *Landsgemeinde*, each party should have its separate *Landsgemeinde* (1623) and tribunals (1683), while it was not till 1798 that the Protestants agreed to accept the Gregorian calendar. The slate-quarrying industry appeared early in the 17th century, while cotton-spinning was introduced about 1714, and calico-printing by 1750. In 1798, in consequence of the resistance of Glarus to the French invaders, the canton was united to other districts under the name of canton of the Linth, though in 1803 it was reduced to its former limits. In 1799 it was traversed by the Russian army, under Suworoff, coming over the Pragel Pass, but blocked by the French at Näfels, and so driven over the Panixer to the Grisons. The old system of government was set up again in 1814. But in 1836 by the new Liberal constitution one single *Landsgemeinde* was restored, despite the resistance (1837) of the Romanist population at Näfels.

Authorities.—J. Bäbler, *Die Alpwirtschaft im Kant. G.* (Soleure, 1898); J. J. Blumer, article on the early history of the canton in vol. iii. (Zürich, 1844) of the *Archiv f. schweiz. Geschichte*; E. Buss and A. Heim, *Der Bergsturz von Elm* (1881) (Zürich, 1881); W. A. B. Coolidge, *The Range of the Tödi* (London,

1894); J. G. Ebel, *Schilderung der Gebirgsvölker d. Schweiz*, vol. ii. (Leipzig, 1798); Gottfried Heer, *Geschichte d. Landes Glarus* (to 1830) (2 vols., Glarus, 1898-1899), *Glarnerische Reformationsgeschichte* (Glarus, 1900), *Zur 500 jährigen Gedächtnisfeier der Schlacht bei Näfels* (1388) (Glarus, 1888) and *Die Kirchen d. Kant. Glarus* (Glarus, 1890); Oswald Heer and J. J. Blumer-Heer, *Der Kant. Glarus* (St Gall, 1846); J. J. Hottinger, *Conrad Escher von der Linth* (Zürich, 1852); *Jahrbuch*, published annually since 1865 by the Cantonal Historical Society; A. Jenny-Trümpy, "Handel u. Industrie d. Kant. G." (article in vol. xxxiii., 1899, of the *Jahrbuch*); M. Schuler, *Geschichte d. Landes Glarus* (Zürich, 1836); E. Näf-Blumer, *Clubführer durch die Glarner-Alpen* (Schwanden, 1902); Aloys Schulte, article on the true and legendary early history of the Canton, published in vol. xviii., 1893, of the *Jahrbuch f. schweiz. Geschichte* (Zürich); J. J. Blumer, *Staats- und Rechtsgeschichte d. schweiz. Demokratien* (3 vols., St Gall, 1850-1859); H. Ryffel, *Die schweiz. Landsgemeinden* (Zürich, 1903); R. von Reding-Biberegg, *Der Zug Suworoffs durch die Schweiz in 1799* (Stans, 1895).

(W. A. B. C.)

GLAS, GEORGE (1725-1765); Scottish seaman and merchant adventurer in West Africa, son of John Glas the divine, was born at Dundee in 1725, and is said to have been brought up as a surgeon. He obtained command of a ship which traded between Brazil, the N.W. coasts of Africa and the Canary Islands. During his voyages he discovered on the Saharan seaboard a river navigable for some distance inland, and here he proposed to found a trading station. The exact spot is not known with certainty, but it is plausibly identified with Gueder, a place in about 29° 10' N., possibly the haven where the Spaniards had in the 15th and 16th centuries a fort called Santa Cruz de Mar Pequeña. Glas made an arrangement with the Lords of Trade whereby he was granted £15,000 if he obtained free cession of the port he had discovered to the British crown; the proposal was to be laid before parliament in the session of 1765. Having chartered a vessel, Glas, with his wife and daughter, sailed for Africa in 1764, reached his destination and made a treaty with the Moors of the district. He named his settlement Port Hillsborough, after Wills Hill, earl of Hillsborough (afterwards marquis of Downshire), president of the Board of Trade and Plantations, 1763-1765. In November 1764 Glas and some companions, leaving his ship behind, went in the longboat to Lanzarote, intending to buy a small barque suitable for the navigation of the river on which was his settlement. From Lanzarote he forwarded to London the treaty he had concluded for the acquisition of Port Hillsborough. A few days later he was seized by the Spaniards, taken to Teneriffe and imprisoned at Santa Cruz. In a letter to the Lords of Trade from Teneriffe, dated the 15th of December 1764, Glas said he believed the reason for his detention was the jealousy of the Spaniards at the settlement at Port Hillsborough "because from thence in time of war the English might ruin their fishery and effectually stop the whole commerce of the Canary Islands." The Spaniards further looked upon the settlement as a step towards the conquest of the islands. "They are therefore contriving how to make out a claim to the port and will forge old manuscripts to prove their assertion" (*Calendar of Home Office Papers*, 1760-1765). In March 1765 the ship's company at Port Hillsborough was attacked by the natives and several members of it killed. The survivors, including Mrs and Miss Glas, escaped to Teneriffe. In October following, through the representations of the British government, Glas was released from prison. With his wife and child he set sail for England on board the barque "Earl of Sandwich." On the 30th of November Spanish and Portuguese members of the crew, who had learned that the ship contained much treasure, mutinied, killing the captain and passengers. Glas was stabbed to death, and his wife and daughter thrown overboard. (The murderers were afterwards captured and hanged at Dublin.) After the death of Glas the British government appears to have taken no steps to carry out his project.

In 1764 Glas published in London *The History of the Discovery and Conquest of the Canary Islands*, which he had translated from the MS. of an Andalusian monk named Juan Abreu de Galindo, then recently discovered at Palma. To this Glas added a description of the islands, a continuation of the history and an account of the manners, customs, trade, &c., of the inhabitants, displaying considerable knowledge of the archipelago.

GLAS, JOHN (1695-1773), Scottish divine, was born at Auchtermuchty, Fife, where his father was parish minister, on the 5th of October 1695. He was educated at Kinclaven and the grammar school, Perth, graduated A.M. at the university of St Andrews in 1713, and completed his education for the ministry at Edinburgh. He was licensed as a preacher by the presbytery of Dunkeld, and soon afterwards ordained by that of Dundee as minister of the parish of Tealing (1719), where his effective preaching soon secured a large congregation. Early in his ministry he was "brought to a stand" while lecturing on the "Shorter Catechism" by the question "How doth Christ execute the office of a king?" This led to an examination of the New Testament foundation of the Christian Church, and in 1725, in a letter to Francis Archibald, minister of Guthrie, Forfarshire, he repudiated the obligation of national covenants. In the same year his views found expression in the formation of a society "separate from the multitude" numbering nearly a hundred, and drawn from his own and neighbouring parishes. The

members of this *ecclesiola in ecclesia* pledged themselves "to join together in the Christian profession, to follow Christ the Lord as the righteousness of his people, to walk together in brotherly love, and in the duties of it, in subjection to Mr Glas as their overseer in the Lord, to observe the ordinance of the Lord's Supper once every month, to submit themselves to the Lord's law for removing offences," &c. (Matt. xviii. 15-20). From the scriptural doctrine of the essentially spiritual nature of the kingdom of Christ, Glas in his public teaching drew the conclusions: (1) that there is no warrant in the New Testament for a national church; (2) that the magistrate as such has no function in the church; (3) that national covenants are without scriptural grounds; (4) that the true Reformation cannot be carried out by political and secular weapons but by the word and spirit of Christ only.

This argument is most fully exhibited in a treatise entitled *The Testimony of the King of Martyrs* (1729). For the promulgation of these views, which were confessedly at variance with the doctrines of the standards of the national church of Scotland, he was summoned (1726) before his presbytery, where in the course of the investigations which followed he affirmed still more explicitly his belief that "every national church established by the laws of earthly kingdoms is antichristian in its constitution and persecuting in its spirit," and further declared opinions upon the subject of church government which amounted to a repudiation of Presbyterianism and an acceptance of the puritan type of Independency. For these opinions he was in 1728 suspended from the discharge of ministerial functions, and finally deposed in 1730. The members of the society already referred to, however, for the most part continued to adhere to him, thus constituting the first "Glassite" or "Glasite" church. The seat of this congregation was shortly afterwards transferred to Dundee (whence Glas subsequently removed to Edinburgh), where he officiated for some time as an "elder." He next laboured in Perth for a few years, where he was joined by Robert Sandeman (see Glasites), who became his son-in-law, and eventually was recognized as the leader and principal exponent of Glas's views; these he developed in a direction which laid them open to the charge of antinomianism. Ultimately in 1730 Glas returned to Dundee, where the remainder of his life was spent. He introduced in his church the primitive custom of the "osculum pacis" and the "agape" celebrated as a common meal with broth. From this custom his congregation was known as the "kail kirk." In 1739 the General Assembly, without any application from him, removed the sentence of deposition which had been passed against him, and restored him to the character and function of a minister of the gospel of Christ, but not that of a minister of the Established Church of Scotland, declaring that he was not eligible for a charge until he should have renounced principles inconsistent with the constitution of the church.

A collected edition of his works was published at Edinburgh in 1761 (4 vols., 8vo), and again at Perth in 1782 (5 vols., 8vo). He died in 1773.

Glas's published works bear witness to his vigorous mind and scholarly attainments. His reconstruction of the *True Discourse of Celsus* (1753), from Origen's reply to it, is a competent and learned piece of work. The *Testimony of the King of Martyrs concerning His Kingdom* (1729) is a classic repudiation of erastianism and defence of the spiritual autonomy of the church under Jesus Christ. His common sense appears in his rejection of Hutchinson's attempt to prove that the Bible supplies a complete system of physical science, and his shrewdness in his *Notes on Scripture Texts* (1747). He published a volume of Christian Songs (Perth, 1784).

(D. Mn.)

GLASER, CHRISTOPHER, a pharmaceutical chemist of the 17th century, was a native of Basel, became demonstrator of chemistry at the Jardin du Roi in Paris and apothecary to Louis XIV. and to the duke of Orleans. He is best known by his *Traité de la chymie* (Paris, 1663), which went through some ten editions in about five-and-twenty years, and was translated into both German and English. It has been alleged that he was an accomplice in the notorious poisonings carried out by the marchioness de Brinvilliers, but the extent of his complicity is doubtful. He appears to have died some time before 1676. The *sal polychrestum Glaseri* is normal potassium sulphate which he prepared and used medicinally.

GLASGOW, a city, county of a city, royal burgh and port of Lanarkshire, Scotland, situated on both banks of the Clyde, 401½ m. N.W. of London by the West Coast railway route, and 47 m. W.S.W. of Edinburgh by the North British railway. The valley of the Clyde is closely confined by hills, and the city extends far over these, the irregularity of its site making for picturesqueness. The commercial centre of Glasgow, with the majority of important public buildings, lies on the north bank of the river, which traverses the city from W.S.W. to E.N.E., and is crossed by a number of bridges. The uppermost is Dalmarnock Bridge, dating from 1891, and next below it is Rutherglen Bridge, rebuilt in 1896, and superseding a structure of 1775. St Andrew's suspension bridge gives access to the Green to the inhabitants of Hutchesontown, a district which is approached also by Albert Bridge, a handsome erection, leading from the Saltmarket. Above this bridge is the tidal dam and weir. Victoria Bridge, of

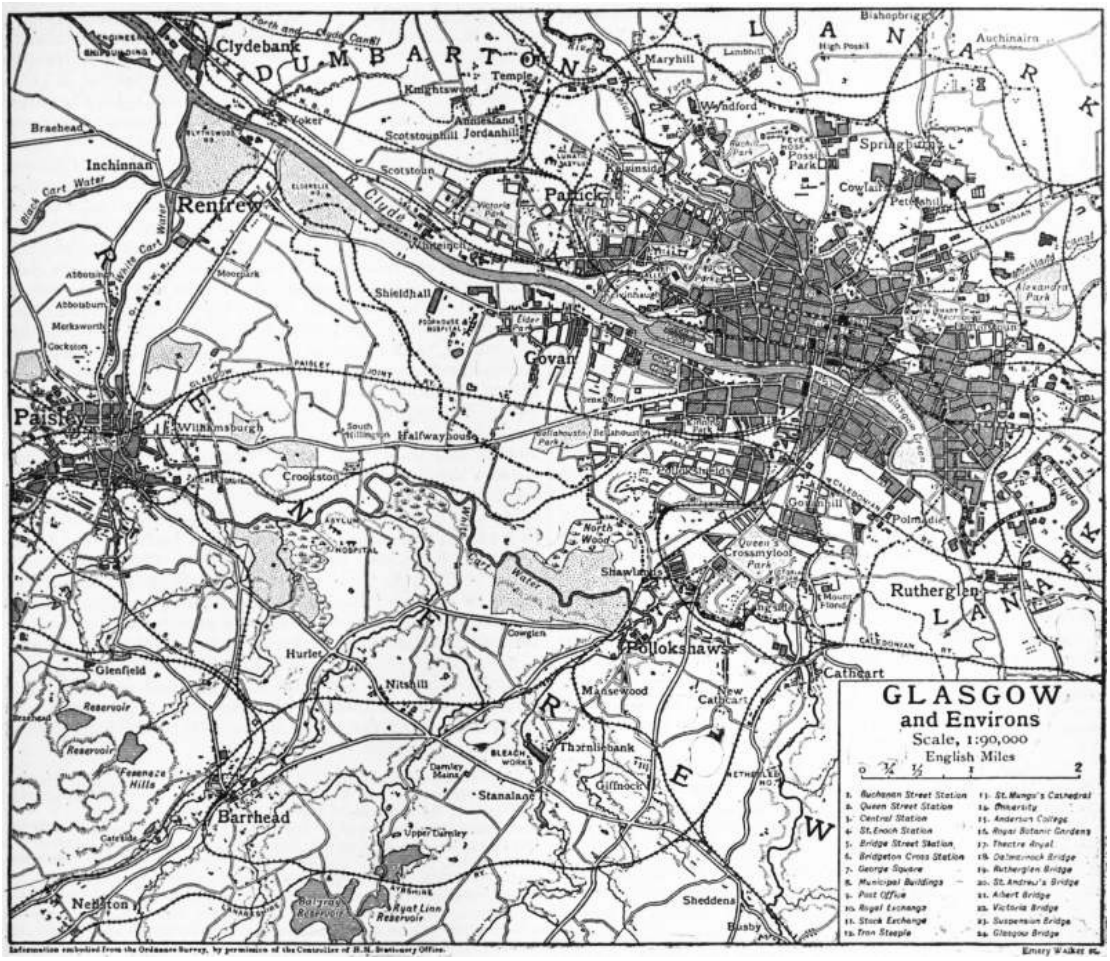
granite, was opened in 1856, taking the place of the venerable bridge erected by Bishop Rae in 1345, which was demolished in 1847. Then follows a suspension bridge (dating from 1853) by which foot-passengers from the south side obtain access to St Enoch Square and, finally, the most important bridge of all is reached, variously known as Glasgow, Jamaica Street, or Broomielaw Bridge, built of granite from Telford's designs and first used in 1835. Towards the close of the century it was reconstructed, and reopened in 1899. At the busier periods of the day it bears a very heavy traffic. The stream is spanned between Victoria and Albert Bridges by a bridge belonging to the Glasgow & South-Western railway and by two bridges carrying the lines of the Caledonian railway, one below Dalmarnock Bridge and the other a massive work immediately west of Glasgow Bridge.

Buildings.—George Square, in the heart of the city, is an open space of which every possible advantage has been taken. On its eastern side stand the municipal buildings, a palatial pile in Venetian renaissance style, from the designs of William Young, a native of Paisley. They were opened in 1889 and cost nearly £600,000. They form a square block four storeys high and carry a domed turret at each end of the western façade, from the centre of which rises a massive tower. The entrance hall and grand staircase, the council chamber, banqueting hall and reception rooms are decorated in a grandiose style, not unbecoming to the commercial and industrial metropolis of Scotland. Several additional blocks have been built or rented for the accommodation of the municipal staff. Admirably equipped sanitary chambers were opened in 1897, including a bacteriological and chemical laboratory. Up till 1810 the town council met in a hall adjoining the old tolbooth. It then moved to the fine classical structure at the foot of the Saltmarket, which is now used as court-houses. This was vacated in 1842 for the county buildings in Wilson Street. Growth of business compelled another migration to Ingram Street in 1875, and, fourteen years later, it occupied its present quarters. On the southern side of George Square the chief structure is the massive General Post Office. On the western side stand two ornate Italian buildings, the Bank of Scotland and the Merchants' House, the head of which (the dean of gild), along with the head of the Trades' House (the deacon-convener of trades) has been de facto member of the town council since 1711, an arrangement devised with a view to adjusting the frequent disputes between the two gilds. The Royal Exchange, a Corinthian building with a fine portico of columns in two rows, is an admired example of the work of David Hamilton (1768-1843), a native of Glasgow, who designed several of the public buildings and churches, and gained the second prize for a design for the Houses of Parliament. The news-room of the exchange is a vast apartment, 130 ft. long, 60 ft. wide, 130 ft. high, with a richly-decorated roof supported by Corinthian pillars. Buchanan Street, the most important and handsome street in the city, contains the Stock Exchange, the Western Club House (by David Hamilton) and the offices of the *Glasgow Herald*. In Sauchiehall Street are the Fine Art Institute and the former Corporation Art Gallery. Argyll Street, the busiest thoroughfare, mainly occupied with shops, leads to Trongate, where a few remains of the old town are now carefully preserved. On the south side of the street, spanning the pavement, stands the Tron Steeple, a stunted spire dating from 1637. It is all that is left of St Mary's church, which was burned down in 1793 during the revels of a notorious body known as the Hell Fire Club. On the opposite side, at the corner of High Street, stood the ancient tolbooth, or prison, a turreted building, five storeys high, with a fine Jacobean crown tower. The only remnant of the structure is the tower known as the Cross Steeple.

St Mungo's Cathedral.

Although almost all the old public buildings of Glasgow have been swept away, the cathedral remains in excellent preservation. It stands in the north-eastern quarter of the city at a height of 104 ft. above the level of the Clyde. It is a beautiful example of Early English work, impressive in its simplicity. Its form is that of a Latin cross, with imperfect transepts. Its length from east to west is 319 ft., and its width 63 ft.; the height of the choir is 93 ft., and of the nave 85 ft. At the centre rises a fine tower, with a short octagonal spire, 225 ft. high. The choir, locally known as the High Church, serves as one of the city churches, and the extreme east end of it forms the Lady chapel. The rich western doorway is French in design but English in details. The chapter-house projects from the north-eastern corner and somewhat mars the harmony of the effect. It was built in the 15th century and has a groined roof supported by a pillar 20 ft. high. Many citizens have contributed towards filling the windows with stained glass, executed at Munich, the government providing the eastern window in recognition of their enterprise. The crypt beneath the choir is not the least remarkable part of the edifice, being without equal in Scotland. It is borne on 65 pillars and lighted by 41 windows. The sculpture of the capitals of the columns and bosses of the groined vaulting is exquisite and the whole is in excellent preservation. Strictly speaking, it is not a crypt, but a lower church adapted to the sloping ground of the right bank of the Molendinar burn. The dripping aisle is so named from the constant dropping of water from the roof. St Mungo's Well in the south-eastern corner was considered to possess therapeutic virtues, and in the crypt a recumbent effigy, headless and handless, is faithfully accepted as the tomb of Kentigern. The cathedral contains few monuments of exceptional merit, but the surrounding graveyard is almost completely paved with tombstones. In 1115 an investigation was ordered by David, prince of Cumbria, into the lands and churches belonging to the bishopric, and from the deed then drawn up it is clear that at that date a cathedral had already been endowed. When David ascended the throne in 1124 he gave to the see of Glasgow the lands of Partick, besides restoring many possessions of which it had been deprived. Jocelin (d. 1199), made bishop in 1174, was the first great bishop, and is memorable for his efforts to replace the cathedral built in 1136 by Bishop John Achaius, which had been destroyed by fire. The crypt is his work, and he began the choir, Lady chapel, and central tower. The new structure was sufficiently advanced to be dedicated in 1197. Other famous bishops were Robert Wishart (d. 1316), appointed in 1272, who was among the first to join in the revolt of Wallace, and received Robert Bruce when he lay under the ban of the church for the murder of Comyn; John Cameron (d. 1446), appointed in 1428, under whom the building as it stands was completed; and William Turnbull (d. 1454),

appointed in 1447, who founded the university in 1450. James Beaton or Bethune (1517-1603) was the last Roman Catholic archbishop. He fled to France at the reformation in 1560, and took with him the treasures and records of the see, including the Red Book of Glasgow dating from the reign of Robert III. The documents were deposited in the Scots College in Paris, were sent at the outbreak of the Revolution for safety to St Omer, and were never recovered. This loss explains the paucity of the earlier annals of the city. The zeal of the Reformers led them to threaten to mutilate the cathedral, but the building was saved by the prompt action of the craftsmen, who mustered in force and dispersed the fanatics.



(Click to enlarge.)

Excepting the cathedral, none of the Glasgow churches possesses historical interest; and, speaking generally, it is only the buildings that have been erected since the beginning of the 19th century that have pronounced architectural merit. This was due largely to the long survival of the severe sentiment of the Covenanters, who discouraged, if they did not actually forbid, the raising of temples of beautiful design. Representative examples of later work are found in the United Free churches in Vincent Street, in Caledonia Road and at Queen's Park, designed by Alexander Thomson (1817-1875), an architect of distinct originality; St George's church, in West George Street, a remarkable work by William Stark, erected in the beginning of the 19th century; St Andrew's church in St Andrew's Square off the Saltmarket, modelled after St Martin's-in-the-Fields, London, with a fine Roman portico; some of the older parish churches, such as St Enoch's, dating from 1780, with a good spire (the saint's name is said to be a corruption of Tanew, mother of Kentigern); the episcopal church of St Mary (1870), in Great Western Road, by Sir G. G. Scott; the Roman Catholic cathedral of St Andrew, on the river-bank between Victoria and Broomielaw bridges; the Barony church, replacing the older kirk in which Norman Macleod ministered; and several admirable structures, well situated, on the eastern confines of Kelvingrove Park.

Churches.

The principal burying-ground is the Necropolis, occupying Fir Park, a hill about 300 ft. high in the northern part of the city. It provides a not inappropriate background to the cathedral, from which it is approached by a bridge, known as the "Bridge of Sighs," over the Molendinar ravine. The ground, which once formed portion of the estate of Wester Craigs, belongs to the Merchants' House, which purchased it in 1650 from Sir Ludovic Stewart of Minto. A Doric column to the memory of Knox, surmounted by a colossal statue of the reformer, was erected by public subscription on the crown of the height in 1824, and a few years later the idea arose of utilizing the land as a cemetery. The Jews have reserved for their own people a detached area in the north-western corner of the cemetery.

Education.—The university, founded in 1450 by Bishop Turnbull under a bull of Pope Nicholas V., survived in its old quarters till far in the 19th century. The *paedagogium*, or college of arts, was at first housed in Rottenrow, but was moved in 1460 to a site in High Street, where Sir James Hamilton of Cadzow, first Lord Hamilton (d. 1479), gave it four acres of land and some

Glasgow

University. buildings. Queen Mary bestowed upon it thirteen acres of contiguous ground, and her son granted it a new charter and enlarged the endowments. Prior to the Revolution its fortunes fluctuated, but in the 18th century it became very famous. By the middle of the 19th century, however, its surroundings had deteriorated, and in 1860 it was decided to rebuild it elsewhere. The ground had enormously increased in value and a railway company purchased it for £100,000. In 1864 the university bought the Gilmore Hill estate for £65,000, the adjacent property of Dowan Hill for £16,000 and the property of Clayslaps for £17,400. Sir G. G. Scott was appointed architect and selected as the site of the university buildings the ridge of Gilmore Hill—the finest situation in Glasgow. The design is Early English with a suggestion in parts of the Scots-French style of a much later period. The main structure is 540 ft. long and 300 ft. broad. The principal front faces southwards and consists of a lofty central tower with spire and corner blocks with turrets, between which are buildings of lower height. Behind the tower lies the Bute hall, built on cloisters, binding together the various departments and smaller halls, and dividing the massive edifice into an eastern and western quadrangle, on two sides of which are ranged the class-rooms in two storeys. The northern façade comprises two corner blocks, besides the museum, the library and, in the centre, the students' reading-room on one floor and the Hunterian museum on the floor above. On the south the ground falls in terraces towards Kelvingrove Park and the Kelvin. On the west, but apart from the main structure, stand the houses of the principal and professors. The foundation stone was laid in 1868 and the opening ceremony was held in 1870. The total cost of the university buildings amounted to £500,000, towards which government contributed £120,000 and public subscription £250,000. The third marquess of Bute (1847-1900) gave £40,000 to provide the Bute or common hall, a room of fine proportions fitted in Gothic style and divided by a beautiful Gothic screen from the Randolph hall, named after another benefactor, Charles Randolph (1809-1878), a native of Stirling, who had prospered as shipbuilder and marine engineer and left £60,000 to the university. The graceful spire surmounting the tower was provided from the bequest of £5000 by Mr A. Cunningham, deputy town-clerk, and Dr John M'Intyre erected the Students' Union at a cost of £5000, while other donors completed the equipment so generously that the senate was enabled to carry on its work, for the first time in its history, in almost ideal circumstances. The library includes the collection of Sir William Hamilton, and the Hunterian museum, bequeathed by William Hunter, the anatomist, is particularly rich in coins, medals, black-letter books and anatomical preparations. The observatory on Dowan Hill is attached to the chair of astronomy. An interesting link with the past are the exhibitions founded by John Snell (1629-1679), a native of Colmonell in Ayrshire, for the purpose of enabling students of distinction to continue their career at Balliol College, Oxford. Amongst distinguished exhibitioners have been Adam Smith, John Gibson Lockhart, John Wilson ("Christopher North"), Archbishop Tait, Sir William Hamilton and Professor Shairp. The curriculum of the university embraces the faculties of arts, divinity, medicine, law and science. The governing body includes the chancellor, elected for life by the general council, the principal, also elected for life, and the lord rector elected triennially by the students voting in "nations" according to their birthplace (*Glottiana*, natives of Lanarkshire; *Transforthana*, of Scotland north of the Forth; *Rothseiana*, of the shires of Bute, Renfrew and Ayr; and *Loudonia*, all others). There are a large number of well-endowed chairs and lectureships and the normal number of students exceeds 2000. The universities of Glasgow and Aberdeen unite to return one member to parliament. Queen Margaret College for women, established in 1883, occupies a handsome building close to the botanic gardens, has an endowment of upwards of £25,000, and was incorporated with the university in 1893. Muirhead College is another institution for women.

Schools and colleges. Elementary instruction is supplied at numerous board schools. Higher, secondary and technical education is provided at several well-known institutions. There are two educational endowments boards which apply a revenue of about £10,000 a year mainly to the foundation of bursaries. Anderson College in George Street perpetuates the memory of its founder, John Anderson (1726-1796), professor of natural philosophy in the university, who opened a class in physics for working men, which he conducted to the end of his life. By his will he provided for an institution for the instruction of artisans and others unable to attend the university. The college which bears his name began in 1796 with lectures on natural philosophy and chemistry by Thomas Garnett (1766-1802). Two years later mathematics and geography were added. In 1799 Dr George Birkbeck (1776-1841) succeeded Garnett and began those lectures on mechanics and applied science which, continued elsewhere, ultimately led to the foundation of mechanics' institutes in many towns. In later years the college was further endowed and its curriculum enlarged by the inclusion of literature and languages, but ultimately it was determined to limit the scope of its work to medicine (comprising, however, physics, chemistry and botany also). The lectures of its medical school, incorporated in 1887 and situated near the Western Infirmary, are accepted by Glasgow and other universities. The Glasgow and West of Scotland Technical College, formed in 1886 out of a combination of the arts side of Anderson College, the College of Science and Arts, Allan Glen's Institution and the Atkinson Institution, is subsidized by the corporation and the endowments board, and is especially concerned with students desirous of following an industrial career. St Mungo's College, which has developed from an extra-mural school in connexion with the Royal Infirmary, was incorporated in 1889, with faculties of medicine and law. The United Free Church College, finely situated near Kelvingrove Park, the School of Art and Design, and the normal schools for the training of teachers, are institutions with distinctly specialized objects.

The High school in Elmbank is the successor of the grammar school (long housed in John Street) which was founded in the 14th century as an appanage of the cathedral. It was placed under the jurisdiction of the school board in 1873. Other secondary schools include Glasgow Academy, Kelvinside Academy and the girls' and boys' schools endowed by the Hutcheson trust. Several of the schools under the board are furnished with secondary departments or equipped as science schools, and the

Roman Catholics maintain elementary schools and advanced academies.

Art Galleries, Libraries and Museums.—Glasgow merchants and manufacturers alike have been constant patrons of art, and their liberality may have had some influence on the younger painters who, towards the close of the 19th century, broke away from tradition and, stimulated by training in the studios of Paris, became known as the "Glasgow school." The art gallery and museum in Kelvingrove Park, which was built at a cost of £250,000 (partly derived from the profits of the exhibitions held in the park in 1888 and 1901), is exceptionally well appointed. The collection originated in 1854 in the purchase of the works of art belonging to Archibald M'Lellan, and was supplemented from time to time by numerous bequests of important pictures. It was housed for many years in the Corporation galleries in Sauchiehall Street. The Institute of Fine Arts, in Sauchiehall Street, is mostly devoted to periodical exhibitions of modern art. There are also pictures on exhibition in the People's Palace on Glasgow Green, which was built by the corporation in 1898 and combines an art gallery and museum with a conservatory and winter garden, and in the museum at Camphill, situated within the bounds of Queen's Park. The library and Hunterian museum in the university are mostly reserved for the use of students. The faculty of procurators possess a valuable library which is housed in their hall, an Italian Renaissance building, in West George Street. In Bath Street there are the Mechanics' and the Philosophical Society's libraries, and the Physicians' is in St Vincent Street. Miller Street contains the headquarters of the public libraries. The premises once occupied by the water commission have been converted to house the Mitchell library, which grew out of a bequest of £70,000 by Stephen Mitchell, largely reinforced by further gifts of libraries and funds, and now contains upwards of 100,000 volumes. It is governed by the city council and has been in use since 1877. Another building in this street accommodates both the Stirling and Baillie libraries. The Stirling, with some 50,000 volumes, is particularly rich in tracts of the 16th and 17th centuries, and the Baillie was endowed by George Baillie, a solicitor who, in 1863, gave £18,000 for educational objects. The Athenaeum in St George's Place, an institution largely concerned with evening classes in various subjects, contains an excellent library and reading-room.

Charities.—The old Royal Infirmary, designed by Robert Adam and opened in 1794, adjoining the cathedral, occupies the site of the archiepiscopal palace, the last portion of which was removed towards the close of the 18th century. The chief architectural feature of the infirmary is the central dome forming the roof of the operating theatre. On the northern side are the buildings of the medical school attached to the institution. The new infirmary commemorates the Diamond Jubilee of Queen Victoria. A little farther north, in Castle Street, is the blind asylum. The Western Infirmary is to some extent used for the purposes of clinical instruction in connexion with the university, to which it stands in immediate proximity. Near it is the Royal hospital for sick children. To the south of Queen's Park is Victoria Infirmary, and close to it the deaf and dumb institution. On the bank of the river, not far from the south-eastern boundary of the city, is the Belvedere hospital for infectious diseases, and at Ruchill, in the north, is another hospital of the same character opened in 1900. The Royal asylum at Gartnavel is situated near Jordanhill station, and the District asylum at Gartloch (with a branch at West Muckroft) lies in the parish of Cadder beyond the north-eastern boundary. There are numerous hospitals exclusively devoted to the treatment of special diseases, and several nursing institutions and homes. Hutcheson's Hospital, designed by David Hamilton and adorned with statues of the founders, is situated in Ingram Street, and by the increase in the value of its lands has become a very wealthy body. George Hutcheson (1580-1639), a lawyer in the Trongate near the tolbooth, who afterwards lived in the Bishop's castle, which stood close to the spot where the Kelvin enters the Clyde, founded the hospital for poor old men. His brother Thomas (1589-1641) established in connexion with it a school for the lodging and education of orphan boys, the sons of burgesses. The trust, through the growth of its funds, has been enabled to extend its educational scope and to subsidize schools apart from the charity.

Monuments.—Most of the statues have been erected in George Square. They are grouped around a fluted pillar 80 ft. high, surmounted by a colossal statue of Sir Walter Scott by John Ritchie (1809-1850), erected in 1837, and include Queen Victoria and the Prince Consort (both equestrian) by Baron Marochetti; James Watt by Chantrey; Sir Robert Peel, Thomas Campbell the poet, who was born in Glasgow, and David Livingstone, all by John Mossman; Sir John Moore, a native of Glasgow, by Flaxman, erected in 1819; James Oswald, the first member returned to parliament for the city after the Reform Act of 1832; Lord Clyde (Sir Colin Campbell), also a native, by Foley, erected in 1868; Dr Thomas Graham, master of the mint, another native, by Brodie; Robert Burns by G. E. Ewing, erected in 1877, subscribed for in shillings by the working men of Scotland; and William Ewart Gladstone by Hamo Thornycroft, unveiled by Lord Rosebery in 1902. In front of the Royal Exchange stands the equestrian monument of the duke of Wellington. In Cathedral Square are the statues of Norman Macleod, James White and James Arthur, and in front of the Royal infirmary is that of Sir James Lumsden, lord provost and benefactor. Nelson is commemorated by an obelisk 143 ft. high on the Green, which was erected in 1806 and is said to be a copy of that in the Piazza del Popolo at Rome. One of the most familiar statues is the equestrian figure of William III. in the Trongate, which was presented to the town in 1735 by James Macrae (1677-1744), a poor Ayrshire lad who had amassed a fortune in India, where he was governor of Madras from 1725 to 1730.

Recreations.—Of the theatres the chief are the King's in Bath Street, the Royal and the Grand in Cowcaddens, the Royalty and Gaiety in Sauchiehall Street, and the Princess's in Main Street. Variety theatres, headed by the Empire in Sauchiehall Street, are found in various parts of the town. There is a circus in Waterloo Street, a hippodrome in Sauchiehall Street and a zoological garden in New City Road. The principal concert halls are the great hall of the St Andrew's Halls, a group of rooms belonging to the corporation; the City Hall in Candleriggs, the People's Palace on the Green, and Queen's Rooms close to Kelvingrove Park. Throughout winter enormous crowds throng the football grounds of the Queen's Park, the leading amateur club, and the Celtic, the Rangers, the Third Lanark

and other prominent professional clubs.

Parks and Open Spaces.—The oldest open space is the Green (140 acres), on the right bank of the river, adjoining a densely-populated district. It once extended farther west, but a portion was built over at a time when public rights were not vigilantly guarded. It is a favourite area for popular demonstrations, and sections have been reserved for recreation or laid out in flower-beds. Kelvingrove Park, in the west end, has exceptional advantages, for the Kelvin burn flows through it and the ground is naturally terraced, while the situation is beautified by the adjoining Gilmore Hill with the university on its summit. The park was laid out under the direction of Sir Joseph Paxton, and contains the Stewart fountain, erected to commemorate the labours of Lord Provost Stewart and his colleagues in the promotion of the Loch Katrine water scheme. The other parks on the right bank are, in the north, Ruchill (53 acres), acquired in 1891, and Springburn (53¼ acres), acquired in 1892, and, in the east, Alexandra Park (120 acres), in which is laid down a nine-hole golf-course, and Tollcross (82¾ acres), beyond the municipal boundary, acquired in 1897. On the left bank Queen's Park (130 acres), occupying a commanding site, was laid out by Sir Joseph Paxton, and considerably enlarged in 1894 by the enclosure of the grounds of Camphill. The other southern parks are Richmond (44 acres), acquired in 1898, and named after Lord Provost Sir David Richmond, who opened it in 1899; Maxwell, which was taken over on the annexation of Pollokshields in 1891; Bellahouston (176 acres), acquired in 1895; and Cathkin Braes (50 acres), 3½m. beyond the south-eastern boundary, presented to the city in 1886 by James Dick, a manufacturer, containing "Queen Mary's stone," a point which commands a view of the lower valley of the Clyde. In the north-western district of the town 40 acres between Great Western Road and the Kelvin are devoted to the Royal Botanic Gardens, which became public property in 1891. They are beautifully laid out, and contain a great range of hothouses. The gardens owed much to Sir William Hooker, who was regius professor of botany in Glasgow University before his appointment to the directorship of Kew Gardens.

Communications.—The North British railway terminus is situated in Queen Street, and consists of a high-level station (main line) and a low-level station, used in connexion with the City & District line, largely underground, serving the northern side of the town, opened in 1886. The Great Northern and North-Eastern railways use the high-level line of the N.B.R., the three companies forming the East Coast Joint Service. The Central terminus of the Caledonian railway in Gordon Street, served by the West Coast system (in which the London & North-Western railway shares), also comprises a high-level station for the main line traffic and a low-level station for the Cathcart District railway, completed in 1886 and made circular for the southern side and suburbs in 1894, and also for the connexion between Maryhill and Rutherglen, which is mostly underground. Both the underground lines communicate with certain branches of the main line, either directly or by change of carriage. The older terminus of the Caledonian railway in Buchanan Street now takes the northern and eastern traffic. The terminus of the Glasgow & South-Western railway company in St Enoch Square serves the country indicated in its title, and also gives the Midland railway of England access to the west coast and Glasgow. The Glasgow Subway—an underground cable passenger line, 6½ m. long, worked in two tunnels and passing below the Clyde twice—was opened in 1896. Since no more bridge-building will be sanctioned west of the railway bridge at the Broomielaw, there are at certain points steam ferry boats or floating bridges for conveying vehicles across the harbour, and at Stobcross there is a subway for foot and wheeled traffic. Steamers, carrying both goods and passengers, constantly leave the Broomielaw quay for the piers and ports on the river and firth, and the islands and sea lochs of Argyllshire. The city is admirably served by tramways which penetrate every populous district and cross the river by Glasgow and Albert bridges.

Trade.—Natural causes, such as proximity to the richest field of coal and ironstone in Scotland and the vicinity of hill streams of pure water, account for much of the great development of trade in Glasgow. It was in textiles that the city showed its earliest predominance, which, however, has not been maintained, owing, it is alleged, to the shortage of female labour. Several cotton mills are still worked, but the leading feature in the trade has always been the manufacture of such light textures as plain, striped and figured muslins, ginghams and fancy fabrics. Thread is made on a considerable scale, but jute and silk are of comparatively little importance. The principal varieties of carpets are woven. Some factories are exclusively devoted to the making of lace curtains. The allied industries of bleaching, printing and dyeing, on the other hand, have never declined. The use of chlorine in bleaching was first introduced in Great Britain at Glasgow in 1787, on the suggestion of James Watt, whose father-in-law was a bleacher; and it was a Glasgow bleacher, Charles Tennant, who first discovered and made bleaching powder (chloride of lime). Turkey-red dyeing was begun at Glasgow by David Dale and George M'Intosh, and the colour was long known locally as Dale's red. A large quantity of grey cloth continues to be sent from Lancashire and other mills to be bleached and printed in Scottish works. These industries gave a powerful impetus to the manufacture of chemicals, and the works at St Rollox developed rapidly. Among prominent chemical industries are to be reckoned the alkali trades—including soda, bleaching powder and soap-making—the preparation of alum and prussiates of potash, bichromate of potash, white lead and other pigments, dynamite and gunpowder. Glass-making and paper-making are also carried on, and there are several breweries and distilleries, besides factories for the making of aerated waters, starch, dextrine and matches. Many miscellaneous trades flourish, such as clothing, confectionery, cabinet-making, bread and biscuit making, boot and shoe making, flour mills and saw mills, pottery and india-rubber. Since the days of the brothers Robert Foulis (1705-1776) and Andrew Foulis (1712-1775), printing, both letterpress and colour, has been identified with Glasgow, though in a lesser degree than with Edinburgh. The tobacco trade still flourishes, though much lessened. But the great industry is iron-founding. The discovery of the value of blackband ironstone, till then regarded as useless "wild coal," by David Mushet (1772-1847), and Neilson's invention of the hot-air blast threw the control of the Scottish iron trade into the hands of Glasgow ironmasters, although the furnaces themselves were mostly erected in Lanarkshire and Ayrshire. The expansion of the industry was such that, in 1859, one-third of the total output in the

United Kingdom was Scottish. During the following years, however, the trade seemed to have lost its elasticity, the annual production averaging about one million tons of pig-iron. Mild steel is manufactured extensively, and some crucible cast steel is made. In addition to brass foundries there are works for the extraction of copper and the smelting of lead and zinc. With such resources every branch of engineering is well represented. Locomotive engines are built for every country where railways are employed, and all kinds of builder's ironwork is forged in enormous quantities, and the sewing-machine factories in the neighbourhood are important. Boiler-making and marine engine works, in many cases in direct connexion with the shipbuilding yards, are numerous. Shipbuilding, indeed, is the greatest of the industries of Glasgow, and in some years more than half of the total tonnage in the United Kingdom has been launched on the Clyde, the yards of which extend from the harbour to Dumbarton on one side and Greenock on the other side of the river and firth. Excepting a trifling proportion of wooden ships, the Clyde-built vessels are of iron and steel, the trade having owed its immense expansion to the prompt adoption of this material. Every variety of craft is turned out, from battleships and great liners to dredging-plant and hopper barges.

The Port.—The harbour extends from Glasgow Bridge to the point where the Kelvin joins the Clyde, and occupies 206 acres. For the most part it is lined by quays and wharves, which have a total length of 8¼ m., and from the harbour to the sea vessels drawing 26 ft. can go up or down on one tide. It is curious to remember that in the middle of the 18th century the river was fordable on foot at Dumbuck, 12 m. below Glasgow and 1½ m. S.E. of Dumbarton. Even within the limits of the present harbour Smeaton reported to the town council in 1740 that at Pointhouse ford, just east of the mouth of the Kelvin, the depth at low water was only 15 in. and at high water 39 in. The transformation effected within a century and a half is due to the energy and enterprise of the Clyde Navigation Trust. The earliest shipping-port of Glasgow was Irvine in Ayrshire, but lighterage was tedious and land carriage costly, and in 1658 the civic authorities endeavoured to purchase a site for a spacious harbour at Dumbarton. Being thwarted by the magistrates of that burgh, however, in 1662 they secured 13 acres on the southern bank at a spot some 2 m. above Greenock, which became known as Port Glasgow, where they built harbours and constructed the first graving dock in Scotland. Sixteen years later the Broomielaw quay was built, but it was not until the tobacco merchants appreciated the necessity of bringing their wares into the heart of the city that serious consideration was paid to schemes for deepening the waterway. Smeaton's suggestion of a lock and dam 4 m. below the Broomielaw was happily not accepted. In 1768 John Golborne advised the narrowing of the river and the increasing of the scour by the construction of rubble jetties and the dredging of sandbanks and shoals. After James Watt's report in 1769 on the ford at Dumbuck, Golborne succeeded in 1775 in deepening the ford to 6 ft. at low water with a width of 300 ft. By Rennie's advice in 1799, following up Golborne's recommendation, as many as 200 jetties were built between Glasgow and Bowling, some old ones were shortened and low rubble walls carried from point to point of the jetties, and thus the channel was made more uniform and much land reclaimed. By 1836 there was a depth of 7 or 8 ft. at the Broomielaw at low water, and in 1840 the whole duty of improving the navigation was devolved upon the Navigation Trust. Steam dredgers were kept constantly at work, shoals were removed and rocks blasted away. Two million cubic yards of matter are lifted every year and dumped in Loch Long. By 1900 the channel had been deepened to a minimum of 22 ft., and, as already indicated, the largest vessels make the open sea in one tide, whereas in 1840 it took ships drawing only 15 ft. two and even three tides to reach the sea. The debt of the Trust amounts to £6,000,000, and the annual revenue to £450,000. Long before these great results had been achieved, however, the shipping trade had been revolutionized by the application of steam to navigation, and later by the use of iron for wood in shipbuilding, in both respects enormously enhancing the industry and commerce of Glasgow. From 1812 to 1820 Henry Bell's "Comet," 30 tons, driven by an engine of 3 horse-power, plied between Glasgow and Greenock, until she was wrecked, being the first steamer to run regularly on any river in the Old World. Thus since the appearance of that primitive vessel phenomenal changes had taken place on the Clyde. When the quays and wharves ceased to be able to accommodate the growing traffic, the construction of docks became imperative. In 1867 Kingston Dock on the south side, of 5⅓ acres, was opened, but soon proved inadequate, and in 1880 Queen's Dock (two basins) at Stobcross, on the north side, of 30 acres, was completed. Although this could accommodate one million tons of shipping, more dock space was speedily called for, and in 1897 Prince's Dock (three basins) on the opposite side, of 72 acres, was opened, fully equipped with hydraulic and steam cranes and all the other latest appliances. There are, besides, three graving docks, the longest of which (880 ft.) can be made at will into two docks of 417 ft. and 457 ft. in length. The Caledonian and Glasgow & South-Western railways have access to the harbour for goods and minerals at Terminus Quay to the west of Kingston Dock, and a mineral dock has been constructed by the Trust at Clydebank, about 3½ m. below the harbour. The shipping attains to colossal proportions. The imports consist chiefly of flour, fruit, timber, iron ore, live stock and wheat; and the exports principally of cotton manufactures, manufactured iron and steel, machinery, whisky, cotton yarn, linen fabrics, coal, jute, jam and foods, and woollen manufactures.

Government.—By the Local Government (Scotland) Act 1889 the city was placed entirely in the county of Lanark, the districts then transferred having previously belonged to the shires of Dumbarton and Renfrew. In 1891 the boundaries were enlarged to include six suburban burghs and a number of suburban districts, the area being increased from 6111 acres to 11,861 acres. The total area of the city and the conterminous burghs of Govan, Partick and Kinning Park—which, though they successfully resisted annexation in 1891, are practically part of the city—is 15,659 acres. The extreme length from north to south and from east to west is about 5 m. each way, and the circumference measures 27 m. In 1893 the municipal burgh was constituted a county of a city. Glasgow is governed by a corporation consisting of 77 members, including 14 bailies and the lord provost. In 1895 all the powers which the town council exercised as police commissioners and trustees for parks, markets, water and the like were consolidated and conferred upon the corporation. Three years later the two parish councils of the city and barony, which administered the poor law over the greater part of the city north of the Clyde,

were amalgamated as the parish council of Glasgow, with 31 members. As a county of a city Glasgow has a lieutenancy (successive lords provost holding the office) and a court of quarter sessions, which is the appeal court from the magistrates sitting as licensing authority. Under the corporation municipal ownership has reached a remarkable development, the corporation owning the supplies of water, gas and electric power, tramways and municipal lodging-houses. The enterprise of the corporation has brought its work prominently into notice, not only in the United Kingdom, but in the United States of America and elsewhere. In 1859 water was conveyed by aqueducts and tunnels from Loch Katrine (364 ft. above sea-level, giving a pressure of 70 or 80 ft. above the highest point in the city) to the reservoir at Mugdock (with a capacity of 500,000,000 gallons), a distance of 27 m., whence after filtration it was distributed by pipes to Glasgow, a further distance of 7 m., or 34 m. in all. During the next quarter of a century it became evident that this supply would require to be augmented, and powers were accordingly obtained in 1895 to raise Loch Katrine 5 ft. and to connect with it by tunnel Loch Arklet (455 ft. above the sea), with storage for 2,050,000,000 gallons, the two lochs together possessing a capacity of twelve thousand million gallons. The entire works between the loch and the city were duplicated over a distance of 23½ m., and an additional reservoir, holding 694,000,000 gallons, was constructed, increasing the supply held in reserve from 12½ days' to 30½ days'. In 1909 the building of a dam was undertaken 1¼ m. west of the lower end of Loch Arklet, designed to create a sheet of water 2½ m. long and to increase the water-supply of the city by ten million gallons a day. The water committee supplies hydraulic power to manufacturers and merchants. In 1869 the corporation acquired the gasworks, the productive capacity of which exceeds 70 million cub. ft. a day. In 1893 the supply of electric light was also undertaken, and since that date the city has been partly lighted by electricity. The corporation also laid down the tramways, which were leased by a company for twenty-three years at a rental of £150 a mile per annum. When the lease expired in 1894 the town council took over the working of the cars, substituting overhead electric traction for horse-power. One of the most difficult problems that the corporation has had to deal with was the housing of the poor. By the lapse of time and the congestion of population, certain quarters of the city, in old Glasgow especially, had become slums and rookeries of the worst description. The condition of the town was rapidly growing into a byword, when the municipality obtained parliamentary powers in 1866 enabling it to condemn for purchase over-crowded districts, to borrow money and levy rates. The scheme of reform contemplated the demolition of 10,000 insanitary dwellings occupied by 50,000 persons, but the corporation was required to provide accommodation for the dislodged whenever the numbers exceeded 500. In point of fact they never needed to build, as private enterprise more than kept pace with the operations of the improvement. The work was carried out promptly and effectually, and when the act expired in 1881 whole localities had been recreated and nearly 40,000 persons properly housed. Under the amending act of 1881 the corporation began in 1888 to build tenement houses in which the poor could rent one or more rooms at the most moderate rentals; lodging-houses for men and women followed, and in 1896 a home was erected for the accommodation of families in certain circumstances. The powers of the improvement trustees were practically exhausted in 1896, when it appeared that during twenty-nine years £1,955,550 had been spent in buying and improving land and buildings, and £231,500 in building tenements and lodging-houses; while, on the other side, ground had been sold for £1,072,000, and the trustees owned heritable property valued at £692,000, showing a deficiency of £423,050. Assessment of ratepayers for the purposes of the trust had yielded £593,000, and it was estimated that these operations, beneficial to the city in a variety of ways, had cost the citizens £24,000 a year. In 1897 an act was obtained for dealing in similar fashion with insanitary and congested areas in the centre of the city, and on the south side of the river, and for acquiring not more than 25 acres of land, within or without the city, for dwellings for the poorest classes. Along with these later improvements the drainage system was entirely remodelled, the area being divided into three sections, each distinct, with separate works for the disposal of its own sewage. One section (authorized in 1891 and doubled in 1901) comprises 11 sq. m.—one-half within the city north of the river, and the other in the district in Lanarkshire—with works at Dalmarnock; another section (authorized in 1896) includes the area on the north bank not provided for in 1891, as well as the burghs of Partick and Clydebank and intervening portions of the shires of Renfrew and Dumbarton, the total area consisting of 14 sq. m., with works at Dalmuir, 7 m. below Glasgow; and the third section (authorized in 1898) embraces the whole municipal area on the south side of the river, the burghs of Rutherglen, Pollokshaws, Kinning Park and Govan, and certain districts in the counties of Renfrew and Lanark—14 sq. m. in all, which may be extended by the inclusion of the burghs of Renfrew and Paisley—with works at Braehead, 1 m. east of Renfrew. Among other works in which it has interests there may be mentioned its representation on the board of the Clyde Navigation Trust and the governing body of the West of Scotland Technical College. In respect of parliamentary representation the Reform Act of 1832 gave two members to Glasgow, a third was added in 1868 (though each elector had only two votes), and in 1885 the city was split up into seven divisions, each returning one member.

Population.—Throughout the 19th century the population grew prodigiously. Only 77,385 in 1801, it was nearly doubled in twenty years, being 147,043 in 1821, already outstripping Edinburgh. It had become 395,503 in 1861, and in 1881 it was 511,415. In 1891, prior to extension of the boundary, it was 565,839, and, after extension, 658,198, and in 1901 it stood at 761,709. The birth-rate averages 33, and the death-rate 21 per 1000, but the mortality before the city improvement scheme was carried out was as high as 33 per 1000. Owing to its being convenient of access from the Highlands, a very considerable number of Gaelic-speaking persons live in Glasgow, while the great industries attract an enormous number of persons from other parts of Scotland. The valuation of the city, which in 1878-1879 was £3,420,697, now exceeds £5,000,000.

History.—There are several theories as to the origin of the name of Glasgow. One holds that it comes from Gaelic words meaning "dark glen," descriptive of the narrow ravine through which the Molendinar flowed to the Clyde. But the more generally accepted version is that the word is the Celtic *Cleschu*, afterwards written Glesco or Glasghu, meaning "dear green spot" (*glas*, green; *cu* or *ghu*,

dear), which is supposed to have been the name of the settlement that Kentigern found here when he came to convert the Britons of Strathclyde. Mungo became the patron-saint of Glasgow, and the motto and arms of the city are wholly identified with him—"Let Glasgow Flourish by the Preaching of the Word," usually shortened to "Let Glasgow Flourish." It is not till the 12th century, however, that the history of the city becomes clear. About 1178 William the Lion made the town by charter a burgh of barony, and gave it a market with freedom and customs. Amongst more or less isolated episodes of which record has been preserved may be mentioned the battle of the Bell o' the Brae, on the site of High Street, in which Wallace routed the English under Percy in 1300; the betrayal of Wallace to the English in 1305 in a barn situated, according to tradition, in Robroyston, just beyond the north-eastern boundary of the city; the ravages of the plague in 1350 and thirty years later; the regent Arran's siege, in 1544, of the bishop's castle, garrisoned by the earl of Glencairn, and the subsequent fight at the Butts (now the Gallowgate) when the terms of surrender were dishonoured, in which the regent's men gained the day. Most of the inhabitants were opposed to Queen Mary and many actively supported Murray in the battle of Langside—the site of which is now occupied by the Queen's Park—on the 13th of May 1568, in which she lost crown and kingdom. A memorial of the conflict was erected on the site in 1887. Under James VI. the town became a royal burgh in 1636, with freedom of the river from the Broomielaw to the Cloch. But the efforts to establish episcopacy aroused the fervent anti-prelatical sentiment of the people, who made common cause with the Covenanters to the end of their long struggle. Montrose mulcted the citizens heavily after the battle of Kilsyth in 1645, and three years later the provost and bailies were deposed for contumacy to their sovereign lord. Plague and famine devastated the town in 1649, and in 1652 a conflagration laid a third of the burgh in ashes. Even after the restoration its sufferings were acute. It was the headquarters of the Whiggamores of the west and its prisons were constantly filled with rebels for conscience' sake. The government scourged the townsfolk with an army of Highlanders, whose brutality only served to strengthen the resistance at the battles of Drumclog and Bothwell Brig. With the Union, hotly resented as it was at the time, the dawn of almost unbroken prosperity arose. By the treaty of Union Scottish ports were placed, in respect of trade, on the same footing as English ports, and the situation of Glasgow enabled it to acquire a full share of the ever-increasing Atlantic trade. Its commerce was already considerable and in population it was now the second town in Scotland. It enjoyed a practical monopoly of the sale of raw and refined sugars, had the right to distil spirits from molasses free of duty, dealt largely in cured herring and salmon, sent hides to English tanners and manufactured soap and linen. It challenged the supremacy of Bristol in the tobacco trade—fetching cargoes from Virginia, Maryland and Carolina in its own fleet—so that by 1772 its importations of tobacco amounted to more than half of the whole quantity brought into the United Kingdom. The tobacco merchants built handsome mansions and the town rapidly extended westwards. With the surplus profits new industries were created, which helped the city through the period of the American War. Most, though not all, of the manufactures in which Glasgow has always held a foremost place date from this period. It was in 1764 that James Watt succeeded in repairing a hitherto unworkable model of Newcomen's fire (steam) engine in his small workshop within the college precincts. Shipbuilding on a colossal scale and the enormous developments in the iron industries and engineering were practically the growth of the 19th century. The failure of the Western bank in 1857, the Civil War in the United States, the collapse of the City of Glasgow bank in 1878, among other disasters, involved heavy losses and distress, but recovery was always rapid.

AUTHORITIES.—J. Cleland, *Annals of Glasgow* (Glasgow, 1816); Duncan, *Literary History of Glasgow* (Glasgow, 1886); *Registrum Episcopatus Glasgow* (Maitland Club, 1843); Pagan, *Sketch of the History of Glasgow* (Glasgow, 1847); Sir J. D. Marwick, *Extracts from the Burgh Records of Glasgow* (Burgh Records Society); *Charters relating to Glasgow* (Glasgow, 1891); *River Clyde and Harbour of Glasgow* (Glasgow, 1898); *Glasgow Past and Present* (Glasgow, 1884); *Munimenta Universitatis Glasgow* (Maitland Club, 1854); J. Strang, *Glasgow and its Clubs* (Glasgow, 1864); Reid ("Senex"), *Old Glasgow* (Glasgow, 1864); A. Macgeorge, *Old Glasgow* (Glasgow, 1888); Deas, *The River Clyde* (Glasgow, 1881); Gale, *Loch Katrine Waterworks* (Glasgow, 1883); Mason, *Public and Private Libraries of Glasgow* (Glasgow, 1885); J. Nicol, *Vital, Social and Economic Statistics of Glasgow* (1881); J. B. Russell, *Life in One Room* (Glasgow, 1888); *Ticketed Houses* (Glasgow, 1889); T. Somerville, *George Square* (Glasgow, 1891); J. A. Kilpatrick, *Literary Landmarks of Glasgow* (Glasgow, 1898); J. K. M'Dowall, *People's History of Glasgow* (Glasgow, 1899); Sir J. Bell and J. Paton, *Glasgow: Its Municipal Organization and Administration* (Glasgow, 1896); Sir D. Richmond, *Notes on Municipal Work* (Glasgow, 1899); J. M. Lang, *Glasgow and the Barony* (Glasgow, 1895); *Old Glasgow* (Glasgow, 1896); J. H. Muir, *Glasgow in 1901*.

GLASITES, or SANDEMANIANS,[1] a Christian sect, founded in Scotland by John Glas (*q.v.*). It spread into England and America, but is now practically extinct. Glas dissented from the Westminster Confession only in his views as to the spiritual nature of the church and the functions of the civil magistrate. But his son-in-law Robert Sandeman added a distinctive doctrine as to the nature of faith which is thus stated on his tombstone: "That the bare death of Jesus Christ without a thought or deed on the part of man, is sufficient to present the chief of sinners spotless before God." In a series of letters to James Hervey, the author of *Theron and Aspasia*, he maintained that justifying faith is a simple assent to the divine testimony concerning Jesus Christ, differing in no way in its character from belief in any ordinary testimony. In their practice the Glasite churches aimed at a strict conformity with the

primitive type of Christianity as understood by them. Each congregation had a plurality of elders, pastors or bishops, who were chosen according to what were believed to be the instructions of Paul, without regard to previous education or present occupation, and who enjoy a perfect equality in office. To have been married a second time disqualified for ordination, or for continued tenure of the office of bishop. In all the action of the church unanimity was considered to be necessary; if any member differed in opinion from the rest, he must either surrender his judgment to that of the church, or be shut out from its communion. To join in prayer with any one not a member of the denomination was regarded as unlawful, and even to eat or drink with one who had been excommunicated was held to be wrong. The Lord's Supper was observed weekly; and between forenoon and afternoon service every Sunday a love feast was held at which every member was required to be present. Mutual exhortation was practised at all the meetings for divine service, when any member who had the gift of speech (χάρισμα) was allowed to speak. The practice of washing one another's feet was at one time observed; and it was for a long time customary for each brother and sister to receive new members, on admission, with a holy kiss. "Things strangled" and "blood" were rigorously abstained from; the lot was regarded as sacred; the accumulation of wealth they held to be unscriptural and improper, and each member considered his property as liable to be called upon at any time to meet the wants of the poor and the necessities of the church. Churches of this order were founded in Paisley, Glasgow, Edinburgh, Leith, Arbroath, Montrose, Aberdeen, Dunkeld, Cupar, Galashiels, Liverpool and London, where Michael Faraday was long an elder. Their exclusiveness in practice, neglect of education for the ministry, and the antinomian tendency of their doctrine contributed to their dissolution. Many Glasites joined the general body of Scottish Congregationalists, and the sect may now be considered extinct. The last of the Sandemanian churches in America ceased to exist in 1890.

See James Ross, *History of Congregational Independency in Scotland* (Glasgow, 1900).

(D. Mn.)

1 The name Glasites or Glassites was generally used in Scotland; in England and America the name Sandemanians was more common.

GLASS (O.E. *glæs*, cf. Ger. *Glas*, perhaps derived from an old Teutonic root *gla-*, a variant of *glo-*, having the general sense of shining, cf. "glare," "glow"), a hard substance, usually transparent or translucent, which from a fluid condition at a high temperature has passed to a solid condition with sufficient rapidity to prevent the formation of visible crystals. There are many varieties of glass differing widely in chemical composition and in physical qualities. Most varieties, however, have certain qualities in common. They pass through a viscous stage in cooling from a state of fluidity; they develop effects of colour when the glass mixtures are fused with certain metallic oxides; they are, when cold, bad conductors both of electricity and heat, they are easily fractured by a blow or shock and show a conchoidal fracture; they are but slightly affected by ordinary solvents, but are readily attacked by hydrofluoric acid.

The structure of glass has been the subject of repeated investigations. The theory most widely accepted at present is that glass is a quickly solidified solution, in which silica, silicates, borates, phosphates and aluminates may be either solvents or solutes, and metallic oxides and metals may be held either in solution or in suspension. Long experience has fixed the mixtures, so far as ordinary furnace temperatures are concerned, which produce the varieties of glass in common use. The essential materials of which these mixtures are made are, for English flint glass, sand, carbonate of potash and red lead; for plate and sheet glass, sand, carbonate or sulphate of soda and carbonate of lime; and for Bohemian glass, sand, carbonate of potash and carbonate of lime. It is convenient to treat these glasses as "normal" glasses, but they are in reality mixtures of silicates, and cannot rightly be regarded as definite chemical compounds or represented by definite chemical formulae.

The knowledge of the chemistry of glass-making has been considerably widened by Dr F. O. Schott's experiments at the Jena glass-works. The commercial success of these works has demonstrated the value of pure science to manufactures.

The recent large increase in the number of varieties of glass has been chiefly due to developments in the manufacture of optical glass. Glasses possessing special qualities have been required, and have been supplied by the introduction of new combinations of materials. The range of the specific gravity of glasses from 2.5 to 5.0 illustrates the effect of modified compositions. In the same way glass can be rendered more or less fusible, and its stability can be increased both in relation to extremes of temperature and to the chemical action of solvents.

The fluidity of glass at a high temperature renders possible the processes of ladelling, pouring, casting and stirring. A mass of glass in a viscous state can be rolled with an iron roller like dough; can be rendered hollow by the pressure of the human breath or by compressed air; can be forced by air pressure, or by a mechanically driven plunger, to take the shape and impression of a mould; and can be almost indefinitely extended as solid rod or as hollow tube. So extensible is viscous glass that it can be drawn out into a filament sufficiently fine and elastic to be woven into a fabric.

Glasses are generally transparent but may be translucent or opaque. Semi-opacity due to

crystallization may be induced in many glasses by maintaining them for a long period at a temperature just insufficient to cause fusion. In this way is produced the crystalline, devitrified material, known as Réaumur's porcelain. Semi-opacity and opacity are usually produced by the addition to the glass-mixtures of materials which will remain in suspension in the glass, such as oxide of tin, oxide of arsenic, phosphate of lime, cryolite or a mixture of felspar and fluorspar.

Little is known about the actual cause of colour in glass beyond the fact that certain materials added to and melted with certain glass-mixtures will in favourable circumstances produce effects of colour. The colouring agents are generally metallic oxides. The same oxide may produce different colours with different glass-mixtures, and different oxides of the same metal may produce different colours. The purple-blue of cobalt, the chrome green or yellow of chromium, the dichroic canary-colour of uranium and the violet of manganese, are constant. Ferrous oxide produces an olive green or a pale blue according to the glass with which it is mixed. Ferric oxide gives a yellow colour, but requires the presence of an oxidizing agent to prevent reduction to the ferrous state. Lead gives a pale yellow colour. Silver oxide, mixed as a paint and spread on the surface of a piece of glass and heated, gives a permanent yellow stain. Finely divided vegetable charcoal added to a soda-lime glass gives a yellow colour. It has been suggested that the colour is due to sulphur, but the effect can be produced with a glass mixture containing no sulphur, free or combined, and by increasing the proportion of charcoal the intensity of the colour can be increased until it reaches black opacity. Selenites and selenates give a pale pink or pinkish yellow. Tellurium appears to give a pale pink tint. Nickel with a potash-lead glass gives a violet colour, and a brown colour with a soda-lime glass. Copper gives a peacock-blue which becomes green if the proportion of the copper oxide is increased. If oxide of copper is added to a glass mixture containing a strong reducing agent, a glass is produced which when first taken from the crucible is colourless but on being reheated develops a deep crimson-ruby colour. A similar glass, if its cooling is greatly retarded, produces throughout its substance minute crystals of metallic copper, and closely resembles the mineral called avanturine. There is also an intermediate stage in which the glass has a rusty red colour by reflected light, and a purple-blue colour by transmitted light. Glass containing gold behaves in almost precisely the same way, but the ruby glass is less crimson than copper ruby glass. J. E. C. Maxwell Garnett, who has studied the optical properties of these glasses, has suggested that the changes in colour correspond with changes effected in the structure of the metals as they pass gradually from solution in the glass to a state of crystallization.

Owing to impurities contained in the materials from which glasses are made, accidental coloration or discoloration is often produced. For this reason chemical agents are added to glass mixtures to remove or neutralize accidental colour. Ferrous oxide is the usual cause of discoloration. By converting ferrous into ferric oxide the green tint is changed to yellow, which is less noticeable. Oxidation may be effected by the addition to the glass mixture of a substance which gives up oxygen at a high temperature, such as manganese dioxide or arsenic trioxide. With the same object, red lead and saltpetre are used in the mixture for potash-lead glass. Manganese dioxide not only acts as a source of oxygen, but develops a pink tint in the glass, which is complementary to and neutralizes the green colour due to ferrous oxide.

Glass is a bad conductor of heat. When boiling water is poured into a glass vessel, the vessel frequently breaks, on account of the unequal expansion of the inner and outer layers. If in the process of glass manufacture a glass vessel is suddenly cooled, the constituent particles are unable to arrange themselves and the vessel remains in a state of extreme tension. The surface of the vessel may be hard, but the vessel is liable to fracture on receiving a trifling shock. M. de la Bastie's process of "toughening" glass consisted in dipping glass, raised to a temperature slightly below the melting-point, into molten tallow. The surface of the glass was hardened, but the inner layers remained in unstable equilibrium. Directly the crust was pierced the whole mass was shattered into minute fragments. In all branches of glass manufacture the process of "annealing," *i.e.* cooling the manufactured objects sufficiently slowly to allow the constituent particles to settle into a condition of equilibrium, is of vital importance. The desired result is obtained either by moving the manufactured goods gradually away from a constant source of heat, or by placing them in a heated kiln and allowing the heat gradually to die out.

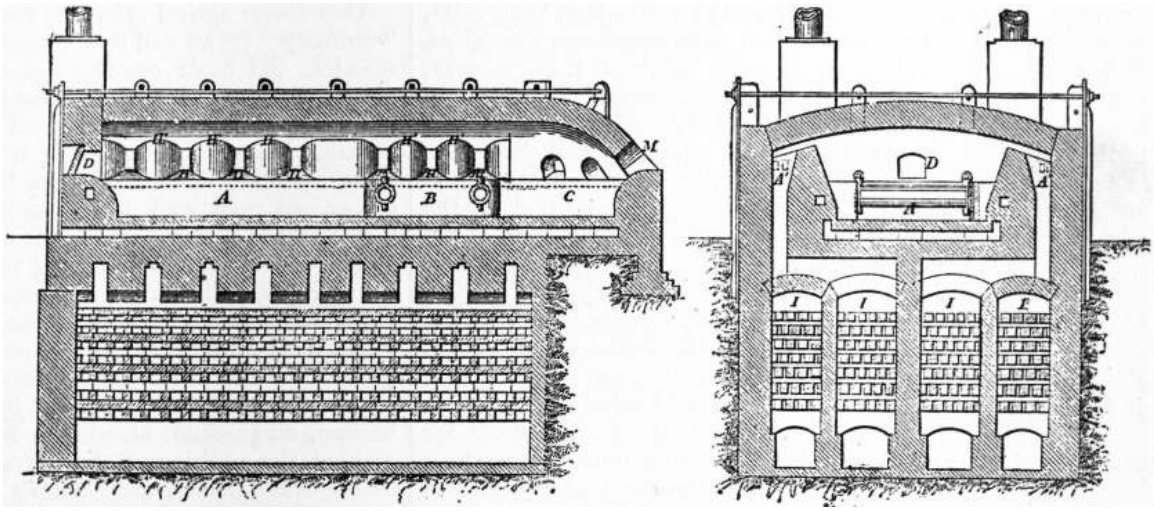


FIG. 15.—Siemens's Continuous Tank Furnace.

The furnaces (fig. 15) employed for melting glass are usually heated with gas on the “Siemens,” or some similar system of regenerative heating. In the United States natural gas is used wherever it is available. In some English works coal is still employed for direct heating with various forms of mechanical stokers. Crude petroleum and a thin tar, resulting from the process of enriching water-gas with petroleum, have been used both with compressed air and with steam with considerable success. Electrical furnaces have not as yet been employed for ordinary glass-making on a commercial scale, but the electrical plants which have been erected for melting and moulding quartz suggest the possibility of electric heating being employed for the manufacture of glass. Many forms of apparatus have been tried for ascertaining the temperature of glass furnaces. It is usually essential that some parts of the apparatus shall be made to acquire a temperature identical with the temperature to be measured. Owing to the physical changes produced in the material exposed prolonged observations of temperature are impossible. In the Féry radiation pyrometer this difficulty is obviated, as the instrument may be placed at a considerable distance from the furnace. The radiation passing out from an opening in the furnace falls upon a concave mirror in a telescope and is focused upon a thermoelectric couple. The hotter the furnace the greater is the rise of temperature of the couple. The electromotive force thus generated is measured by a galvanometer, the scale of which is divided and figured so that the temperature may be directly read. (See Thermometry.)

In dealing with the manufacture of glass it is convenient to group the various branches in the following manner:

Manufactured Glass.

I. Optical Glass	
II. Blown Glass	A. Table glass. B. Tube. Special glasses for thermometers, and other special glasses. C. Sheet and crown glass. D. Bottles.
III. Mechanically Pressed Glass	A. Plate and rolled plate glass. B. Pressed table glass.

I. Optical Glass.—As regards both mode of production and essential properties optical glass differs widely from all other varieties. These differences arise primarily from the fact that glass for optical uses is required in comparatively large and thick pieces, while for most other purposes glass is used in the form of comparatively thin sheets; when, therefore, as a consequence of Dollond’s invention of achromatic telescope objectives in 1757, a demand first arose for optical glass, the industry was unable to furnish suitable material. Flint glass particularly, which appeared quite satisfactory when viewed in small pieces, was found to be so far from homogeneous as to be useless for lens construction. The first step towards overcoming this vital defect in optical glass was taken by P. L. Guinand, towards the end of the 18th century, by introducing the process of stirring the molten glass by means of a cylinder of fireclay. Guinand was induced to migrate from his home in Switzerland to Bavaria, where he worked at the production of homogeneous flint glass, first with Joseph von Utzschneider and then with J. Fraunhofer; the latter ultimately attained considerable success and produced telescope disks up to 28 centimetres (11 in.) diameter. Fraunhofer further initiated the specification of refraction and dispersion in terms of certain lines of the spectrum, and even attempted an investigation of the effect of chemical composition on the relative dispersion produced by glasses in different parts of the spectrum. Guinand’s process was further developed in France by Guinand’s sons and subsequently by Bontemps and E. Feil. In 1848 Bontemps was obliged to leave France for political reasons and came to England, where he initiated the optical glass manufacture at Chance’s glass works near Birmingham, and this firm ultimately attained a considerable reputation in the production of optical glass, especially of large disks for telescope objectives. Efforts at improving optical glass had, however, not been confined to the descendants and successors of Guinand and Fraunhofer. In 1824 the Royal Astronomical Society of London appointed a committee on the subject, the experimental work being carried out by Faraday. Faraday independently recognized the necessity for mechanical agitation of the molten glass in order to ensure homogeneity, and to facilitate his manipulations he worked with dense lead borate glasses which are very fusible, but have proved too unstable for ordinary optical purposes. Later Máes of Clichy (France) exhibited some “zinc crown” glass in small plates of optical quality at the London Exhibition of 1851; and another French glass-maker, Lamy, produced a dense thallium glass in 1867. In 1834 W. V. Harcourt began experiments in glass-making, in which he was subsequently joined by G. G. Stokes. Their object was to pursue the inquiry begun by Fraunhofer as to the effect of chemical composition on the distribution of dispersion. The specific effect of boric acid in this respect was correctly ascertained by Stokes and Harcourt, but they mistook the effect of titanic acid. J. Hopkinson, working at Chance’s glass works, subsequently made an attempt to produce a titanium silicate glass, but nothing further resulted.

The next and most important forward step in the progress of optical glass manufacture was initiated by Ernst Abbe and carried out jointly by him and O. Schott at Jena in Germany. Aided by grants from the Prussian government, these workers systematically investigated the effect of introducing a large number of different chemical substances (oxides) into vitreous fluxes. As a result a whole series of glasses of novel composition and optical properties were produced. A certain number of the most promising of these, from the purely optical point of view, had unfortunately to be abandoned for

practical use owing to their chemical instability, and the problem of Fraunhofer, viz. the production of pairs of glasses of widely differing refraction and dispersion, but having a similar distribution of dispersion in the various regions of the spectrum, was not in the first instance solved. On the other hand, while in the older crown and flint glasses the relation between refraction and dispersion had been practically fixed, dispersion and refraction increasing regularly with the density of the glass, in some of the new glasses introduced by Abbe and Schott this relation is altered and a relatively low refractive index is accompanied by a relatively high dispersion, while in others a high refractive index is associated with low dispersive power.

The initiative of Abbe and Schott, which was greatly aided by the resources for scientific investigation available at the Physikalische Reichsanstalt (Imperial Physical Laboratory), led to such important developments that similar work was undertaken in France by the firm of Mantois, the successors of Feil, and somewhat later by Chance in England. The manufacture of the new varieties of glass, originally known as “Jena” glasses, is now carried out extensively and with a considerable degree of commercial success in France, and also to a less extent in England, but none of the other makers of optical glass has as yet contributed to the progress of the industry to anything like the same extent as the Jena firm.

The older optical glasses, now generally known as the “ordinary” crown and flint glasses, are all of the nature of pure silicates, the basic constituents being, in the case of crown glasses, lime and soda or lime and potash, or a mixture of both, and in the case of flint glasses, lead and either (or both) soda and potash. With the exception of the heavier flint (lead) glasses, these can be produced so as to be free both from noticeable colour and from such defects as bubbles, opaque inclusions or “striae,” but extreme care in the choice of all the raw materials and in all the manipulations is required to ensure this result. Further, these glasses, when made from properly proportioned materials, possess a very considerable degree of chemical stability, which is amply sufficient for most optical purposes. The newer glasses, on the other hand, contain a much wider variety of chemical constituents, the most important being the oxides of barium, magnesium, aluminium and zinc, used either with or without the addition of the bases already named in reference to the older glasses, and—among acid bodies—boric anhydride (B_2O_3) which replaces the silica of the older glasses to a varying extent. It must be admitted that, by the aid of certain of these new constituents, glasses can be produced which, as regards purity of colour, freedom from defects and chemical stability are equal or even superior to the best of the “ordinary” glasses, but it is a remarkable fact that when this is the case the optical properties of the new glass do not fall very widely outside the limits set by the older glasses. On the other hand, the more extreme the optical properties of these new glasses, *i.e.* the further they depart from the ratio of refractive index to dispersive power found in the older glasses, the greater the difficulty found in obtaining them of either sufficient purity or stability to be of practical use. It is, in fact, admitted that some of the glasses, most useful optically, the dense barium crown glasses, which are so widely used in modern photographic lenses, cannot be produced entirely free either from noticeable colour or from numerous small bubbles, while the chemical nature of these glasses is so sensitive that considerable care is required to protect the surfaces of lenses made from them if serious tarnishing is to be avoided. In practice, however, it is not found that the presence either of a decidedly greenish-yellow colour or of numerous small bubbles interferes at all seriously with the successful use of the lenses for the majority of purposes, so that it is preferable to sacrifice the perfection of the glass in order to secure valuable optical properties.

It is a further striking fact, not unconnected with those just enumerated, that the extreme range of optical properties covered even by the relatively large number of optical glasses now available is in reality very small. The refractive indices of all glasses at present available lie between 1.46 and 1.90, whereas transparent minerals are known having refractive indices lying considerably outside these limits; at least one of these, fluorite (calcium fluoride), is actually used by opticians in the construction of certain lenses, so that probably progress is to be looked for in a considerable widening of the limits of available optical materials; possibly such progress may lie in the direction of the artificial production of large mineral crystals.

The qualities required in optical glasses have already been partly referred to, but may now be summarized:—

1. *Transparency and Freedom from Colour.*—These qualities can be readily judged by inspection of the glass in pieces of considerable thickness, and they may be quantitatively measured by means of the spectro-photometer.

2. *Homogeneity.*—The optical desideratum is uniformity of refractive index and dispersive power throughout the mass of the glass. This is probably never completely attained, variations in the sixth significant figure of the refractive index being observed in different parts of single large blocks of the most perfect glass. While such minute and gradual variations are harmless for most optical purposes, sudden variations which generally take the form of striae or veins are fatal defects in all optical glass. In their coarsest forms such striae are readily visible to the unaided eye, but finer ones escape detection unless special means are taken for rendering them visible; such special means conveniently take the form of an apparatus for examining the glass in a beam of parallel light, when the striae scatter the light and appear as either dark or bright lines according to the position of the eye. Plate glass of the usual quality, which appears to be perfectly homogeneous when looked at in the ordinary way, is seen to be a mass of fine striae, when a considerable thickness is examined in parallel light. Plate glass is, nevertheless, considerably used for the cheaper forms of lenses, where the scattering of the light and loss of definition arising from these fine striae is not readily recognized.

Bubbles and enclosures of opaque matter, although more readily observed, do not constitute such serious defects; their presence in a lens, to a moderate extent, does not interfere with its performance (see above).

3. *Hardness and Chemical Stability.*—These properties contribute to the durability of lenses, and are specially desirable in the outer members of lens combinations which are likely to be subjected to frequent handling or are exposed to the weather. As a general rule, to which, however, there are important exceptions, both these qualities are found to a greater degree, the lower the refractive index of the glass. The chemical stability, *i.e.* the power of resisting the disintegrating effects of atmospheric moisture and carbonic acid, depends largely upon the quantity of alkalis contained in the glass and their proportion to the lead, lime or barium present, the stability being generally less the higher the proportion of alkali. A high silica-content tends towards both hardness and chemical stability, and this can be further increased by the addition of small proportions of boric acid; in larger quantities, however, the latter constituent produces the opposite effect.

4. *Absence of Internal Strain.*—Internal strain in glass arises from the unequal contraction of the outer and inner portions of masses of glass during cooling. Processes of annealing, or very gradual cooling, are intended to relieve these strains, but such processes are only completely effective when the cooling, particularly through those ranges of temperature where the glass is just losing the last traces of plasticity, is extremely gradual, a rate measured in hours per degree Centigrade being required. The existence of internal strains in glass can be readily recognized by examination in polarized light, any signs of double refraction indicating the existence of strain. If the glass is very badly annealed, the lenses made from it may fly to pieces during or after manufacture, but apart from such extreme cases the optical effects of internal strain are not readily observed except in large optical apparatus. Very perfectly annealed optical glass is now, however, readily obtainable.

5. *Refraction and Dispersion.*—The purely optical properties of refraction and dispersion, although of the greatest importance, cannot be dealt with in any detail here; for an account of the optical properties required in glasses for various forms of lenses see the articles Lens and Aberration: II. *In Optical Systems*. As typical of the range of modern optical glasses Table I. is given, which constituted the list of optical glasses exhibited by Messrs Chance at the Optical Convention in London in 1905. In this table n is the refractive index of the glass for sodium light (the D line of the solar spectrum), while the letters C, F and G′ refer to lines in the hydrogen spectrum by which dispersion is now generally specified. The symbol ν represents the inverse of the dispersive power, its value being $(n_D - 1)/(C - F)$. The very much longer lists of German and French firms contain only a few types not represented in this table.

Table I.—*Optical Properties.*

Factory Number.	Name.	n_D.	ν.	Medium Dispersion. C − F.	Partial and Relative Partial Dispersions.					
					C − D.	$\frac{C-D}{C-F}$.	D − F.	$\frac{D-F}{C-F}$.	F − G′.	$\frac{F-G'}{C-F}$.
C. 644	Extra Hard Crown	1.4959	64.4	.00770	.00228	.296	.00542	.704	.00431	.560
B. 646	Boro-silicate Crown	1.5096	63.3	.00803	.00236	.294	.00562	.700	.00446	.555
A. 605	Hard Crown	1.5175	60.5	.00856	.00252	.294	.00604	.706	.00484	.554
C. 577	Medium Barium Crown	1.5738	57.9	.00990	.00293	.296	.00697	.704	.00552	.557
C. 579	Densest Barium Crown	1.6065	57.9	.01046	.00308	.294	.00738	.705	.00589	.563
A. 569	Soft Crown.	1.5152	56.9	.00906	.00264	.291	.00642	.708	.00517	.570
B. 563	Medium Barium Crown	1.5660	56.3	.01006	.00297	.295	.00709	.704	.00576	.572
B. 535	Barium Light Flint	1.5452	53.5	.01020	.00298	.292	.00722	.701	.00582	.570
A. 490	Extra Light Flint	1.5316	49.0	.01085	.00313	.288	.00772	.711	.00630	.580
A. 485	Extra Light Flint	1.5333	48.5	.01099	.00322	.293	.00777	.707	.00643	.582
C. 474	Boro-silicate Flint	1.5623	47.4	.01187	.00343	.289	.00844	.711	.00693	.584
B. 466	Barium Light Flint	1.5833	46.6	.01251	.00362	.288	.00889	.711	.00721	.576
B. 458	Soda Flint	1.5482	45.8	.01195	.00343	.287	.00852	.713	.00690	.577
A. 458	Light Flint	1.5472	45.8	.01196	.00348	.291	.00848	.709	.00707	.591
A. 432	Light Flint	1.5610	43.2	.01299	.00372	.287	.00927	.713	.00770	.593
A. 410	Light Flint	1.5760	41.0	.01404	.00402	.286	.01002	.713	.00840	.598
B. 407	Light Flint	1.5787	40.7	.01420	.00404	.284	.01016	.715	.00840	.591
A. 370	Dense Flint	1.6118	36.9	.01657	.00470	.284	.01187	.716	.01004	.606
A. 361	Dense Flint	1.6214	36.1	.01722	.00491	.285	.01231	.715	.01046	.608
A. 360	Dense Flint	1.6225	36.0	.01729	.00493	.286	.01236	.715	.01054	.609
A. 337	Extra Dense Flint	1.6469	33.7	.01917	.00541	.285	.01376	.720	.01170	.655
A. 299	Densest Flint	1.7129	29.9	.02384	.00670	.281	.01714	.789	.01661	.678

Manufacture of Optical Glass.—In its earlier stages, the process for the production of optical glass closely resembles that used in the production of any other glass of the highest quality. The raw materials are selected with great care to assure chemical purity, but whereas in most glasses the only impurities to be dreaded are those that are either infusible or produce a colouring effect upon the glass, for optical purposes the admixture of other glass-forming bodies than those which are intended to be present must be avoided on account of their effect in modifying the optical constants of the glass. Constancy of composition of the raw materials and their careful and thorough admixture in constant proportions are therefore essential to the production of the required glasses. The materials are generally used in the form either of oxides (lead, zinc, silica, &c.) or of salts readily decomposed by heat, such as the nitrates or carbonates. Fragments of glass of the same composition as that aimed at are generally incorporated to a limited extent with the mixed raw materials to facilitate their fusion.

The crucibles or pots used for the production of optical glass very closely resemble those used in the manufacture of flint glass for other purposes; they are “covered” and the molten materials are thus protected from the action of the furnace gases by the interposition of a wall of fireclay, but as crucibles for optical glass are used for only one fusion and are then broken up, they are not made so thick and heavy as those used in flint-glass making, since the latter remain in the furnace for many weeks. On the other hand, the chemical and physical nature of the fireclays used in the manufacture of such crucibles requires careful attention in order to secure the best results. The furnace used for the production of optical glass is generally constructed to take one crucible only, so that the heat of the furnace may be accurately adjusted to the requirements of the particular glass under treatment. These small furnaces are frequently arranged for direct coal firing, but regenerative gas-fired furnaces are also employed. The empty crucible, having first been gradually dried and heated to a bright red heat in a subsidiary furnace, is taken up by means of massive iron tongs and introduced into the previously heated furnace, the temperature of which is then gradually raised. When a suitable temperature for the fusion of the particular glass in question has been attained, the mixture of raw materials is introduced in comparatively small quantities at a time. In this way the crucible is gradually filled with a mass of molten glass, which is, however, full of bubbles of all sizes. These bubbles arise partly from the air enclosed between the particles of raw materials and partly from the gaseous decomposition products of the materials themselves. In the next stage of the process, the glass is raised to a high temperature in order to render it sufficiently fluid to allow of the complete elimination of these bubbles; the actual temperature required varies with the chemical composition of the glass, a bright red heat sufficing for the most fusible glasses, while with others the utmost capacity of the best furnaces is required to attain the necessary temperature. With these latter glasses there is, of course, considerable risk that the partial fusion and consequent contraction of the fireclay of the crucible may result in its destruction and the entire loss of the glass. The stages of the process so far described generally occupy from 36 to 60 hours, and during this time the constant care and watchfulness of those attending the furnace is required. This is still more the case in the next stage. The examination of small test-pieces of the glass withdrawn from the crucible by means of an iron rod having shown that the molten mass is free from bubbles, the stirring process may be begun, the object of this manipulation being to render the glass as homogeneous as possible and to secure the absence of veins or striae in the product. For this purpose a cylinder of fireclay, provided with a square axial hole at the upper end, is heated in a small subsidiary furnace and is then introduced into the molten glass. Into the square axial hole fits the square end of a hooked iron bar which projects several yards beyond the mouth of the furnace; by means of this bar a workman moves the fireclay cylinder about in the glass with a steady circular sweep. Although the weight of the iron bar is carried by a support, such as an overhead chain or a swivel roller, this operation is very laborious and trying, more especially during the earlier stages when the heat radiated from the open mouth of the crucible is intense. The men who manipulate the stirring bars are therefore changed at short intervals, while the bars themselves have also to be changed at somewhat longer intervals, as they rapidly become oxidized, and accumulated scale would tend to fail off them, thus contaminating the glass below. The stirring process is begun when the glass is perfectly fluid at a temperature little short of the highest attained in its fusion, but as the stirring proceeds the glass is allowed to cool gradually and thus becomes more and more viscous until finally the stirring cylinder can scarcely be moved. When the glass has acquired this degree of consistency it is supposed that no fresh movements can occur within its mass, so that if homogeneity has been attained the glass will preserve it permanently. The stirring is therefore discontinued and the clay cylinder is either left embedded in the glass, or by the exercise of considerable force it may be gradually withdrawn. The crucible with the semi-solid glass which it contains is now allowed to cool considerably in the melting furnace, or it may be removed to another slightly heated furnace. When the glass has cooled so far as to become hard and solid, the furnace is hermetically sealed up and allowed to cool very gradually to the ordinary temperature. If the cooling is very gradual—occupying several weeks—it sometimes happens that the entire contents of a large crucible, weighing perhaps 1000 lb., are found intact as a single mass of glass, but more frequently the mass is found broken up into a number of fragments of various sizes. From the large masses great lenses and mirrors may be produced, while the smaller pieces are used for the production of the disks and slabs of moderate size, in which the optical glass of commerce is usually supplied. In order to allow of the removal of the glass, the cold crucible is broken up and the glass carefully separated from the fragments of fireclay. The pieces of glass are then examined for the detection of the grosser defects, and obviously defective pieces are rejected. As the fractured surfaces of the glass in this condition are unsuitable for delicate examination a good deal of glass that passes this inspection has yet ultimately to be rejected. The next stage in the preparation of the glass is the process of moulding and annealing. Lumps of glass of approximately the right weight are chosen, and are heated to a temperature just sufficient to soften the glass, when the lumps are caused to assume the shape of moulds made of iron or fireclay either by the natural flow of the softened glass under gravity, or by pressure from suitable tools or presses. The glass, now in its approximate form, is placed in a heated chamber where it is allowed to cool very gradually—the minimum time of cooling from a dull red heat being six days, while for “fine annealing” a much longer period is required (see above). At the end of the annealing process the glass issues in the shape of disks or slabs slightly larger than required by the optician in each case. The glass is, however, by no means ready for delivery, since it has yet to be examined with scrupulous care, and all defective pieces must be rejected entirely or at least the defective part must be cut out and the slab remoulded or ground down to a smaller size. For the purpose of rendering this minute examination possible, opposite plane surfaces of the glass are ground approximately flat and polished, the faces to be polished being so chosen as to allow of a view through the greatest possible thickness of glass; thus in slabs the narrow edges are polished.

It will be readily understood from the above account of the process of production that optical glass, relatively to other kinds of glass, is very expensive, the actual price varying from 3s. to 30s. per lb in small slabs or disks. The price, however, rapidly increases with the total bulk of perfect glass required in one piece, so that large disks of glass suitable for telescope objectives of wide aperture, or blocks for large prisms, become exceedingly costly. The reason for this high cost is to be found partly in the fact that the yield of optically perfect glass even in large and successful meltings rarely exceeds 20% of the total weight of glass melted. Further, all the subsequent processes of cutting, moulding and annealing become increasingly difficult, owing to the greatly increased risk of breakage arising from either external injury or internal strain, as the dimensions of the individual piece of glass increase. Nevertheless, disks of optical glass, both crown and flint, have been produced up to 39 in. in diameter.

II. Blown Glass. (A) *Table-ware and Vases.*—The varieties of glass used for the manufacture of table-ware and vases are the potash-lead glass, the soda-lime glass and the potash-lime glass. These glasses may be colourless or coloured. Venetian glass is a soda-lime glass; Bohemian glass is a potash-lime glass. The potash-lead glass, which was first used on a commercial scale in England for the manufacture of table-ware, and which is known as “flint” glass or “crystal,” is also largely used in France, Germany and the United States. Table II. shows the typical composition of these glasses.

Table II.

	SiO_2.	K_2O.	PbO.	Na_2O.	CaO.	MgO.	Fe_2O_3 and Al_2O_3.
Potash-lead (flint) glass	53.17	13.88	32.95	..	..	..	..
Soda-lime (Venetian) glass	73.40	..	..	18.58	5.06	..	2.48
Potash-lime (Bohemian) glass	71.70	12.70	..	2.50	10.30	..	0.90

For melting the leadless glasses, open, bowl-shaped crucibles are used, ranging from 12 to 40 in. in diameter. Glass mixtures containing lead are melted in covered, beehive-shaped crucibles holding from 12 to 18 cwt. of glass. They have a hooded opening on one side near the top. This opening serves for the introduction of the glass-mixture, for the removal of the melted glass and as a source of heat for the processes of manipulation.

The Venetian furnaces in the island of Murano are small low structures heated with wood. The heat passes from the melting furnace into the annealing kiln. In Germany, Austria and the United States, gas furnaces are generally used. In England directly-heated coal furnaces are still in common use, which in many cases are stoked by mechanical feeders. There are two systems of annealing. The manufactured goods are either removed gradually from a constant source of heat by means of a train of small iron trucks drawn along a tramway by an endless chain, or are placed in a heated kiln in which the fire is allowed gradually to die out. The second system is especially used for annealing large and heavy objects. The manufacture of table-ware is carried on by small gangs of men and boys. In England each “gang” or “chair” consists of three men and one boy. In works, however, in which most of the goods are moulded, and where less skilled labour is required, the proportion of boy labour is increased. There are generally two shifts of workmen, each shift working six hours, and the work is carried on continuously from Monday morning until Friday morning. Directly work is suspended the glass remaining in the crucibles is ladled into water, drained and dried. It is then mixed with the glass mixture and broken glass (“cullet”), and replaced in the crucibles. The furnaces are driven to a white heat in order to fuse the mixture and expel bubbles of gas and air. Before work begins the temperature is lowered sufficiently to render the glass viscous. In the viscous state a mass of glass can be coiled upon the heated end of an iron rod, and if the rod is hollow can be blown into a hollow bulb. The tools used are extremely primitive—hollow iron blowing-rods, solid rods for holding vessels during manipulation, spring tools, resembling sugar-tongs in shape, with steel or wooden blades for fashioning the viscous glass, callipers, measure-sticks, and a variety of moulds of wood, carbon, cast iron, gun-metal and plaster of Paris (figs. 16 and 17). The most important tool, however, is the bench or “chair” on which the workman sits, which serves as his lathe. He sits between two rigid parallel arms, projecting forwards and backwards and sloping slightly from back to front. Across the arms he balances the iron rod to which the glass bulb adheres, and rolling it backwards and forwards with the fingers of his left hand fashions the glass between the blades of his sugar-tongs tool, grasped in his right hand. The hollow bulb is worked into the shape it is intended to assume, partly by blowing, partly by gravitation, and partly by the workman’s tool. If the blowing iron is held vertically with the bulb uppermost the bulb becomes flattened and shallow, if the bulb is allowed to hang downwards it becomes elongated and reduced in diameter, and if the end of the bulb is pierced and the iron is held horizontally and sharply trundled, as a mop is trundled, the bulb opens out into a flattened disk.

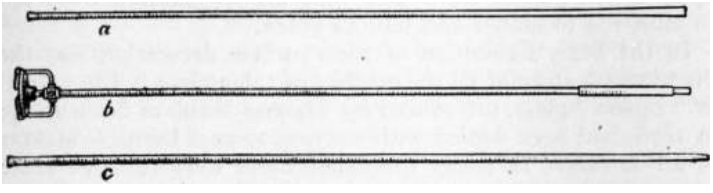


Fig. 16.—Pontils and Blowing Iron.

a, Puntee; *b*, spring puntee; *c*, blowing iron.

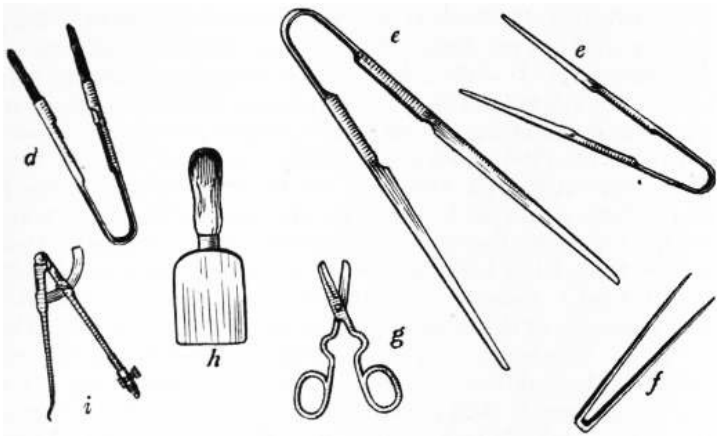


Fig. 17.—Shaping and Measuring Tools.

d, "Sugar-tongs" tool with wooden ends.
e,e, "Sugar-tongs" tools with cutting edges.
f, Pincers.
g, Scissors.
h, Battledore.
i, Marking compass.

During the process of manipulation, whether on the chair or whilst the glass is being reheated, the rod must be constantly and gently trundled to prevent the collapse of the bulb or vessel. Every natural development of the spherical form can be obtained by blowing and fashioning by hand. A non-spherical form can only be produced by blowing the hollow bulb into a mould of the required shape. Moulds are used both for giving shape to vessels and also for impressing patterns on their surface. Although spherical forms can be obtained without the use of moulds, moulds are now largely used for even the simplest kinds of table-ware in order to economize time and skilled labour. In France, Germany and the United States it is rare to find a piece of table-ware which has not received its shape in a mould. The old and the new systems of making a wine-glass illustrate almost all the ordinary processes of glass working. Sufficient glass is first "gathered" on the end of a blowing iron to form the bowl of the wine-glass. The mere act of coiling an exact weight of molten glass round the end of a rod 4 ft. in length requires considerable skill. The mass of glass is rolled on a polished slab of iron, the "marvor," to solidify it, and it is then slightly hollowed by blowing. Under the old system the form of the bowl is gradually developed by blowing and by shaping the bulb with the sugar-tongs tool. The leg is either pulled out from the substance of the base of the bowl, or from a small lump of glass added to the base. The foot starts as a small independent bulb on a separate blowing iron. One extremity of this bulb is made to adhere to the end of the leg, and the other extremity is broken away from its blowing iron. The fractured end is heated, and by the combined action of heat and centrifugal force opens out into a flat foot. The bowl is now severed from its blowing iron and the unfinished wine-glass is supported by its foot, which is attached to the end of a working rod by a metal clip or by a seal of glass. The fractured edge of the bowl is heated, trimmed with scissors and melted so as to be perfectly smooth and even, and the bowl itself receives its final form from the sugar-tongs tool.

Under the new system the bowl is fashioned by blowing the slightly hollowed mass of glass into a mould. The leg is formed and a small lump of molten glass is attached to its extremity to form the foot. The blowing iron is constantly trundled, and the small lump of glass is squeezed and flattened into the shape of a foot, either between two slabs of wood hinged together, or by pressure against an upright board. The bowl is severed from the blowing iron, and the wine-glass is sent to the annealing oven with a bowl, longer than that of the finished glass, and with a rough fractured edge. When the glass is cold the surplus is removed either by grinding, or by applying heat to a line scratched with a diamond round the bowl. The fractured edge is smoothed by the impact of a gas flame.

In the manufacture of a wine-glass the ductility of glass is illustrated on a small scale by the process of pulling out the leg. It is more strikingly illustrated in the manufacture of glass cane and tube. Cane is produced from a solid mass of molten glass, tube from a mass hollowed by blowing. One workman holds the blowing iron with the mass of glass attached to it, and another fixes an iron rod by means of a seal of glass to the extremity of the mass. The two workmen face each other and walk backwards. The diameter of the cane or tube is regulated by the weight of glass carried, and by the distance covered by the two workmen. It is a curious property of viscous glass that whatever form is given to the mass of glass before it is drawn out is retained by the finished cane or tube, however small its section may be. Owing to this property, tubes or canes can be produced with a square, oblong, oval or triangular section. Exceedingly fine canes of milk-white glass play an important part in the masterpieces produced by the Venetian glass-makers of the 16th century. Vases and drinking cups were produced of extreme lightness, in the walls of which were embedded patterns rivalling lace-work in fineness and intricacy. The canes from which the patterns are formed are either simple or complex. The latter are made by dipping a small mass of molten colourless glass into an iron cup around the inner wall of which short lengths of white cane have been arranged at regular intervals. The canes

adhere to the molten glass, and the mass is first twisted and then drawn out into fine cane, which contains white threads arranged in endless spirals. The process can be almost indefinitely repeated and canes formed of extreme complexity. A vase decorated with these simple or complex canes is produced by embedding short lengths of the cane on the surface of a mass of molten glass and blowing and fashioning the mass into the required shape.

Table-ware and vases may be wholly coloured or merely decorated with colour. Touches of colour may be added to vessels in course of manufacture by means of seals of molten glass, applied like sealing-wax; or by causing vessels to wrap themselves round with threads or coils of coloured glass. By the application of a pointed iron hook, while the glass is still ductile, the parallel coils can be distorted into bends, loops or zigzags. The surface of vessels may be spangled with gold or platinum by rolling the hot glass on metallic leaf, or iridescent, by the deposition of metallic tin, or by the corrosion caused by the chemical action of acid fumes. Gilding and enamel decoration are applied to vessels when cold, and fixed by heat.

Cutting and *engraving* are mechanical processes for producing decorative effects by abrading the surface of the glass when cold. The abrasion is effected by pressing the glass against the edge of wheels, or disks, of hard material revolving on horizontal spindles. The spindles of cutting wheels are driven by steam or electric power. The wheels for making deep cuts are made of iron, and are fed with sand and water. The wheels range in diameter from 18 in. to 3 in. Wheels of carborundum are also used. Wheels of fine sandstone fed with water are used for making slighter cuts and for smoothing the rough surface left by the iron wheels. Polishing is effected by wooden wheels fed with wet pumice-powder and rottenstone and by brushes fed with moistened putty-powder. Patterns are produced by combining straight and curved cuts. Cutting brings out the brilliancy of glass, which is one of its intrinsic qualities. At the end of the 18th century English cut glass was unrivalled for design and beauty. Gradually, however, the process was applied without restraint and the products lost all artistic quality. At the present time cut glass is steadily regaining favour.

Engraving is a process of drawing on glass by means of small copper wheels. The wheels range from ½ in. to 2 in. in diameter, and are fed with a mixture of fine emery and oil. The spindles to which the wheels are attached revolve in a lathe worked by a foot treadle. The true use of engraving is to add interest to vessels by means of coats of arms, crests, monograms, inscriptions and graceful outlines. The improper use of engraving is to hide defective material. There are two other processes of marking patterns on glass, but they possess no artistic value. In the “sandblast” process the surface of the glass is exposed to a stream of sharp sand driven by compressed air. The parts of the surface which are not to be blasted are covered by adhesive paper. In the “etching” process the surface of the glass is etched by the chemical action of hydrofluoric acid, the parts which are not to be attacked being covered with a resinous paint. The glass is first dipped in this protective liquid, and when the paint has set the pattern is scratched through it with a sharp point. The glass is then exposed to the acid.

Glass stoppers are fitted to bottles by grinding. The mouth of the bottle is ground by a revolving iron cone, or mandrel, fed with sand and water and driven by steam. The head of the stopper is fastened in a chuck and the peg is ground to the size of the mouth of the bottle by means of sand and water pressed against the glass by bent strips of thin sheet iron. The mouth of the bottle is then pressed by hand on the peg of the stopper, and the mouth and peg are ground together with a medium of very fine emery and water until an air-tight joint is secured.

The revival in recent years of the craft of glass-blowing in England must be attributed to William Morris and T.G. Jackson, R.A. (Pl. II. figs. 11 and 12). They, at any rate, seem to have been the first to grasp the idea that a wine-glass is not merely a bowl, a stem and a foot, but that, whilst retaining simplicity of form, it may nevertheless possess decorative effect. They, moreover, suggested the introduction for the manufacture of table-glass of a material similar in texture to that used by the Venetians, both colourless and tinted.

The colours previously available for English table-glass were ruby, canary-yellow, emerald-green, dark peacock-green, light peacock-blue, dark purple-blue and a dark purple. About 1870 the “Jackson” table-glass was made in a light, dull green glass. The dull green was followed successively by amber, white opal, blue opal, straw opal, sea-green, horn colour and various pale tints of soda-lime glass, ranging from yellow to blue. Experiments were also tried with a violet-coloured glass, a violet opal, a transparent black and with glasses shading from red to blue, red to amber and blue to green.

In the Paris Exhibition of 1900 surface decoration was the prominent feature of all the exhibits of table-glass. The carved or “cameo” glass, introduced by Thomas Webb of Stourbridge in 1878, had been copied with varying success by glass-makers of all nations. In many specimens there were three or more layers of differently coloured glass, and curious effects of blended colour were obtained by cutting through, or partly through, the different layers. The surface of the glass had usually been treated with hydrofluoric acid so as to have a satin-like gloss. Some vases of this character, shown by Émile Gallé and Daum Frères of Nancy, possessed considerable beauty. The “Favrile” glass of Louis C. Tiffany of New York (Pl. II. fig. 13) owes its effect entirely to surface colour and lustre. The happiest specimens of this glass almost rival the wings of butterflies in the brilliancy of their iridescent colours. The vases of Karl Koepping of Berlin are so fantastic and so fragile that they appear to be creations of the lamp rather than of the furnace. An illustration is also given of some of Powell’s “Whitefriars” glass, shown at the St Louis Exhibition, 1904 (Pl. II. fig. 14). The specimens of “pâte de verre” exhibited by A. L. Dammouse, of Sèvres, in the Musée des Arts décoratifs in Paris, and at the London Franco-British Exhibition in 1908, deserve attention. They have a semi-opaque body with an “egg-

shell" surface and are delicately tinted with colour. The shapes are exceedingly simple, but some of the pieces possess great beauty. The material and technique suggest a close relationship to porcelain.

(B) *Tube.*—The process of making tube has already been described. Although the bore of the thermometer-tube is exceedingly small, it is made in the same way as ordinary tube. The white line of enamel, which is seen in some thermometers behind the bore, is introduced before the mass of glass is pulled out. A flattened cake of viscous glass-enamel is welded on to one side of the mass of glass after it has been hollowed by blowing. The mass, with the enamel attached, is dipped into the crucible and covered with a layer of transparent glass; the whole mass is then pulled out into tube. If the section of the finished tube is to be a triangle, with the enamel and bore at the base, the molten mass is pressed into a **V**-shaped mould before it is pulled out.

In modern thermometry instruments of extreme accuracy are required, and researches have been made, especially in Germany and France, to ascertain the causes of variability in mercurial thermometers, and how such variability is to be removed or reduced. In all mercurial thermometers there is a slight depression of the ice-point after exposure to high temperatures; it is also not uncommon to find that the readings of two thermometers between the ice- and boiling-points fail to agree at any intermediate temperature, although the ice- and boiling-points of both have been determined together with perfect accuracy, and the intervening spaces have been equally divided. It has been proved that these variations depend to a great extent on the chemical nature of the glass of which the thermometer is made. Special glasses have therefore been produced by Tonnelot in France and at the Jena glass-works in Germany expressly for the manufacture of thermometers for accurate physical measurements; the analyses of these are shown in Table III.

Table III.

	SiO_2.	Na_2O.	K_2O.	CaO.	Al_2O_3.	MgO.	B_2O_3.	ZnO.	Depression of Ice-point.
Tonnelot's "Verre dur"	70.96	12.02	0.56	14.40	1.44	0.40	..	..	0.07
Jena glass—									
XVI.-111	67.5	14.0	..	7.0	2.5	..	2.0	7.0	0.05
59-111	72.0	11.0	..	5.0	5.0	..	12.0	..	0.02

Since the discovery of the Röntgen rays, experiments have been made to ascertain the effects of the different constituents of glass on the transparency of glass to X-rays. The oxides of lead, barium, zinc and antimony are found perceptibly to retard the rays. The glass tubes, therefore, from which the X-ray bulbs are to be fashioned, must not contain any of these oxides, whereas the glass used for making the funnel-shaped shields, which direct the rays upon the patient and at the same time protect the hands of the operator from the action of the rays, must contain a large proportion of lead.

Among the many developments of the Jena Works, not the least important are the glasses made in the form of a tube, from which gas-chimneys, gauge-glasses and chemical apparatus are fashioned, specially adapted to resist sudden changes of temperature. One method is to form the tube of two layers of glass, one being considerably more expansible than the other.

(C) *Sheet and Crown-glass.*—Sheet-glass is almost wholly a soda-lime-silicate glass, containing only small quantities of iron, alumina and other impurities. The raw materials used in this manufacture are chosen with considerable care, since the requirements as to the colour of the product are somewhat stringent. The materials ordinarily employed are the following: sand, of good quality, uniform in grain and free from any notable quantity of iron oxide; carbonate of lime, generally in the form of a pure variety of powdered limestone; and sulphate of soda. A certain proportion of soda ash (carbonate of soda) is also used in some works in sheet-glass mixtures, while "decolorizers" (substances intended to remove or reduce the colour of the glass) are also sometimes added, those most generally used being manganese dioxide and arsenic. Another essential ingredient of all glass mixtures containing sulphate of soda is some form of carbon, which is added either as coke, charcoal or anthracite coal; the carbon so introduced aids the reducing substances contained in the atmosphere of the furnace in bringing about the reduction of the sulphate of soda to a condition in which it combines more readily with the silicic acid of the sand. The proportions in which these ingredients are mixed vary according to the exact quality of glass required and with the form and temperature of the melting furnace employed. A good quality of sheet-glass should show, on analysis, a composition approximating to the following: silica (SiO_2), 72%; lime (CaO), 13%; soda (Na_2O), 14%; and iron and alumina (Fe_2O_3, Al_2O_3), 1%. The actual composition, however, of a mixture that will give a glass of this composition cannot be directly calculated from these figures and the known composition of the raw materials, owing to the fact that considerable losses, particularly of alkali, occur during melting.

The fusion of sheet-glass is now generally carried out in gas-fired regenerative tank furnaces. The glass in process of fusion is contained in a basin or tank built up of large blocks of fire-clay and is heated by one or more powerful gas flames which enter the upper part of the furnace chamber through suitable apertures or "ports." In Europe the gas burnt in these furnaces is derived from special gas-producers, while in some parts of America natural gas is utilized. With producer gas it is necessary to pre-heat both the gas and the air which is supplied for its combustion by passing both through heated regenerators (for an account of the principles of the regenerative furnace see article Furnace). In many

respects the glass-melting tank resembles the open-hearth steel furnace, but there are certain interesting differences. Thus the dimensions of the largest glass tanks greatly exceed those of the largest steel furnaces; glass furnaces containing up to 250 tons of molten glass have been successfully operated, and owing to the relatively low density of glass this involves very large dimensions. The temperature required in the fusion of sheet-glass and of other glasses produced in tank furnaces is much lower than that attained in steel furnaces, and it is consequently possible to work glass-tanks continuously for many months together; on the other hand, glass is not readily freed from foreign bodies that may become admixed with it, so that the absence of detachable particles is much more essential in glass than in steel melting. Finally, fluid steel can be run or poured off, since it is perfectly fluid, while glass cannot be thus treated, but is withdrawn from the furnace by means of either a ladle or a gatherer's pipe, and the temperature required for this purpose is much lower than that at which the glass is melted. In a sheet-glass tank there is therefore a gradient of temperature and a continuous passage of material from the hotter end of the furnace where the raw materials are introduced to the cooler end where the glass, free from bubbles and raw material, is withdrawn by the gatherers. For the purpose of the removal of the glass, the cooler end of the furnace is provided with a number of suitable openings, provided with movable covers or shades. The "gatherer" approaches one of these openings, removes the shade and introduces his previously heated "pipe." This instrument is an iron tube, some 5 ft. long, provided at one end with an enlarged butt and at the other with a wooden covering acting as handle and mouthpiece. The gatherer dips the butt of the pipe into the molten "metal" and withdraws upon it a small ball of viscous glass, which he allows to cool in the air while constantly rotating it so as to keep the mass as nearly spherical in shape as he can. When the first ball or "gathering" has cooled sufficiently, the whole is again dipped into the molten glass and a further layer adheres to the pipe-end, thus forming a larger ball. This process is repeated, with slight modifications, until the gathering is of the proper size and weight to yield the sheet which is to be blown. When this is the case the gathering is carried to a block or half-open mould in which it is rolled and blown until it acquires, roughly, the shape of a hemisphere, the flat side being towards the pipe and the convexity away from it; the diameter of this hemisphere is so regulated as to be approximately that of the cylinder which is next to be formed of the viscous mass. From the hemispherical shape the mass of glass is now gradually blown into the form of a short cylinder, and then the pipe with the adherent mass of glass is handed over to the blower proper. This workman stands upon a platform in front of special furnaces which, from their shape and purpose, are called "blowing holes." The blower repeatedly heats the lower part of the mass of glass and keeps it distended by blowing while he swings it over a deep trench which is provided next to his working platform. In this way the glass is extended into the form of a long cylinder closed at the lower end. The size of cylinder which can be produced in this way depends chiefly upon the dimensions of the working platform and the weight which a man is able to handle freely. The lower end of the cylinder is opened, in the case of small and thin cylinders, by the blower holding his thumb over the mouthpiece of the pipe and simultaneously warming the end of the cylinder in the furnace, the expansion of the imprisoned air and the softening of the glass causing the end of the cylinder to burst open. The blower then heats the end of the cylinder again and rapidly spins the pipe about its axis; the centrifugal effect is sufficient to spread the soft glass at the end to a radius equal to that of the rest of the cylinder. In the case of large and thick cylinders, however, another process of opening the ends is generally employed: an assistant attaches a small lump of hot glass to the domed end, and the heat of this added glass softens the cylinder sufficiently to enable the assistant to cut the end open with a pair of shears; subsequently the open end is spun out to the diameter of the whole as described above. The finished cylinder is next carried to a rack and the pipe detached from it by applying a cold iron to the neck of thick hot glass which connects pipe-butt and cylinder, the neck cracking at the touch. Next, the rest of the connecting neck is detached from the cylinder by the application of a heated iron to the chilled glass. This leaves a cylinder with roughly parallel ends; these ends are cut by the use of a diamond applied internally and then the cylinder is split longitudinally by the same means. The split cylinder is passed to the flattening furnace, where it is exposed to a red heat, sufficient to soften the glass; when soft the cylinder is laid upon a smooth flat slab and flattened down upon it by the careful application of pressure with some form of rubbing implement, which frequently takes the form of a block of charred wood. When flattened, the sheet is moved away from the working opening of the furnace, and pushed to a system of movable grids, by means of which it is slowly moved along a tunnel, away from a source of heat nearly equal in temperature to that of the flattening chamber. The glass thus cools gradually as it passes down the tunnel and is thereby adequately annealed.

The process of sheet-glass manufacture described above is typical of that in use in a large number of works, but many modifications are to be found, particularly in the furnaces in which the glass is melted. In some works, the older method of melting the glass in large pots or crucibles is still adhered to, although the old-fashioned coal-fired furnaces have nearly everywhere given place to the use of producer gas and regenerators. For the production of coloured sheet-glass, however, the employment of pot furnaces is still almost universal, probably because the quantities of glass required of any one tint are insufficient to employ even a small tank furnace continuously; the exact control of the colour is also more readily attained with the smaller bulk of glass which has to be dealt with in pots. The general nature of the colouring ingredients employed, and the colour effects produced by them, have already been mentioned. In coloured sheet-glass, two distinct kinds are to be recognized; in one kind the colouring matter is contained in the body of the glass itself, while in the other the coloured sheet consists of ordinary white glass covered upon one side with a thin coating of intensely coloured glass. The latter kind is known as "flashed," and is universally employed in the case of colouring matters whose effect is so intense that in any usual thickness of glass they would cause almost entire opacity.

Flashed glass is produced by taking either the first or the last gathering in the production of a cylinder out of a crucible containing the coloured “metal,” the other gatherings being taken out of ordinary white sheet-glass. It is important that the thermal expansion of the two materials which are thus incorporated should be nearly alike, as otherwise warping of the finished sheet is liable to result.

Mechanical Processes for the Production of Sheet-glass.—The complicated and indirect process of sheet-glass manufacture has led to numerous inventions aiming at a direct method of production by more or less mechanical means. All the earlier attempts in this direction failed on account of the difficulty of bringing the glass to the machines without introducing air-bells, which are always formed in molten glass when it is ladled or poured from one vessel into another. More modern inventors have therefore adopted the plan of drawing the glass direct from the furnace. In an American process the glass is drawn direct from the molten mass in the tank in a cylindrical form by means of an iron ring previously immersed in the glass, and is kept in shape by means of special devices for cooling it rapidly as it leaves the molten bath. In this process, however, the entire operations of splitting and flattening are retained, and although the mechanical process is said to be in successful commercial operation, it has not as yet made itself felt as a formidable rival to hand-made sheet-glass. An effort at a more direct mechanical process is embodied in the inventions of Foucault which are at present being developed in Germany and Belgium; in this process the glass is drawn from the molten bath in the shape of flat sheets, by the aid of a bar of iron, previously immersed in the glass, the glass receiving its form by being drawn through slots in large fire-bricks, and being kept in shape by rapid chilling produced by the action of air-blasts. The mechanical operation is quite successful for thick sheets, but it is not as yet available for the thinner sheets required for the ordinary purposes of sheet-glass, since with these excessive breakage occurs, while the sheets generally show grooves or lines derived from small irregularities of the drawing orifice. For the production of thick sheets which are subsequently to be polished the process may thus claim considerable success, but it is not as yet possible to produce satisfactory sheet-glass by such means.

Crown-glass has at the present day almost disappeared from the market, and it has been superseded by sheet-glass, the more modern processes described above being capable of producing much larger sheets of glass, free from the knob or “bullion” which may still be seen in old crown-glass windows. For a few isolated purposes, however, it is desirable to use a glass which has not been touched upon either surface and thus preserves the lustre of its “fire polish” undiminished; this can be attained in crown-glass but not in sheet, since one side of the latter is always more or less marked by the rubber used in the process of flattening. One of the few uses of crown-glass of this kind is the glass slides upon which microscopic specimens are mounted, as well as the thin glass slips with which such preparations are covered. A full account of the process of blowing crown-glass will be found in all older books and articles on the subject, so that it need only be mentioned here that the glass, instead of being blown into a cylinder, is blown into a flattened sphere, which is caused to burst at the point opposite the pipe and is then, by the rapid spinning of the glass in front of a very hot furnace-opening, caused to expand into a flat disk of large diameter. This only requires to be annealed and is then ready for cutting up, but the lump of glass by which the original globe was attached to the pipe remains as the bullion in the centre of the disk of glass.

Coloured Glass for Mosaic Windows.—The production of coloured glass for “mosaic” windows has become a separate branch of glass-making. Charles Winston, after prolonged study of the coloured windows of the 13th, 14th and 15th centuries, convinced himself that no approach to the colour effect of these windows could be made with glass which is thin and even in section, homogeneous in texture, and made and coloured with highly refined materials. To obtain the effect it was necessary to reproduce as far as possible the conditions under which the early craftsmen worked, and to create scientifically glass which is impure in colour, irregular in section, and non-homogeneous in texture. The glass is made in cylinders and in “crowns” or circles. The cylinders measure about 14 in. in length by 8 in. in diameter, and vary in thickness from ⅛ to ⅜ in. The crowns are about 15 in. in diameter, and vary in thickness from ⅛ to ½ in., the centre being the thickest. These cylinders and crowns may be either solid colour or flashed. Great variety of colour may be obtained by flashing one colour upon another, such as blue on green, and ruby on blue, green or yellow.

E. J. Prior has introduced an ingenious method of making small oblong and square sheets of coloured glass, which are thick in the centre and taper towards the edges, and which have one surface slightly roughened and one brilliantly polished. Glass is blown into an oblong box-shaped iron mould, about 12 in. in depth and 6 in. across. A hollow rectangular bottle is formed, the base and sides of which are converted into sheets. The outer surface of these sheets is slightly roughened by contact with the iron mould.

(D) *Bottles and mechanically blown Glass.*—The manufacture of bottles has become an industry of vast proportions. The demand constantly increases, and, owing to constant improvements in material in the moulds and in the methods of working, the supply fully keeps pace with the demand. Except for making bottles of special colours, gas-heated tank furnaces are in general use. Melting and working are carried on continuously. The essential qualities of a bottle are strength and power to resist chemical corrosion. The materials are selected with a view to secure these qualities. For the highest quality of bottles, which are practically colourless, sand, limestone and sulphate and carbonate of soda are used. The following is a typical analysis of high quality bottle-glass: SiO_2, 69.15%; Na_2O, 13.00%; CaO, 15.00%; Al_2O_3, 2.20%; and Fe_2O_3, 0.65%. For the commoner grades of dark-coloured bottles the glass mixture is cheapened by substituting common salt for part of the sulphate of soda, and by the addition of felspar, granite, granulite, furnace slag and other substances fusible at a high temperature.

Bottle moulds are made of cast iron, either in two pieces, hinged together at the base or at one side, or in three pieces, one forming the body and two pieces forming the neck.

A bottle gang or “shop” consists of five persons. The “gatherer” gathers the glass from the tank furnace on the end of the blowing-iron, rolls it on a slab of iron or stone, slightly expands the glass by blowing, and hands the blowing iron and glass to the “blower.” The blower places the glass in the mould, closes the mould by pressing a lever with his foot, and either blows down the blowing iron or attaches it to a tube connected with a supply of compressed air. When the air has forced the glass to take the form of the mould, the mould is opened and the blower gives the blowing iron with the bottle attached to it to the “wetter off.” The wetter off touches the top of the neck of the bottle with a moistened piece of iron and by tapping the blowing iron detaches the bottle and drops it into a wooden trough. He then grips the body of the bottle with a four-pronged clip, attached to an iron rod, and passes it to the “bottle maker.” The bottle maker heats the fractured neck of the bottle, binds a band of molten glass round the end of it and simultaneously shapes the inside and the outside of the neck by using the tool shown in fig. 18. The finished bottle is taken by the “taker in” to the annealing furnace. The bottles are stacked in iron trucks, which, when full, are moved slowly away from a constant source of heat.

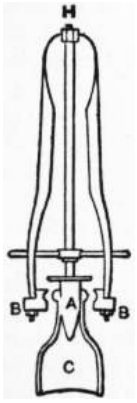


FIG. 18.—Tool for moulding the inside and outside of the neck of a bottle.

C, Bottle.
A, Conical piece of iron to form the inside of the neck.
B, B, Shaped pieces of iron, which can be pressed upon the outside of the neck by the spring-handle H.

The processes of manipulation which have been described, although in practice they are very rapidly performed, are destined to be replaced by the automatic working of a machine. Bottle-making machines, based on Ashley’s original patent, are already being largely used. They ensure absolute regularity in form and save both time and labour. A bottle-making machine combines the process of pressing with a plunger with that of blowing by compressed air. The neck of the bottle is first formed by the plunger, and the body is subsequently blown by compressed air admitted through the plunger. A sufficient weight of molten glass to form a bottle is gathered and placed in a funnel-shaped vessel which serves as a measure, and gives access to the mould which shapes the outside of the neck. A plunger is forced upwards into the glass in the neck-mould and forms the neck. The funnel is removed, and the plunger, neck-mould and the mass of molten glass attached to the neck are inverted. A bottle mould rises and envelops the mass of molten glass. Compressed air admitted through the plunger forces the molten glass to take the form of the bottle mould and completes the bottle.

In the case of the machine patented by Michael Owens of Toledo, U.S.A., for making tumblers, lamp-chimneys, and other goods of similar character, the manual operations required are (1) gathering the molten glass at the end of a blowing iron; (2) placing the blowing iron with the glass attached to it in the machine; (3) removing the blowing iron with the blown vessel attached. Each machine (fig. 19) consists of a revolving table carrying five or six moulds. The moulds are opened and closed by cams actuated by compressed air. As soon as a blowing iron is in connexion with an air jet, the sections of the mould close upon the molten glass, and the compressed air forces the glass to take the form of the mould. After removal from the machine, the tumbler is severed from the blowing iron, and its fractured edge is trimmed.

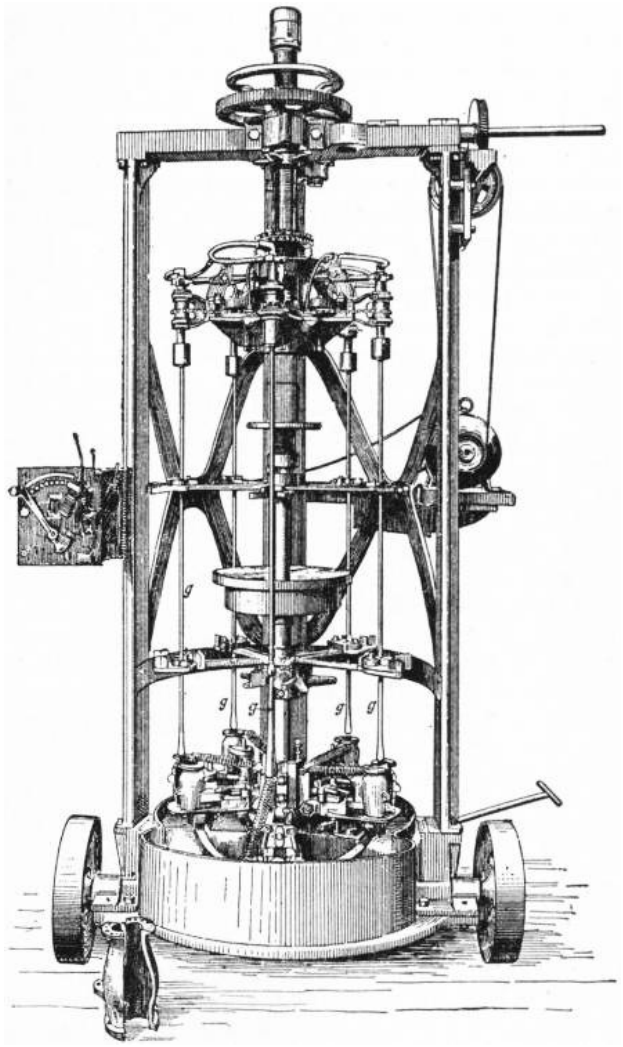


Fig. 19.—Owens's Glass-blowing Machine. *g,g,g,* Blowing-irons.

Compressed air or steam is also used for fashioning very large vessels, baths, dishes and reservoirs by the "Sievert" process. Molten glass is spread upon a large iron plate of the required shape and dimensions. The flattened mass of glass is held by a rim, connected to the edge of the plate. The plate with the glass attached to it is inverted, and compressed air or steam is introduced through openings in the plate. The mass of glass, yielding to its own weight and the pressure of air or steam, sinks downwards and adapts itself to any mould or receptacle beneath it.

The processes employed in the manufacture of the glass bulbs for incandescent electric lamps, are similar to the old-fashioned processes of bottle making. The mould is in two pieces hinged together; it is heated and the inner surface is rubbed over with finely powdered plumbago. When the glass is being blown in the mould the blowing iron is twisted round and round so that the finished bulb may not be marked by the joint of the mould.

III. Mechanically Pressed Glass. (A) *Plate-glass.*—The glass popularly known as "plate-glass" is made by casting and rolling. The following are typical analyses:

	SiO_2.	CaO.	Na_2O.	Al_2O_3.	Fe_2O_3.
French.	71.80	15.70	11.10	1.26	0.14%
English.	70.64	16.27	11.47	0.70	0.49%

The raw materials for the production of plate-glass are chosen with great care so as to secure a product as free from colour as possible, since the relatively great thickness of the sheets would render even a faint tint conspicuous. The substances employed are the same as those used for the manufacture of sheet-glass, viz. pure sand, a pure form of carbonate of lime, and sulphate of soda, with the addition of a suitable proportion of carbon in the form of coke, charcoal or anthracite coal.

The glass to be used for the production of plate is universally melted in pots or crucibles and not in open tank furnaces. When the glass is completely melted and "fine," *i.e.* free from bubbles, it is allowed to cool down to a certain extent so as to become viscous or pasty. The whole pot, with its contents of viscous glass, is then removed bodily from the furnace by means of huge tongs and is transported to a crane, which grips the pot, raises it, and ultimately tips it over so as to pour the glass upon the slab of the rolling-table. In most modern works the greater part of these operations, as well as the actual rolling of the glass, is carried out by mechanical means, steam power and subsequently electrical power having been successfully applied to this purpose; the handling of the great weights of glass required for the largest sheets of plate-glass which are produced at the present time would, indeed, be impossible without the aid of machinery. The casting-table usually consists of a perfectly smooth cast-

iron slab, frequently built up of a number of pieces carefully fitted together, mounted upon a low, massive truck running upon rails, so that it can be readily moved to any desired position in the casting-room. The viscous mass having been thrown on the casting-table, a large and heavy roller passes over it and spreads it out into a sheet. Rollers up to 5 tons in weight are employed and are now generally driven by power. The width of the sheet or plate is regulated by moving guides which are placed in front of the roller and are pushed along by it, while its thickness is regulated by raising or lowering the roller relatively to the surface of the table. Since the surfaces produced by rolling have subsequently to be ground and polished, it is essential that the glass should leave the rolling-table with as smooth a surface as possible, so that great care is required in this part of the process. It is, however, equally important that the glass as a whole should be flat and remains flat during the process of gradual cooling (annealing), otherwise great thicknesses of glass would have to be ground away at the projecting parts of the sheet. The annealing process is therefore carried out in a manner differing essentially from that in use for any other variety of flat glass and nearly resembling that used for optical glass. The rolled sheet is left on the casting-table until it has set sufficiently to be pushed over a flat iron plate without risk of distortion; meanwhile the table has been placed in front of the opening of one of the large annealing kilns and the slab of glass is carefully pushed into the kiln. The annealing kilns are large fire-brick chambers of small height but with sufficient floor area to accommodate four or six large slabs, and the slabs are placed directly upon the floor of the kiln, which is built up of carefully dressed blocks of burnt fireclay resting upon a bed of sand; in order to avoid any risk of working or buckling in this floor these blocks are set slightly apart and thus have room to expand freely when heated. Before the glass is introduced, the annealing kiln is heated to dull red by means of coal fires in grates which are provided at the ends or sides of the kiln for that purpose. When the floor of the kiln has been covered with slabs of glass the opening is carefully built up and luted with fire-bricks and fire-clay, and the whole is then allowed to cool. In the walls and floor of the kiln special cooling channels or air passages are provided and by gradually opening these to atmospheric circulation the cooling is considerably accelerated while a very even distribution of temperature is obtained; by these means even the largest slabs can now be cooled in three or four days and are nevertheless sufficiently well annealed to be free from any serious internal stress. From the annealing kiln the slabs of glass are transported to the cutting room, where they are cut square, defective slabs being rejected or cut down to smaller sizes. The glass at this stage has a comparatively dull surface and this must now be replaced by that brilliant and perfectly polished surface which is the chief beauty of this variety of glass. The first step in this process is that of grinding the surface down until all projections are removed and a close approximation to a perfect plane is obtained. This operation, like all the subsequent steps in the polishing of the glass, is carried out by powerful machinery. By means of a rotating table either two surfaces of glass, or one surface of glass and one of cast iron, are rubbed together with the interposition of a powerful abrasive such as sand, emery or carborundum. The machinery by which this is done has undergone numerous modifications and improvements, all tending to produce more perfectly plane glass, to reduce the risk of breakage, and to lessen the expenditure of time and power required per sq. yd. of glass to be worked. It is impossible to describe this machinery within the limits of this article, but it is notable that the principal difficulties to be overcome arise from the necessity of providing the glass with a perfectly continuous and unyielding support to which it can be firmly attached but from which it can be detached without undue difficulty.

When the surface of the glass has been ground down to a plane, the surface itself is still “grey,” *i.e.* deeply pitted with the marks of the abrasive used in grinding it down; these marks are removed by the process of smoothing, in which the surface is successively ground with abrasives of gradually increasing fineness, leaving ultimately a very smooth and very minutely pitted “grey” surface. This smooth surface is then brilliantly polished by the aid of friction with a rubbing tool covered with a soft substance like leather or felt and fed with a polishing material, such as rouge. A few strokes of such a rubber are sufficient to produce a decidedly “polished” appearance, but prolonged rubbing under considerable pressure and the use of a polishing paste of a proper consistency are required in order to remove the last trace of pitting from the surface. This entire process must, obviously, be applied in turn to each of the two surfaces of the slab of glass. Plate-glass is manufactured in this manner in thicknesses varying from $\frac{3}{16}$ in. to 1 in. or even more, while single sheets are produced measuring more than 27 ft. by 13 ft.

“Rolled Plate” and figured “Rolled Plate.”—Glass for this purpose, with perhaps the exception of the best white and tinted varieties, is now universally produced in tank-furnaces, similar in a general way to those used for sheet-glass, except that the furnaces used for “rolled plate” glass of the roughest kinds do not need such minutely careful attention and do not work at so high a temperature. The composition of these glasses is very similar to that of sheet-glass, but for the ordinary kinds of rolled plate much less scrupulous selection need be made in the choice of raw materials, especially of the sand.

The glass is taken from the furnace in large iron ladles, which are carried upon slings running on overhead rails; from the ladle the glass is thrown upon the cast-iron bed of a rolling-table, and is rolled into sheet by an iron roller, the process being similar to that employed in making plate-glass, but on a smaller scale. The sheet thus rolled is roughly trimmed while hot and soft, so as to remove those portions of glass which have been spoilt by immediate contact with the ladle, and the sheet, still soft, is pushed into the open mouth of an annealing tunnel or “lear,” down which it is carried by a system of moving grids.

The surface of the glass produced in this way may be modified by altering the surface of the rolling-

table; if the table has a smooth surface, the glass will also be more or less smooth, but much dented and buckled on the surface and far from having the smooth face of blown sheet. If the table has a pattern engraved upon it the glass will show the same pattern in relief, the most frequent pattern of the kind being either small parallel ridges or larger ribs crossing to form a lozenge pattern.

The more elaborate patterns found on what is known as “figure rolled plate” are produced in a somewhat different manner; the glass used for this purpose is considerably whiter in colour and much softer than ordinary rolled plate, and instead of being rolled out on a table it is produced by rolling between two moving rollers from which the sheet issues. The pattern is impressed upon the soft sheet by a printing roller which is brought down upon the glass as it leaves the main rolls. This glass shows a pattern in high relief and gives a very brilliant effect.

The various varieties of rolled plate-glass are now produced for some purposes with a reinforcement of wire netting which is embedded in the mass of the glass. The wire gives the glass great advantages in the event of fracture from a blow or from fire, but owing to the difference in thermal expansion between wire and glass, there is a strong tendency for such “wired glass” to crack spontaneously.

Patent Plate-glass.—This term is applied to blown sheet-glass, whose surface has been rendered plane and brilliant by a process of grinding and polishing. The name “patent plate” arose from the fact that certain patented devices originated by James Chance of Birmingham first made it possible to polish comparatively thin glass in this way.

(B) *Pressed Glass.*—The technical difference between pressed and moulded glass is that moulded glass-ware has taken its form from a mould under the pressure of a workman’s breath, or of compressed air, whereas pressed glass-ware has taken its form from a mould under the pressure of a plunger. Moulded glass receives the form of the mould on its interior as well as on its exterior surface. In pressed glass the exterior surface is modelled by the mould, whilst the interior surface is modelled by the plunger (fig. 20).

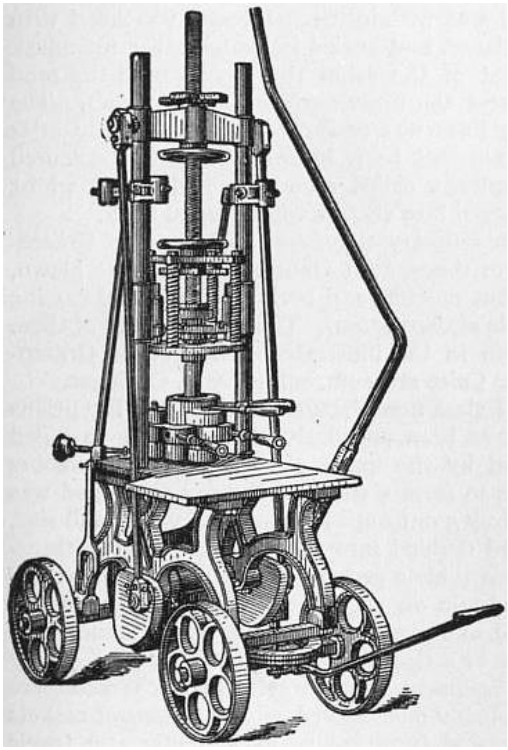


Fig. 20.—Modern American Glass-Press.

The process of pressing glass was introduced to meet the demand for cheap table-ware. Pressed glass, which is necessarily thick and serviceable, has well met this legitimate demand, but it also caters for the less legitimate taste for cheap imitations of hand-cut glass. An American writer has expressed his satisfaction that the day-labourer can now have on his table at a nominal price glass dishes of elaborate design, which only an expert can distinguish from hand-cut crystal. The deceptive effect is in some cases heightened by cutting over and polishing by hand the pressed surface.

The glass for pressed ware must be colourless, and, when molten, must be sufficiently fluid to adapt itself readily to the intricacies of the moulds, which are often exceedingly complex. The materials employed are sand, sulphate of soda, nitrate of soda, calcspar and in some works carbonate of barium. The following is an analysis of a specimen of English pressed glass; SiO_2, 70.68%; Na_2O, 18.38%; CaO, 5.45%; BaO, 4.17%; Al_2O_3, 0.33%; and Fe_2O_3, 0.20%. Tanks and pots are both used for melting the glass. The moulds are made of cast iron. They are usually in two main pieces, a base and an upper part or collar of hinged sections. The plunger is generally worked by a hand lever. The operator knows by touch when the plunger has pressed the glass far enough to exactly fill the mould. Although the moulds are heated, the surface of the glass is always slightly ruffled by contact with the mould. For this reason every piece of pressed glass-ware, as soon as it is liberated from the mould, is exposed to a sharp heat in a small subsidiary furnace in order that the ruffled surface may be removed by melting. These small furnaces are usually heated by an oil spray under the pressure of steam or compressed air.

See Antonio Neri, *Ars vitraria, cum Merritti observationibus* (Amsterdam, 1668) (Neri’s work was translated into English by C. Merritt in 1662, and the translation, *The Art of making Glass*, was privately reprinted by Sir T. Phillipps, Bart., in 1826); Johann Kunkel, *Vollständige Glasmacher-Kunst* (Nuremberg, 1785); Apsley Pellatt, *Curiosities of Glass-making* (London, 1849); A. Sauzay, *Marvels of Glass-making* (from the French) (London, 1869); G. Bontemps, *Guide du verrier* (Paris, 1868); E. Peligot, *Le Verre, son histoire, sa fabrication* (Paris, 1878); W. Stein, “Die Glasfabrikation,” in Bolley’s *Technologie*, vol. iii. (Brunswick, 1862); H. E. Benrath, *Die Glasfabrikation* (Brunswick, 1875); J. Falck and L. Lobmeyr, *Die Glasindustrie* (Vienna, 1875); D. H. Hovestadt, *Jenaer Glas* (Jena, 1900; Eng. trans. by J. D. and A. Everett, Macmillan, 1907); J. Henrivaux, *Le Verre et le cristal* (Paris, 1887), and *La Verrerie au XX^e siècle* (1903); Chance, Harris and Powell, *Principles of Glass-making* (London, 1883); Moritz V. Rohr, *Theorie und Geschichte der photographischen Objektive* (Berlin, 1899); C. E. Guillaume, *Traité pratique de la thermométrie de précision* (Paris, 1889); Louis Coffignal, *Verres et*

émaux (Paris, 1900); R. Gerner, *Die Glasfabrikation* (Vienna, 1897); C. Wetzel, *Herstellung grosser Glaskörper* (Vienna, 1900); C. Wetzel, *Bearbeitung von Glaskörpern* (Vienna, 1901); E. Tscheuschner, *Handbuch der Glasfabrikation* (Weimar, 1885); R. Dralle, *Anlage und Betrieb der Glasfabriken* (Leipzig, 1886); G. Tammann, *Kristallisieren und Schmelzen* (Leipzig, 1903); W. Rosenhain, "Some Properties of Glass," *Trans. Optical Society* (London, 1903), "Possible Directions of Progress in Optical Glass," *Proc. Optical Convention* (London, 1905) and *Glass Manufacture* (London, 1908); Introduction to section 1, *Catalogue of the Optical Convention* (London, 1905).

(H. J. P.; W. Rn.)

History of Glass Manufacture.

The great similarity in form, technique and decoration of the earliest known specimens of glass-ware suggests that the craft of glass-making originated from a single centre. It has been generally assumed that Egypt was the birthplace of the glass industry. It is true that many conditions existed in Egypt favourable to the development of the craft. The Nile supplied a waterway for the conveyance of fuel and for the distribution of the finished wares. Materials were available providing the essential ingredients of glass. The Egyptian potteries afforded experience in dealing with vitreous glazes and vitreous colours, and from Egyptian alabaster-quarries veined vessels were wrought, which may well have suggested the decorative arrangement of zigzag lines (see Plate I. figs, 1, 2, 4 *d*) so frequently found on early specimens of glass-ware. In Egypt, however, no traces have at present been found of the industry in a rudimentary condition, and the vases which have been classified as "primitive" bear witness to an elaboration of technique far in advance of the experimental period. The earliest specimens of glass-ware which can be definitely claimed as Egyptian productions, and the glass manufactory discovered by Dr Flinders Petrie at Tell el Amarna, belong to the period of the XVIIIth dynasty. The comparative lateness of this period makes it difficult to account for the wall painting at Beni Hasan, which accurately represents the process of glass-blowing, and which is attributed to the period of the XIth dynasty. Dr Petrie surmounts the difficulty by saying that the process depicted is not glass-blowing, but some metallurgical process in which reeds were used tipped with lumps of clay. It is possible that the picture does not represent Egyptian glass-blowers, but is a traveller's record of the process of glass-blowing seen in some foreign or subject country. The scarcity of specimens of early glass-ware actually found in Egypt, and the advanced technique of those which have been found, lead to the supposition that glass-making was exotic and not a native industry. The tradition, recorded by Pliny (*Nat. Hist.* xxxvi. 65), assigns the discovery of glass to Syria, and the geographical position of that country, its forests as a source of fuel, and its deposits of sand add probability to the tradition. The story that Phoenician merchants found a glass-like substance under their cooking pots, which had been supported on blocks of natron, need not be discarded as pure fiction. The fire may well have caused the natron, an impure form of carbonate of soda, to combine with the surrounding sand to form silicate of soda, which, although not a permanent glass, is sufficiently glass-like to suggest the possibility of creating a permanent transparent material. Moreover, Pliny (xxxvi. 66) actually records the discovery which effected the conversion of deliquescent silicate of soda into permanent glass. The words are "Coeptus addi magnes lapis." There have been many conjectures as to the meaning of the words "magnes lapis." The material has been considered by some to be magnetic iron ore and by others oxide of manganese. Oxides of iron and manganese can only be used in glass manufacture in comparatively small quantities for the purpose of colouring or neutralizing colour in glass, and their introduction would not be a matter of sufficient importance to be specially recorded. In chapter 25 of the same book Pliny describes five varieties of "magnes lapis." One of these he says is found in magnesia, is white in colour, does not attract iron and is like pumice stone. This variety must certainly be magnesian limestone. Magnesian limestone mixed and fused with sand and an alkaline carbonate produces a permanent glass. The scene of the discovery of glass is placed by Pliny on the banks of the little river Belus, under the heights of Mount Carmel, where sand suitable for glass-making exists and wood for fuel is abundant. In this neighbourhood fragments and lumps of glass are still constantly being dug up, and analysis proves that the glass contains a considerable proportion of magnesia. The district was a glass-making centre in Roman times, and it is probable that the Romans inherited and perfected an indigenous industry of remote antiquity. Pliny has so accurately recorded the stages by which a permanent glass was developed that it may be assumed that he had good reason for claiming for Syria the discovery of glass. Between Egypt and Syria there was frequent intercourse both of conquest and commerce. It was customary for the victor after a successful raid to carry off skilled artisans as captives. It is recorded that Tahutmes III. sent Syrian artisans to Egypt. Glass-blowers may have been amongst their captive craftsmen, and may have started the industry in Egypt. The claims of Syria and Egypt are at the present time so equally balanced that it is advisable to regard the question of the birthplace of the glass industry as one that has still to be settled.

The "primitive" vessels which have been found in Egypt are small in size and consist of columnar stibium jars, flattened bottles and amphorae, all decorated with zigzag lines, tiny wide-mouthed vases on feet and minute jugs. The vessels of later date which have been found in considerable quantities, principally in the coast towns and islands of the Mediterranean, are amphorae and alabastra, also decorated with zigzag lines. The amphorae (Plate I. figs. 1 and 2) terminate with a point, or with an unfinished extension from the terminal point, or with a knob. The alabastra have short necks, are slightly wider at the base than at the shoulder and have rounded bases. Dr Petrie has called attention to two technical peculiarities to be found in almost every specimen of early glass-ware. The inner surface is roughened (Plate I. fig. 4 *c*), and has particles of sand adhering to it, as if the vessel had been filled with sand and subjected to heat, and the inside of the neck has the impression of a metal

rod (Plate I. fig. 4 *a*), which appears to have been extracted from the neck with difficulty. From this evidence Dr Petrie has assumed that the vessels were not blown, but formed upon a core of sandy paste, modelled upon a copper rod, the rod being the core of the neck (see EGYPT: *Art and Archaeology*). The evidence, however, hardly warrants the abandonment of the simple process of blowing in favour of a process which is so difficult that it may almost be said to be impossible, and of which there is no record or tradition except in connexion with the manufacture of small beads. The technical difficulties to which Dr Petrie has called attention seem to admit of a somewhat less heroic explanation. A modern glass-blower, when making an amphora-shaped vase, finishes the base first, fixes an iron rod to the finished base with a seal of glass, severs the vase from the blowing iron, and finishes the mouth, whilst he holds the vase by the iron attached to its base. The "primitive" glass-worker reversed this process. Having blown the body of the vase, he finished the mouth and neck part, and fixed a small, probably hollow, copper rod inside the finished neck by pressing the neck upon the rod (Plate I. fig. 4 *b*). Having severed the body of the vase from the blowing iron, he heated and closed the fractured base, whilst holding the vase by means of the rod fixed in the neck. Nearly every specimen shows traces of the pressure of a tool on the outside of the neck, as well as signs of the base having been closed by melting. Occasionally a knob or excrescence, formed by the residue of the glass beyond the point at which the base has been pinched together, remains as a silent witness of the process.

If glass-blowing had been a perfectly new invention of Graeco-Egyptian or Roman times, some specimens illustrating the transition from core-moulding to blowing must have been discovered. The absence of traces of the transition strengthens the supposition that the revolution in technique merely consisted in the discovery that it was more convenient to finish the base of a vessel before its mouth, and such a revolution would leave no trace behind. The roughened inner surface and the adhering particles of sand may also be accounted for. The vessels, especially those in which many differently coloured glasses were incorporated, required prolonged annealing. It is probable that when the metal rod was withdrawn the vessel was filled with sand, to prevent collapse, and buried in heated ashes to anneal. The greater the heat of the ashes the more would the sand adhere to and impress the inner surface of the vessels. The decoration of zigzag lines was probably applied directly after the body of the vase had been blown. Threads of coloured molten glass were spirally coiled round the body, and, whilst still viscid, were dragged into zigzags with a metal hook.

Egypt.—The glass industry flourished in Egypt in Graeco-Egyptian and Roman times. All kinds of vessels were blown, both with and without moulds, and both moulding and cutting were used as methods of decoration. The great variety of these vessels is well shown in the illustrated catalogue of Graeco-Egyptian glass in the Cairo museum, edited by C. C. Edgar.

Another species of glass manufacture in which the Egyptians would appear to have been peculiarly skilled is the so-called mosaic glass, formed by the union of rods of various colours in such a manner as to form a pattern; the rod so formed was then reheated and drawn out until reduced to a very small size, 1 sq. in. or less, and divided into tablets by being cut transversely, each of these tablets presenting the pattern traversing its substance and visible on each face. This process was no doubt first practised in Egypt, and is never seen in such perfection as in objects of a decidedly Egyptian character. Very beautiful pieces of ornament of an architectural character are met with, which probably once served as decorations of caskets or other small pieces of furniture or of trinkets; also tragic masks, human faces and birds. Some of the last-named are represented with such truth of colouring and delicacy of detail that even the separate feathers of the wings and tail are well distinguished, although, as in an example in the British Museum, a human-headed hawk, the piece which contains the figure may not exceed ¾ in. in its largest dimension. Works of this description probably belong to the period when Egypt passed under Roman domination, as similar objects, though of inferior delicacy, appear to have been made in Rome.

Assyria.—Early Assyrian glass is represented in the British Museum by a vase of transparent greenish glass found in the north-west palace of Nineveh. On one side of this a lion is engraved, and also a line of cuneiform characters, in which is the name of Sargon, king of Assyria, 722 B.C. Fragments of coloured glasses were also found there, but our materials are too scanty to enable us to form any decided opinion as to the degree of perfection to which the art was carried in Assyria. Many of the specimens discovered by Layard at Nineveh have all the appearance of being Roman, and were no doubt derived from the Roman colony, Niniva Claudiopolis, which occupied the same site.

PLATE I.

FIG. 1.

FIG. 2.

Fig. 6.

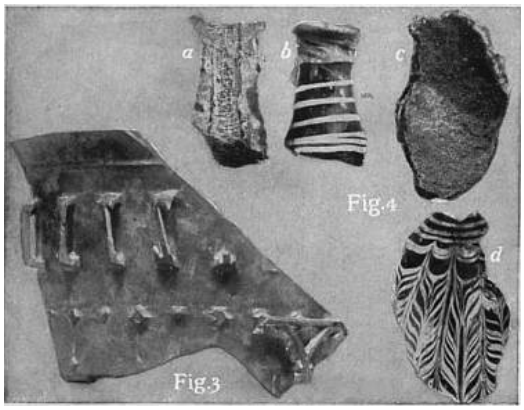


Fig. 3. Fig. 4.

Fig. 8.

Fig. 5.

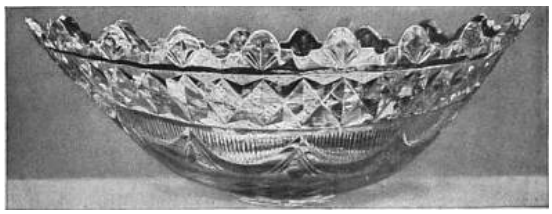


Fig. 10.

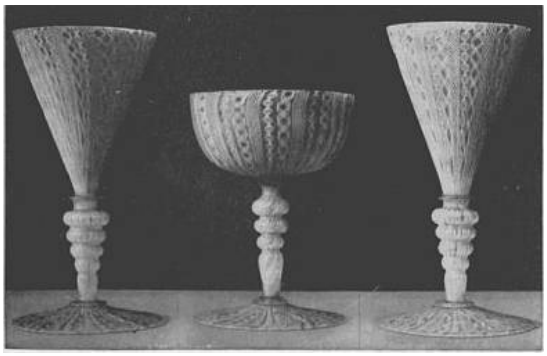


Fig. 7.

Fig. 9.

Plate II.

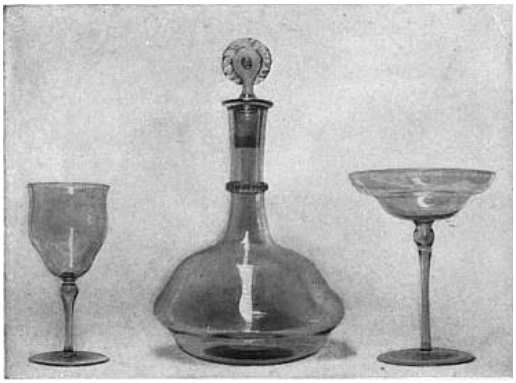


Fig. 11.

Fig. 12.

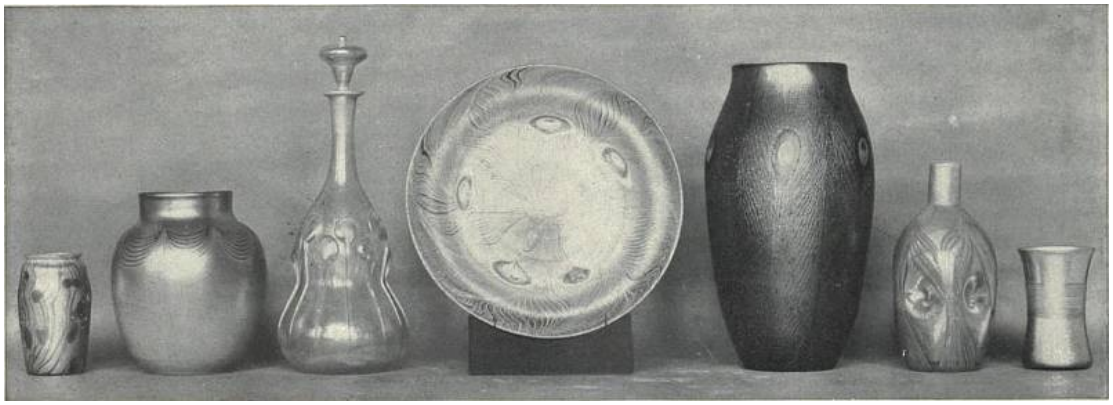


FIG. 13.

FIG. 14.

Roman Glass.—In the first centuries of our era the art of glass-making was developed at Rome and other cities under Roman rule in a most remarkable manner, and it reached a point of excellence which in some respects has never been excelled or even perhaps equalled. It may appear a somewhat exaggerated assertion that glass was used for more purposes, and in one sense more extensively, by the Romans of the imperial period than by ourselves in the present day; but it is one which can be borne out by evidence. It is true that the use of glass for windows was only gradually extending itself at the time when Roman civilization sank under the torrent of German and Hunnish barbarism, and that its employment for optical instruments was only known in a rudimentary stage; but for domestic purposes, for architectural decoration and for personal ornaments glass was unquestionably much more used than at the present day. It must be remembered that the Romans possessed no fine porcelain decorated with lively colours and a beautiful glaze; Samian ware was the most decorative kind of pottery which was then made. Coloured and ornamental glass held among them much the same place for table services, vessels for toilet use and the like, as that held among us by porcelain. Pliny (*Nat. Hist.* xxxvi. 26, 67) tells us that for drinking vessels it was even preferred to gold and silver.

Glass was largely used in pavements, and in thin plates as a coating for walls. It was used in windows, though by no means exclusively, mica, alabaster and shells having been also employed. Glass, in flat pieces, such as might be employed for windows, has been found in the ruins of Roman houses, both in England and in Italy, and in the house of the faun at Pompeii a small pane in a bronze frame remains. Most of the pieces have evidently been made by casting, but the discovery of fragments of sheet-glass at Silchester proves that the process of making sheet-glass was known to the Romans. When the window openings were large, as was the case in basilicas and other public buildings, and even in houses, the pieces of glass were, doubtless, fixed in pierced slabs of marble or in frames of wood or bronze. The Roman glass-blowers were masters of all the ordinary methods of manipulation and decoration. Their craftsmanship is proved by the large cinerary urns, by the jugs with wide, deeply ribbed, scientifically fixed handles, and by vessels and vases as elegant in form and light in weight as any that have been since produced at Murano. Their moulds, both for blowing hollow vessels and for pressing ornaments, were as perfect for the purposes for which they were intended as those of the present time. Their decorative cutting (Plate I. figs. 5 and 6), which took the form of simple, incised lines, or bands of shallow oval or hexagonal hollows, was more suited to the material than the deep prismatic cutting of comparatively recent times.

The Romans had at their command, of transparent colours, blue, green, purple or amethystine, amber, brown and rose; of opaque colours, white, black, red, blue, yellow, green and orange. There are many shades of transparent blue and of opaque blue, yellow and green. In any large collection of fragments it would be easy to find eight or ten varieties of opaque blue, ranging from lapis lazuli to turquoise or to lavender and six or seven of opaque green. Of red the varieties are fewer; the finest is a crimson red of very beautiful tint, and there are various gradations from this to a dull brick red. One

variety forms the ground of a very good imitation of porphyry; and there is a dull semi-transparent red which, when light is passed through it, appears to be of a dull green hue. With these colours the Roman *vitrarius* worked, either using them singly or blending them in almost every conceivable combination, sometimes, it must be owned, with a rather gaudy and inharmonious effect.

The glasses to which the Venetians gave the name “mille fiori” were formed by arranging side by side sections of glass cane, the canes themselves being built up of differently coloured rods of glass, and binding them together by heat. A vast quantity of small cups and paterae were made by this means in patterns which bear considerable resemblance to the surfaces of madrepores. In these every colour and every shade of colour seem to have been tried in great variety of combination with effects more or less pleasing, but transparent violet or purple appears to have been the most common ground colour. Although most of the vessels of this mille fiori glass were small, some were made as large as 20 in. in diameter. Imitations of natural stones were made by stirring together in a crucible glasses of different colours, or by incorporating fragments of differently coloured glasses into a mass of molten glass by rolling. One variety is that in which transparent brown glass is so mixed with opaque white and blue as to resemble onyx. This was sometimes done with great success, and very perfect imitations of the natural stone were produced. Sometimes purple glass is used in place of brown, probably with the design of imitating the precious murrhine. Imitations of porphyry, of serpentine, and of granite are also met with, but these were used chiefly in pavements, and for the decoration of walls, for which purposes the onyx-glass was likewise employed.

The famous cameo glass was formed by covering a mass of molten glass with one or more coatings of a differently coloured glass. The usual process was to gather, first, a small quantity of opaque white glass; to coat this with a thick layer of translucent blue glass; and, finally, to cover the blue glass with a coating of the white glass. The outer coat was then removed from that portion which was to constitute the ground, leaving the white for the figures, foliage or other ornamentation; these were then sculptured by means of the gem-engraver’s tools. Pliny no doubt means to refer to this when he says (*Nat. Hist.* xxxvi. 26. 66), “aliud argenti modo caelatur,” contrasting it with the process of cutting glass by the help of a wheel, to which he refers in the words immediately preceding, “aliud torno teritur.”

The Portland or Barberini vase in the British Museum is the finest example of this kind of work which has come down to us, and was entire until it was broken into some hundred pieces by a madman. The pieces, however, were joined together by Mr Doubleday with extraordinary skill, and the beauty of design and execution may still be appreciated. The two other most remarkable examples of this cameo glass are an amphora at Naples and the Auldjo vase. The amphora measures 1 ft. ⅝ in. in height, 1 ft. 7½ in. in circumference; it is shaped like the earthern amphoras with a foot far too small to support it, and must no doubt have had a stand, probably of gold; the greater part is covered with a most exquisite design of garlands and vines, and two groups of boys gathering and treading grapes and playing on various instruments of music; below these is a line of sheep and goats in varied attitudes. The ground is blue and the figures white. It was found in a house in the Street of Tombs at Pompeii in the year 1839, and is now in the Royal Museum at Naples. It is well engraved in Richardson’s *Studies of Ornamental Design*. The Auldjo vase, in the British Museum, is an oenochoe about 9 in. high; the ornament consists mainly of a most beautiful band of foliage, chiefly of the vine, with bunches of grapes; the ground is blue and the ornaments white; it was found at Pompeii in the house of the faun. It also has been engraved by Richardson. The same process was used in producing large tablets, employed, no doubt, for various decorative purposes. In the South Kensington Museum is a fragment of such a tablet or slab; the figure, a portion of which remains, could not have been less than about 14 in. high. The ground of these cameo glasses is most commonly transparent blue, but sometimes opaque blue, purple or dark brown. The superimposed layer, which is sculptured, is generally opaque white. A very few specimens have been met with in which several colours are employed.

At a long interval after these beautiful objects come those vessels which were ornamented either by means of coarse threads trailed over their surfaces and forming rude patterns, or by coloured enamels merely placed on them in lumps; and these, doubtless, were cheap and common wares. But a modification of the first-named process was in use in the 4th and succeeding centuries, showing great ingenuity and manual dexterity,—that, namely, in which the added portions of glass are united to the body of the cup, not throughout, but only at points, and then shaped either by the wheel or by the hand (Plate I. fig. 3). The attached portions form in some instances inscriptions, as on a cup found at Strassburg, which bears the name of the emperor Maximian (A.D. 286-310), on another in the Vereinigte Sammlungen at Munich, and on a third in the Trivulzi collection at Milan, where the cup is white, the inscription green and the network blue. Probably, however, the finest example is a situla, 10½ in. high by 8 in. wide at the top and 4 in. at the bottom, preserved in the treasury of St Mark at Venice. This is of glass of a greenish hue; on the upper part is represented, in relief, the chase of a lion by two men on horseback accompanied by dogs; the costume appears to be Byzantine rather than Roman, and the style is very bad. The figures are very much undercut. The lower part has four rows of circles united to the vessel at those points alone where the circles touch each other. All the other examples have the lower portion covered in like manner by a network of circles standing nearly a quarter of an inch from the body of the cup. An example connected with the specimens just described is the cup belonging to Baron Lionel de Rothschild; though externally of an opaque greenish colour, it is by transmitted light of a deep red. On the outside, in very high relief, are figures of Bacchus with vines and panthers, some portions being hollow from within, others fixed on the exterior. The changeability of colour may remind us of the “calices versicolores” which Hadrian sent to Servianus.

So few examples of glass vessels of this period which have been painted in enamel have come down to us that it has been questioned whether that art was then practised; but several specimens have been described which can leave no doubt on the point; decisive examples are afforded by two cups found at Vaspelev, in Denmark, engravings of which are published in the *Annaler for Nordisk Oldkyndeghed* for 1861, p. 305. These are small cups, 3 in. and 2½ in. high, 3¾ in. and 3 in. wide, with feet and straight sides; on the larger are a lion and a bull, on the smaller two birds with grapes, and on each some smaller ornaments. On the latter are the letters DVB. R. The colours are vitrified and slightly in relief; green, blue and brown may be distinguished. They are found with Roman bronze vessels and other articles.

The art of glass-making no doubt, like all other art, deteriorated during the decline of the Roman empire, but it is probable that it continued to be practised, though with constantly decreasing skill, not only in Rome but in the provinces. Roman technique was to be found in Byzantium and Alexandria, in Syria, in Spain, in Germany, France and Britain.

Early Christian and Byzantine Glass.—The process of embedding gold and silver leaf between two layers of glass originated as early as the 1st century, probably in Alexandria. The process consisted in spreading the leaf on a thin film of blown glass and pressing molten glass on to the leaf so that the molten glass cohered with the film of glass through the pores of the metallic leaf. If before this application of the molten glass the metallic leaf, whilst resting on the thin film of blown glass, was etched with a sharp point, patterns, emblems, inscriptions and pictures could be embedded and rendered permanent by the double coating of glass. The plaques thus formed could be reheated and fashioned into the bases of bowls and drinking vessels. In this way the so-called “fondi d’oro” of the catacombs in Rome were made. They are the broken bases of drinking vessels containing inscriptions, emblems, domestic scenes and portraits etched in gold leaf. Very few have any reference to Christianity, but they served as indestructible marks for indicating the position of interments in the catacombs. The fondi d’oro suggested the manufacture of plaques of gold which could be broken up into tesserae for use in mosaics.

Some of the Roman artificers in glass no doubt migrated to Constantinople, and it is certain that the art was practised there to a very great extent during the middle ages. One of the gates near the port took its name from the adjacent glass houses. St Sofia when erected by Justinian had vaults covered with mosaics and immense windows filled with plates of glass fitted into pierced marble frames; some of the plates, 7 to 8 in. wide and 9 to 10 in. high, not blown but cast, which are in the windows may possibly date from the building of the church. It is also recorded that pierced silver disks were suspended by chains and supported glass lamps “wrought by fire.” Glass for mosaics was also largely made and exported. In the 8th century, when peace was made between the caliph Walid and the emperor Justinian II., the former stipulated for a quantity of mosaic for the decoration of the new mosque at Damascus, and in the 10th century the materials for the decoration of the niche of the kibla at Cordova were furnished by Romanus II. In the 11th century Desiderius, abbot of Monte Casino, sent to Constantinople for workers in mosaic.

We have in the work of the monk Theophilus, *Diversarum artium schedula*, and in the probably earlier work of Eraclius, about the 11th century, instructions as to the art of glass-making in general, and also as to the production of coloured and enamelled vessels, which these writers speak of as being practised by the Greeks. The only entire enamelled vessel which we can confidently attribute to Byzantine art is a small vase preserved in the treasury of St Mark’s at Venice. This is decorated with circles of rosettes of blue, green and red enamel, each surrounded by lines of gold; within the circles are little figures evidently suggested by antique originals, and precisely like similar figures found on carved ivory boxes of Byzantine origin dating from the 11th or 12th century. Two inscriptions in Cufic characters surround the vase, but they, it would seem, are merely ornamental and destitute of meaning. The presence of these inscriptions may perhaps lead to the inference that the vase was made in Sicily, but by Byzantine workmen. The double-handled blue-glass vase in the British Museum, dating from the 5th century, is probably a chalice, as it closely resembles the chalices represented on early Christian monuments.

Of uncoloured glass brought from Constantinople several examples exist in the treasury of St Mark’s at Venice, part of the plunder of the imperial city when taken by the crusaders in 1204. The glass in all is greenish, very thick, with many bubbles, and has been cut with the wheel; in some instances circles and cones, and in one the outlines of the figure of a leopard, have been left standing up, the rest of the surface having been laboriously cut away. The intention would seem to have been to imitate vessels of rock crystal. The so-called “Hedwig” glasses may also have originated in Constantinople. These are small cups deeply and rudely cut with conventional representations of eagles, lions and griffins. Only nine specimens are known. The specimen in the Rijks Museum at Amsterdam has an eagle and two lions. The specimen in the Germanic Museum at Nuremberg has two lions and a griffin.

Saracenic Glass.—The Saracenic invasion of Syria and Egypt did not destroy the industry of glass-making. The craft survived and flourished under the Saracenic régime in Alexandria, Cairo, Tripoli, Tyre, Aleppo and Damascus. In inventories of the 14th century both in England and in France mention may frequently be found of glass vessels of the manufacture of Damascus. A writer in the early part of the 15th century states that “glass-making is an important industry at Haleb (Aleppo).” Edward Dillon (*Glass*, 1902) has very properly laid stress on the importance of the enamelled Saracenic glass of the 13th, 14th and 15th centuries, pointing out that, whereas the Romans and Byzantine Greeks made some crude and ineffectual experiments in enamelling, it was under Saracenic influence that the

processes of enamelling and gilding on glass vessels were perfected. An analysis of the glass of a Cairene mosque lamp shows that it is a soda-lime glass and contains as much as 4% of magnesia. This large proportion of magnesia undoubtedly supplied the stability required to withstand the process of enamelling. The enamelled Saracenic glasses take the form of flasks, vases, goblets, beakers and mosque lamps. The enamelled decoration on the lamps is restricted to lettering, scrolls and conventional foliage; on other objects figure-subjects of all descriptions are freely used. C. H. Read has pointed out a curious feature in the construction of the enamelled beakers. The base is double but the inner lining has an opening in the centre. Dillon has suggested that this central recess may have served to support a wick. It is possible however, that it served no useful purpose, but that the construction is a survival from the manufacture of vessels with fondi d'oro. The bases containing the embedded gold leaf must have been welded to the vessels to which they belonged, in the same way as the bases are welded to the Saracenic beakers. The enamelling process was probably introduced in the early part of the 13th century; most of the enamelled mosque lamps belong to the 14th century.

Venetian Glass.—Whether refugees from Padua, Aquileia or other Italian cities carried the art to the lagoons of Venice in the 5th century, or whether it was learnt from the Greeks of Constantinople at a much later date, has been a disputed question. It would appear not improbable that the former was the case, for it must be remembered that articles formed of glass were in the later days of Roman civilization in constant daily use, and that the making of glass was carried on, not as now in large establishments, but by artisans working on a small scale. It seems certain that some knowledge of the art was preserved in France, in Germany and in Spain, and it seems improbable that it should have been lost in that archipelago, where the traditions of ancient civilization must have been better preserved than in almost any other place. In 523 Cassiodorus writes of the "innumerosa navigia" belonging to Venice, and where trade is active there is always a probability that manufactures will flourish. However this may be, the earliest positive evidence of the existence at Venice of a worker in glass would seem to be the mention of Petrus Flavianus, phiolarius, in the ducale of Vitale Falier in the year 1090. In 1224 twenty-nine persons are mentioned as friolari (*i.e.* phiolari), and in the same century "mariegole," or codes of trade regulations, were drawn up (*Monografia della vetraria Veneziana e Muranese*, p. 219). The manufacture had then no doubt attained considerable proportions: in 1268 the glass-workers became an incorporated body; in their processions they exhibited decanters, scent-bottles and the like; in 1279 they made, among other things, weights and measures. In the latter part of this century the glass-houses were almost entirely transferred to Murano. Thenceforward the manufacture continued to grow in importance; glass vessels were made in large quantities, as well as glass for windows. The earliest example which has as yet been described—a cup of blue glass, enamelled and gilt—is, however, not earlier than about 1440. A good many other examples have been preserved which may be assigned to the same century: the earlier of these bear a resemblance in form to the vessels of silver made in the west of Europe; in the later an imitation of classical forms becomes apparent. Enamel and gilding were freely used, in imitation no doubt of the much-admired vessels brought from Damascus. Dillon has pointed out that the process of enamelling had probably been derived from Syria, with which country Venice had considerable commercial intercourse. Many of the ornamental processes which we admire in Venetian glass were already in use in this century, as that of mille fiori, and the beautiful kind of glass known as "vitro di trina" or lace glass. An elaborate account of the processes of making the vitro di trina and the vasi a reticelli (Plate I., fig. 7) is given in Bontemps's *Guide du verrier*, pp. 602-612. Many of the examples of these processes exhibit surprising skill and taste, and are among the most beautiful objects produced at the Venetian furnaces. That peculiar kind of glass usually called schmelz, an imperfect imitation of calcedony, was also made at Venice in the 15th century. Avanturine glass, that in which numerous small particles of copper are diffused through a transparent yellowish or brownish mass, was not invented until about 1600.

The peculiar merits of the Venetian manufacture are the elegance of form and the surprising lightness and thinness of the substance of the vessels produced. The highest perfection with regard both to form and decoration was reached in the 16th century; subsequently the Venetian workmen somewhat abused their skill by giving extravagant forms to vessels, making drinking glasses in the forms of ships, lions, birds, whales and the like.

Besides the making of vessels of all kinds the factories of Murano had for a long period almost an entire monopoly of two other branches of the art—the making of mirrors and of beads. Attempts to make mirrors of glass were made as early as A.D. 1317, but even in the 16th century mirrors of steel were still in use. To make a really good mirror of glass two things are required—a plate free from bubbles and striae, and a method of applying a film of metal with a uniform bright surface free from defects. The principle of applying metallic films to glass seems to have been known to the Romans and even to the Egyptians, and is mentioned by Alexander Neckam in the 12th century, but it would appear that it was not until the 16th century that the process of "silvering" mirrors by the use of an amalgam of tin and mercury had been perfected. During the 16th and 17th centuries Venice exported a prodigious quantity of mirrors, but France and England gradually acquired knowledge and skill in the art, and in 1772 only one glass-house at Murano continued to make mirrors.

The making of beads was probably practised at Venice from a very early period, but the earliest documentary evidence bearing on the subject does not appear to be of earlier date than the 14th century, when prohibitions were directed against those who made of glass such objects as were usually made of crystal or other hard stones. In the 16th century it had become a trade of great importance, and about 1764 twenty-two furnaces were employed in the production of beads. Towards the end of the same century from 600 to 1000 workmen were, it is stated, employed on one branch of the art, that of ornamenting beads by the help of the blow-pipe. A very great variety of patterns was produced; a tariff

of the year 1800 contains an enumeration of 562 species and a vast number of sub-species.

The efforts made in France, Germany and England, in the 17th and 18th centuries, to improve the manufacture of glass in those countries had a very injurious effect on the industry of Murano. The invention of colourless Bohemian glass brought in its train the practice of cutting glass, a method of ornamentation for which Venetian glass, from its thinness, was ill adapted. One remarkable man, Giuseppe Briati, exerted himself, with much success, both in working in the old Venetian method and also in imitating the new fashions invented in Bohemia. He was especially successful in making vases and circular dishes of vitro di trina; one of the latter in the Correr collection at Venice, believed to have been made in his glass-house, measures 55 centimetres (nearly 23 in.) in diameter. The vases made by him are as elegant in form as the best of the Cinquecento period, but may perhaps be distinguished by the superior purity and brilliancy of the glass. He also made with great taste and skill large lustres and mirrors with frames of glass ornamented either in intaglio or with foliage of various colours. He obtained a knowledge of the methods of working practised in Bohemia by disguising himself as a porter, and thus worked for three years in a Bohemian glass-house. In 1736 he obtained a patent at Venice to manufacture glass in the Bohemian manner. He died in 1772.

The fall of the republic was accompanied by interruption of trade and decay of manufacture, and in the last years of the 18th and beginning of the 19th century the glass-making of Murano was at a very low ebb. In the year 1838 Signor Bussolin revived several of the ancient processes of glass-working, and this revival was carried on by C. Pietro Biguglia in 1845, and by others, and later by Salviati, to whose successful efforts the modern renaissance of Venetian art glass is principally due.

The fame of Venice in glass-making so completely eclipsed that of other Italian cities that it is difficult to learn much respecting their progress in the art. Hartshorne and Dillon have drawn attention to the important part played by the little Ligurian town, Altare, as a centre from which glass-workers migrated to all parts of Europe. It is said that the glass industry was established at Altare, in the 11th century, by French craftsmen. In the 14th century Muranese glass-workers settled there and developed the industry. It appears that as early as 1295 furnaces had been established at Treviso, Vicenza, Padua, Mantua, Ferrara, Ravenna and Bologna. In 1634 there were two glass-houses in Rome and one in Florence; but whether any of these produced ornamented vessels, or only articles of common use and window glass, would not appear to have as yet been ascertained.

Germany—Glass-making in Germany during the Roman period seems to have been carried on extensively in the neighbourhood of Cologne. The Cologne museum contains many specimens of Roman glass, some of which are remarkable for their cut decoration. The craft survived the downfall of the Roman power, and a native industry was developed. This industry must have won some reputation, for in 758 the abbot of Jarrow appealed to the bishop of Mainz to send him a worker in glass. There are few records of glass manufacture in Germany before the beginning of the 16th century. The positions of the factories were determined by the supply of wood for fuel, and subsequently, when the craft of glass-cutting was introduced, by the accessibility of water-power. The vessels produced by the 16th-century glass-workers in Germany, Holland and the Low Countries are closely allied in form and decoration. The glass is coloured (generally green) and the decoration consists of glass threads and glass studs, or prunts (“Nuppen”). The use of threads and prunts is illustrated by the development of the “Roemer,” so popular as a drinking-glass, and as a feature in Dutch studies of still life. The “Igel,” a squat tumbler covered with prunts, gave rise to the “Krautstrunk,” which is like the “Igel,” but longer and narrow-waisted. The “Roemer” itself consists of a cup, a short waist studded with prunts and a foot. The foot at first was formed by coiling a thread of glass round the base of the waist; but, subsequently, an open glass cone was joined to the base of the waist, and a glass thread was coiled upon the surface of the cone. The “Passglas,” another popular drinking-glass, is cylindrical in form and marked with horizontal rings of glass, placed at regular intervals, to indicate the quantity of liquor to be taken at a draught.

In the edition of 1581 of the *De re metallica* by Georg Agricola, there is a woodcut showing the interior of a German glass factory, and glass vessels both finished and unfinished.

In 1428 a Muranese glass-worker set up a furnace in Vienna, and another furnace was built in the same town by an Italian in 1486. In 1531 the town council of Nuremberg granted a subsidy to attract teachers of Venetian technique. Many specimens exist of German winged and enamelled glasses of Venetian character. The Venetian influence, however, was indirect rather than direct. The native glass-workers adopted the process of enamelling, but applied it to a form of decoration characteristically German. On tall, roomy, cylindrical glasses they painted portraits of the emperor and electors of Germany, or the imperial eagle bearing on its wings the arms of the states composing the empire. The earliest-known example of these enamelled glasses bears the date 1553. They were immensely popular and the fashion for them lasted into the 18th century. Some of the later specimens have views of cities, battle scenes and processions painted in grisaille.

A more important outcome, however, of Italian influence was the production, in emulation of Venetian glass, of a glass made of refined potash, lime and sand, which was more colourless than the material it was intended to imitate. This colourless potash-lime glass has always been known as Bohemian glass. It was well adapted for receiving cut and engraved decoration, and in these processes the German craftsmen proved themselves to be exceptionally skilful. At the end of the 16th century Rudolph II. brought Italian rock-crystal cutters from Milan to take control of the crystal and glass-cutting works he had established at Prague. It was at Prague that Caspar Lehmann and Zachary Belzer learnt the craft of cutting glass. George Schwanhart, a pupil of Caspar Lehmann, started glass-cutting

at Ratisbon, and about 1690 Stephen Schmidt and Hermann Schwinger introduced the crafts of cutting and engraving glass in Nuremberg. To the Germans must be credited the discovery, or development, of colourless potash-lime glass, the reintroduction of the crafts of cutting and engraving on glass, the invention by H. Schwanhart of the process of etching on glass by means of hydrofluoric acid, and the rediscovery by J. Kunkel, who was director of the glass-houses at Potsdam in 1679, of the method of making copper-ruby glass.

Low Countries and the United Provinces.—The glass industry of the Low Countries was chiefly influenced by Italy and Spain, whereas German influence and technique predominated in the United Provinces. The history of glass-making in the provinces is almost identical with that of Germany. In the 17th and 18th centuries the processes of scratching, engraving and etching were brought to great perfection.

The earliest record of glass-making in the Low Countries consists in an account of payments made in 1453-1454 on behalf of Philip the Good of Burgundy to “Gossiun de Vieuglise, Maître Vorrier de Lille” for a glass fountain and four glass plateaus. Schuermans has traced Italian glass-workers to Antwerp, Liége, Brussels and Namur. Antwerp appears to have been the headquarters of the Muranese, and Liége the headquarters of the Altarists. Guicciardini in his description of the Netherlands, in 1563, mentions glass as among the chief articles of export to England.

In 1599 the privilege of making “Voires de cristal à la faschon Venise,” was granted to Philippe de Gridolphi of Antwerp. In 1623 Anthony Miotti, a Muranese, addressed a petition to Philip IV. of Spain for permission to make glasses, vases and cups of fine crystal, equal to those of Venice, but to be sold at one-third less than Venetian glasses. In 1642 Jean Savonetti “gentilhomme Verrier de Murano” obtained a patent for making glass in Brussels. The Low Country glasses are closely copied from Venetian models, but generally are heavier and less elegant. Owing to the fashion of Dutch and Flemish painters introducing glass vases and drinking-glasses into their paintings of still life, interiors and scenes of conviviality, Holland and Belgium at the present day possess more accurate records of the products of their ancient glass factories than any other countries.

Spain.—During the Roman occupation Pliny states that glass was made “per Hispanias” (*Nat. Hist.* xxxvi. 26. 66). Traces of Roman glass manufactories have been found in Valencia and Murcia, in the valleys which run down to the coast of Catalonia, and near the mouth of the Ebro. Little is known about the condition of glass-making in Spain between the Roman period and the 13th century. In the 13th century the craft of glass-making was practised by the Moors in Almeria, and was probably a survival from Roman times. The system of decorating vases and vessels by means of strands of glass trailed upon the surface in knots, zigzags and trellis work, was adopted by the Moors and is characteristic of Roman craftsmanship. Glass-making was continued at Pinar de la Vidriera and at Al Castril de la Pena into the 17th century. The objects produced show no sign of Venetian influence, but are distinctly Oriental in form. Many of the vessels have four or as many as eight handles, and are decorated with serrated ornamentation, and with the trailed strands of glass already referred to. The glass is generally of a dark-green colour.

Barcelona has a long record as a centre of the glass industry. In 1324 a municipal edict was issued forbidding the erection of glass-furnaces within the city. In 1455 the glass-makers of Barcelona were permitted to form a gild. Jeronimo Paulo, writing in 1491, says that glass vessels of various sorts were sent thence to many places, and even to Rome. Marineus Siculus, writing early in the 16th century, says that the best glass was made at Barcelona; and Gaspar Baneiros, in his *Chronographia*, published in 1562, states that the glass made at Barcelona was almost equal to that of Venice and that large quantities were exported.

The author of the *Atlante español*, writing at the end of the 18th century, says that excellent glass was still made at Barcelona on Venetian models. The Italian influence was strongly felt in Spain, but Spanish writers have given no precise information as to when it was introduced or whence it came. Schuermans has, however, discovered the names of more than twenty Italians who found their way into Spain, in some cases by way of Flanders, either from Altare or from Venice. The Spanish glass-makers were very successful in imitating the Venetian style, and many specimens supposed to have originated from Murano are really Spanish. In addition to the works at Barcelona, the works which chiefly affected Venetian methods were those of Cadalso in the province of Toledo, founded in the 16th century, and the works established in 1680 at San Martin de Valdeiglesias in Avila. There were also works at Valdemaqueda and at Villafranca. In 1680 the works in Barcelona, Valdemaqueda and Villafranca are named in a royal schedule giving the prices at which glass was to be sold in Madrid. In 1772 important glass works were established at Recuenco in the province of Cuenca, mainly to supply Madrid. The royal glass manufactory of La Granja de San Ildefonso was founded about 1725; in the first instance for the manufacture of mirror plates, but subsequently for the production of vases and table-ware in the French style. The objects produced are mostly of white clear glass, cut, engraved and gilded. Engraved flowers, views and devices are often combined with decorative cutting. Don Sigismundo Brun is credited with the invention of permanent gilding fixed by heat. Spanish glass is well represented in the Victoria and Albert Museum.

France.—Pliny states that glass was made in Gaul, and there is reason to believe that it was made in many parts of the country and on a considerable scale. There were glass-making districts both in Normandy and in Poitou.

Little information can be gathered concerning the glass industry between the Roman period and the

14th century. It is recorded that in the 7th century the abbot of Wearmouth in England obtained artificers in glass from France; and there is a tradition that in the 11th century glass-workers migrated from Normandy and Brittany and set up works at Altare near Genoa.

In 1302 window glass, probably crown-glass, was made at Beza le Forêt in the department of the Eure. In 1416 these works were in the hands of Robin and Leban Guichard, but passed subsequently to the Le Vaillants.

In 1338 Humbert, the dauphin, granted a part of the forest of Chamborant to a glass-worker named Guionet on the condition that Guionet should supply him with vessels of glass.

In 1466 the abbess of St Croix of Poitiers received a gross of glasses from the glass-works of La Ferrière, for the privilege of gathering fern for the manufacture of potash.

In France, as in other countries, efforts were made to introduce Italian methods of glass-working. Schuermans in his researches discovered that during the 15th and 16th centuries many glass-workers left Altare and settled in France,—the Saroldi migrated to Poitou, the Ferri to Provence, the Massari to Lorraine and the Bormioli to Normandy. In 1551 Henry II. of France established at St Germain en Laye an Italian named Mutio; he was a native of Bologna, but of Altare origin. In 1598 Henry IV. permitted two “gentil hommes verriers” from Mantua to settle at Rouen in order to make “verres de cristal, verres dorée emaul et autres ouvrages qui se font en Venise.”

France assimilated the craft of glass-making, and her craftsmen acquired a wide reputation. Lorraine and Normandy appear to have been the most important centres. To Lorraine belong the well-known names Hennezel, de Thietry, du Thisac, de Houx; and to Normandy the names de Bongar, de Cacqueray le Vaillant and de Brossard.

In the 17th century the manufacture of mirror glass became an important branch of the industry. In 1665 a manufactory was established in the Faubourg St Antoine in Paris, and another at Tour-la-Ville near Cherbourg.

Louis Lucas de Nehou, who succeeded de Cacqueray at the works at Tour-la-Ville, moved in 1675 to the works in Paris. Here, in 1688, in conjunction with A. Thevart, he succeeded in perfecting the process of casting plate-glass. Mirror plates previous to the invention had been made from blown “sheet” glass, and were consequently very limited in size. De Nehou’s process of rolling molten glass poured on an iron table rendered the manufacture of very large plates possible.

The Manufactoire Royale des Glaces was removed in 1693 to the Château de St Gobain.

In the 18th century the manufacture of *vases de verre* had become so neglected that the Academy of Sciences in 1759 offered a prize for an essay on the means by which the industry might be revived (Labarte, *Histoire des arts industriels*).

The famous Baccarat works, for making crystal glass, were founded in 1818 by d’Artigues.

English Glass.—The records of glass-making in England are exceedingly meagre. There is reason to believe that during the Roman occupation the craft was carried on in several parts of the country. Remains of a Roman glass manufactory of considerable extent were discovered near the Manchester Ship Canal at Warrington. Wherever the Romans settled glass vessels and fragments of glass have been found. There is no evidence to prove that the industry survived the withdrawal of the Roman garrison.

It is probable that the glass drinking-vessels, which have been found in pre-Christian Anglo-Saxon tombs, were introduced from Germany. Some are elaborate in design and bear witness to advanced technique of Roman character. In 675 Benedict Biscop, abbot of Wearmouth, was obliged to obtain glass-workers from France, and in 758 Cuthbert, abbot of Jarrow, appealed to the bishop of Mainz to send him artisans to manufacture “windows and vessels of glass, because the English were ignorant and helpless.” Except for the statement in Bede that the French artisans, sent by Benedict Biscop, taught their craft to the English, there is at present no evidence of glass having been made in England between the Roman period and the 13th century. In some deeds relating to the parish of Chiddingfold, in Surrey, of a date not later than 1230, a grant is recorded of twenty acres of land to Lawrence “vitrearius,” and in another deed, of about 1280, the “ovenhusveld” is mentioned as a boundary. This field has been identified, and pieces of crucible and fragments of glass have been dug up. There is another deed, dated 1300, which mentions one William “le verir” of Chiddingfold.

About 1350 considerable quantities of colourless flat glass were supplied by John Alemayn of Chiddingfold for glazing the windows in St George’s chapel, Windsor, and in the chapel of St Stephen, Westminster. The name Alemayn (Aleman) suggests a foreign origin. In 1380 John Glasewryth, a Staffordshire glass-worker, came to work at Shuerewode, Kirdford, and there made brode-glas and vessels for Joan, widow of John Shertere.

There were two kinds of flat glass, known respectively as “brode-glas” and “Normandy” glass. The former was made, as described by Theophilus, from cylinders, which were split, reheated and flattened into square sheets. It was known as Lorraine glass, and subsequently as “German sheet” or sheet-glass. Normandy glass was made from glass circles or disks. When, in after years, the process was perfected, the glass was known as “crown” glass. In 1447 English flat glass is mentioned in the contract for the windows of the Beauchamp chapel at Warwick, but disparagingly, as the contractor binds himself not to use it. In 1486, however, it is referred to in such a way as to suggest that it was

superior to “Dutch, Venice or Normandy glass.” The industry does not seem to have prospered, for when in 1567 an inquiry was made as to its condition, it was ascertained that only small rough goods were being made.

In the 16th century the fashion for using glass vessels of ornamental character spread from Italy into France and England. Henry VIII. had a large collection of glass drinking-vessels chiefly of Venetian manufacture. The increasing demand for Venetian drinking-glasses suggested the possibility of making similar glass in England, and various attempts were made to introduce Venetian workmen and Venetian methods of manufacture. In 1550 eight Muranese glass-blowers were working in or near the Tower of London. They had left Murano owing to slackness of trade, but had been recalled, and appealed to the Council of Ten in Venice to be allowed to complete their contract in London. Seven of these glass-workers left London in the following year, but one, Josepho Casselari, remained and joined 104
Thomas Cavato, a Dutchman. In 1574 Jacob Verzellini, a fugitive Venetian, residing in Antwerp, obtained a patent for making drinking-glasses in London “such as are made in Murano.” He established works in Crutched Friars, and to him is probably due the introduction of the use of soda-ash, made from seaweed and seaside plants, in place of the crude potash made from fern and wood ashes. His manufactory was burnt down in 1575, but was rebuilt. He afterwards moved his works to Winchester House, Broad Street. There is a small goblet (Pl. I., fig. 8) in the British Museum which is attributed to Verzellini. It is Venetian in character, of a brownish tint, with two white enamel rings round the body. It is decorated with diamond or steel-point etching, and bears on one side the date 1586, and on the opposite side the words “In God is al mi trust.” Verzellini died in 1606 and was buried at Down in Kent. In 1592 the Broad Street works had been taken over by Jerome Bowes. They afterwards passed into the hands of Sir R. Mansel, and in 1618 James Howell, author of *Epistolae Ho-elianae*, was acting as steward. The works continued in operation until 1641. During excavations in Broad Street in 1874 many fragments of glass were found; amongst them were part of a wine-glass, a square scent-bottle and a wine-glass stem containing a spiral thread of white enamel.

A greater and more lasting influence on English glass-making came from France and the Low Countries. In 1567 James Carré of Antwerp stated that he had erected two glass-houses at “Fernefol” (Fernfold Wood in Sussex) for Normandy and Lorraine glass for windows, and had brought over workmen. From this period began the records in England of the great glass-making families of Hennezel, de Thietry, du Thisac and du Houx from Lorraine, and of de Bongar and de Cacqueray from Normandy. About this time glass-works were established at Ewhurst and Alford in Surrey, Loxwood, Kirdford, Wisborough and Petworth in Sussex, and Sevenoaks and Penshurst in Kent. Beginning in Sussex, Surrey and Kent, where wood for fuel was plentiful, the foreign glass-workers and their descendants migrated from place to place, always driven by the fuel-hunger of their furnaces. They gradually made their way into Hampshire, Wiltshire, Gloucestershire, Staffordshire, Northumberland, Scotland and Ireland. They can be traced by cullet heaps and broken-down furnaces, and by their names, often mutilated, recorded in parish registers.

In 1610 a patent was granted to Sir W. Slingsby for burning coal in furnaces, and coal appears to have been used in the Broad Street works. In 1615 all patents for glass-making were revoked and a new patent issued for making glass with coal as fuel, in the names of Mansel, Zouch, Thelwall, Kellaway and Percival. To the last is credited the first introduction of covered crucibles to protect the molten glass from the products of burning coal.

Simultaneously with the issue of this patent the use of wood for melting glass was prohibited, and it was made illegal to import glass from abroad. About 1617 Sir R. Mansel, vice-admiral and treasurer of the navy, acquired the sole rights of making glass in England. These rights he retained for over thirty years.

During the protectorate all patent rights virtually lapsed, and mirrors and drinking-glasses were once more imported from Venice. In 1663 the duke of Buckingham, although unable to obtain a renewal of the monopoly of glass-making, secured the prohibition of the importation of glass for mirrors, coach plates, spectacles, tubes and lenses, and contributed to the revival of the glass industry in all its branches. Evelyn notes in his *Diary* a visit in 1673 to the Italian glass-house at Greenwich, “where glass was blown of finer metal than that of Murano,” and a visit in 1677 to the duke of Buckingham’s glass-works, where they made huge “vases of mettal as cleare, ponderous and thick as chrystal; also looking-glasses far larger and better than any that came from Venice.”

Some light is thrown on the condition of the industry at the end of the 17th century by the Houghton letters on the improvement of trade and commerce, which appeared in 1696. A few of these letters deal with the glass trade, and in one a list is given of the glass-works then in operation. There were 88 glass factories in England which are thus classified:

Bottles	39
Looking-glass plates	2
Crown and plate-glass	5
Window glass	15
Flint and ordinary glass	27
	—
	88

It is probable that the flint-glass of that date was very different from the flint-glass of to-day. The term flint-glass is now understood to mean a glass composed of the silicates of potash and lead. It is the

most brilliant and the most colourless of all glasses, and was undoubtedly first perfected in England. Hartshorne has attributed its discovery to a London merchant named Tilson, who in 1663 obtained a patent for making “crystal glass.” E. W. Hulme, however, who has carefully investigated the subject, is of opinion that flint-glass in its present form was introduced about 1730. The use of oxide of lead in glass-making was no new thing; it had been used, mainly as a flux, both by Romans and Venetians. The invention, if it may be regarded as one, consisted in eliminating lime from the glass mixture, substituting refined potash for soda, and using a very large proportion of lead oxide. It is probable that flint-glass was not invented, but gradually evolved, that potash-lead glasses were in use during the latter part of the 17th century, but that the mixture was not perfected until the middle of the following century.

The 18th century saw a great development in all branches of glass-making. Collectors of glass are chiefly concerned with the drinking-glasses which were produced in great profusion and adapted for every description of beverage. The most noted are the glasses with stout cylindrical legs (Plate I. fig. 9), containing spiral threads of air, or of white or coloured enamel. To this type of glass belong many of the Jacobite glasses which commemorate the old or the young Pretender.

In 1746 the industry was in a sufficiently prosperous condition to tempt the government to impose an excise duty. The report of the commission of excise, dealing with glass, published in 1835 is curious and interesting reading. So burdensome was the duty and so vexatious were the restrictions that it is a matter for wonder that the industry survived. In this respect England was more fortunate than Ireland. Before 1825, when the excise duty was introduced into Ireland, there were flourishing glass-works in Belfast, Cork, Dublin and Waterford. By 1850 the Irish glass industry had been practically destroyed. Injurious as the excise duty undoubtedly was to the glass trade generally, and especially to the flint-glass industry, it is possible that it may have helped to develop the art of decorative glass-cutting. The duty on flint-glass was imposed on the molten glass in the crucibles and on the unfinished goods. The manufacturer had, therefore, a strong inducement to enhance by every means in his power the selling value of his glass after it had escaped the exciseman’s clutches. He therefore employed the best available art and skill in improving the craft of glass-cutting. It is the development of this craft in connexion with the perfecting of flint-glass that makes the 18th century the most important period in the history of English glass-making. Glass-cutting was a craft imported from Germany, but the English material so greatly surpassed Bohemian glass in brilliance that the Bohemian cut-glass was eclipsed. Glass-cutting was carried on at works in Birmingham, Bristol, Belfast, Cork, Dublin, Glasgow, London, Newcastle, Stourbridge, Whittington and Waterford. The most important centres of the craft were London, Bristol, Birmingham and Waterford (see Plate I., fig. 10, for oval cut-glass Waterford bowl). The finest specimens of cut-glass belong to the period between 1780 and 1810. Owing to the sacrifice of form to prismatic brilliance, cut-glass gradually lost its artistic value. Towards the middle of the 19th century it became the fashion to regard all cut-glass as barbarous, and services of even the best period were neglected and dispersed. At the present time scarcely anything is known about the origin of the few specimens of 18th-century English cut-glass which have been preserved in public collections. It is strange that so little interest has been taken in a craft in which for some thirty years England surpassed all competitors, creating a wave of fashion which influenced the glass industry throughout the whole of Europe.

In the report of the Excise Commission a list is given of the glass manufactories which paid the excise duty in 1833. There were 105 factories in England, 10 in Scotland and 10 in Ireland. In England the chief centres of the industry were Bristol, Birmingham, London, Manchester, Newcastle, Stourbridge and York. Plate-glass was made by Messrs Cookson of Newcastle, and by the British Plate Glass Company of Ravenhead. Crown and German sheet-glass were made by Messrs Chance & Hartley of Birmingham. The London glass-works were those of Apsley Pellatt of Blackfriars, Christie of Stangate, and William Holmes of Whitefriars. In Scotland there were works in Glasgow, Leith and Portobello. In Ireland there were works in Belfast, Cork, Dublin and Waterford. The famous Waterford works were in the hands of Gatchell & Co.

India.—Pliny states (*Nat. Hist.* xxxvi. 26, 66) that no glass was to be compared to the Indian, and gives as a reason that it was made from broken crystal; and in another passage (xii. 19, 42) he says that the Troglodytes brought to Ocelis (Ghella near Bab-el-Mandeb) objects of glass. We have, however, very little knowledge of Indian glass of any considerable antiquity. A few small vessels have been found in the “topes,” as in that at Manikiala in the Punjab, which probably dates from about the Christian era; but they exhibit no remarkable character, and fragments found at Brahmanabad are hardly distinguishable from Roman glass of the imperial period. The chronicle of the Sinhalese kings, the *Mahavamsa*, however, asserts that mirrors of glittering glass were carried in procession in 306 B.C., and beads like gems, and windows with ornaments like jewels, are also mentioned at about the same date. If there really was an important manufacture of glass in Ceylon at this early time, that island perhaps furnished the Indian glass of Pliny. In the later part of the 17th century some glass decorated with enamel was made at Delhi. A specimen is in the Indian section of the South Kensington Museum. Glass is made in several parts of India—as Patna and Mysore—by very simple and primitive methods, and the results are correspondingly defective. Black, green, red, blue and yellow glasses are made, which contain a large proportion of alkali and are readily fusible. The greater part is worked into bangles, but some small bottles are blown (Buchanan, *Journey through Mysore*, i. 147, iii. 369).

Persia.—No very remarkable specimens of Persian glass are known in Europe, with the exception of some vessels of blue glass richly decorated with gold. These probably date from the 17th century, for Chardin tells us that the windows of the tomb of Shah Abbas II. (*ob.* 1666), at Kum, were “de cristal

peint d'or et d'azur." At the present day bottles and drinking-vessels are made in Persia which in texture and quality differ little from ordinary Venetian glass of the 16th or 17th centuries, while in form they exactly resemble those which may be seen in the engravings in Chardin's *Travels*.

China.—The history of the manufacture of glass in China is obscure, but the common opinion that it was learnt from the Europeans in the 17th century seems to be erroneous. A writer in the *Mémoires concernant les Chinois* (ii. 46) states on the authority of the annals of the Han dynasty that the emperor Wu-ti (140 B.C.) had a manufactory of the kind of glass called "lieou-li" (probably a form of opaque glass), that in the beginning of the 3rd century of our era the emperor Tsaou-tsaou received from the West a considerable present of glasses of all colours, and that soon after a glass-maker came into the country who taught the art to the natives.

The Wei dynasty, to which Tsaou-tsaou belonged, reigned in northern China, and at this day a considerable manufacture of glass is carried on at Po-shan-hien in Shantung, which it would seem has existed for a long period. The Rev. A. Williamson (*Journeys in North China*, i. 131) says that the glass is extremely pure, and is made from the rocks in the neighbourhood. The rocks are probably of quartz, *i.e.* rock crystal, a correspondence with Pliny's statement respecting Indian glass which seems deserving of attention.

Whether the making of glass in China was an original discovery of that ingenious people, or was derived via Ceylon from Egypt, cannot perhaps be now ascertained; the manufacture has, however, never greatly extended itself in China. The case has been the converse of that of the Romans; the latter had no fine pottery, and therefore employed glass as the material for vessels of an ornamental kind, for table services and the like. The Chinese, on the contrary, having from an early period had excellent porcelain, have been careless about the manufacture of glass. A Chinese writer, however, mentions the manufacture of a huge vase in A.D. 627, and in 1154 Edrisi (first climate, tenth section) mentions Chinese glass. A glass vase about a foot high is preserved at Nara in Japan, and is alleged to have been placed there in the 8th century. It seems probable that this is of Chinese manufacture. A writer in the *Mémoires concernant les Chinois* (ii. 463 and 477), writing about 1770, says that there was then a glass-house at Peking, where every year a good number of vases were made, some requiring great labour because nothing was blown (rien n'est soufflé), meaning no doubt that the ornamentation was produced not by blowing and moulding, but by cutting. This factory was, however, merely an appendage to the imperial magnificence. The earliest articles of Chinese glass the date of which has been ascertained, which have been noticed, are some bearing the name of the emperor Kienlung (1735-1795), one of which is in the Victoria and Albert Museum.

In the manufacture of ornamental glass the leading idea in China seems to be the imitation of natural stones. The coloured glass is usually not of one bright colour throughout, but semi-transparent and marbled; the colours in many instances are singularly fine and harmonious. As in 1770, carving or cutting is the chief method by which ornament is produced, the vessels being blown very solid.

BIBLIOGRAPHY.—Georg Agricola, *De re metallica* (Basel, 1556); Percy Bate, *English Table Glass* (n.d.); G. Bontemps, *Guide du verrier* (Paris, 1868); Edward Dillon, *Glass* (London, 1907); C. C. Edgar, "Graeco-Egyptian Glass," *Catalogue du Musée du Caire* (1905); Sir A. W. Franks, *Guide to Glass Room in British Museum* (1888); Rev. A. Hallen, "Glass-making in Sussex," *Scottish Antiquary*, No. 28 (1893); Albert Hartshorne, *Old English Glasses* (London); E. W. Hulme, "English Glass-making in XVI. and XVII. Centuries," *The Antiquary*, Nos. 59, 60, 63, 64, 65; Alexander Nesbitt, "Glass," *Art Handbook*, Victoria and Albert Museum; E. Peligot, *Le Verre, son histoire, sa fabrication* (Paris, 1878); Apsley Pellatt, *Curiosities of Glass-making* (London, 1849); F. Petrie, *Tell-el-Amarna*, Egypt Exploration Fund (1894); "Egypt," sect. *Art*; H. J. Powell, "Cut Glass," *Journal Society of Arts*, No. 2795; C. H. Read, "Saracenic Glass," *Archaeologia*, vol. 58, part 1.; Juan F. Riano, "Spanish Arts," *Art Handbook*, Victoria and Albert Museum; H. Schuermans, "Muranese and Altarist Glass Workers," eleven letters: *Bulletins des commissions royales* (Brussels, 1883, 1891). For the United States, see vol. x. of *Reports of the 12th Census*, pp. 949-1000, and *Special Report of Census of Manufactures* (1905), Part III., pp. 837-935.

(A. NE.; H. J. P.)

GLASS, STAINED. All coloured glass is, strictly speaking, "stained" by some metallic oxide added to it in the process of manufacture. But the term "stained glass" is popularly, as well as technically, used in a more limited sense, and is understood to refer to stained glass windows. Still the words "stained glass" do not fully describe what is meant; for the glass in coloured windows is for the most part not only stained but painted. Such painting was, however, until comparatively modern times, used only to give details of drawing and to define *form*. The *colour* in a stained glass window was not painted on the glass but incorporated in it, mixed with it in the making—whence the term "pot-metal" by which self-coloured glass is known, *i.e.* glass coloured in the melting pot.

A medieval window was consequently a patchwork of variously coloured pieces. And the earlier its date the more surely was it a mosaic, not in the form of tesserae, but in the manner known as "opus sectile." Shaped pieces of coloured glass were, that is to say, put together like the parts of a puzzle. The nearest approach to an exception to this rule is a fragment at the Victoria and Albert Museum, in which actual tesserae are fused together into a solid slab of many-coloured glass, in effect a window

panel, through which the light shines with all the brilliancy of an Early Gothic window. But apart from the fact that the design proves in this case to be even more effective with the light upon it, the use of gold leaf in the tesserae confirms the presumption that this work, which (supposing it to be genuine) would be Byzantine, centuries earlier than any coloured windows that we know of, and entirely different from them in technique, is rather a specimen of fused mosaic that happens to be translucent than part of a window designedly executed in tesserae.

The Eastern (and possibly the earlier) practice was to set chips of coloured glass in a heavy fretwork of stone or to imbed them in plaster. In a medieval window they were held together by strips of lead, in section something like the letter **H**, the upright strokes of which represent the “tapes” extending on either side well over the edges of the glass, and the crossbar the connecting “core” between them. The leading was soldered together at the points of junction, cement or putty was rubbed into the crevices between glass and lead, and the window was attached (by means of copper wires soldered on to the leads) to iron saddle-bars let into the masonry.

Stained glass was primarily the art of the glazier; but the painter, called in to help, asserted himself more and more, and eventually took it almost entirely into his own hands. Between the period when it was glazier’s work eked out by painting and when it was painter’s work with the aid of the glazier lies the entire development of stained and painted window-making. With the eventual endeavour of the glass painter to do without the glazier, and to get the colour by painting in translucent *enamel* upon colourless glass, we have the beginning of a form of art no longer monumental and comparatively trivial.

This evolution of the painted window from a patchwork of little pieces of coloured glass explains itself when it is remembered that coloured glass was originally not made in the big sheets produced nowadays, but at first in jewels to look as much as possible like rubies, sapphires, emeralds and other precious stones, and afterwards in rounds and sheets of small dimensions. Though some of the earliest windows were in the form of pure glazing (“leaded-lights”), the addition of painting seems to have been customary from the very first. It was a means of rendering detail not to be got in lead. Glazing affords by itself scope for beautiful pattern work; but the old glaziers never carried their art as far as they might have done in the direction of ornament; their aim was always in the direction of picture; the idea was to make windows serve the purpose of coloured story books. That was beyond the art of the glazier. It was easy enough to represent the drapery of a saint by red glass, the ground on which he stood by green, the sky above by blue, his crown by yellow, the scroll in his hand by white, and his flesh by brownish pink; but when it came to showing the folds of red drapery, blades of green grass, details of goldsmith’s work, lettering on the scroll, the features of the face—the only possible way of doing it was by painting. The use of paint was confined at first to an opaque brown, used, not as colour, but only as a means of stopping out light, and in that way defining comparatively delicate details within the lead lines. These themselves outlined and defined the main forms of the design. The pigment used by the glass painter was of course vitreous: it consisted of powdered glass and sundry metallic oxides (copper, iron, manganese, &c.), so that, when the pieces of painted glass were made red hot in the kiln, the powdered glass became fused to the surface, and with it the dense colouring matter also. When the pieces of painted glass were afterwards glazed together and seen against the light, the design appeared in the brilliant colour of the glass, its forms drawn in the uniform black into which, at a little distance, leadwork and painting lines became merged.

It needed solid painting to stop out the light entirely: thin paint only obscured it. And, even in early glass, thin paint was used, whether to subdue crude colour or to indicate what little shading a 13th-century draughtsman might desire. In the present state of old glass, the surface often quite disintegrated, it is difficult to determine to what extent thin paint was used for either purpose. There must always have been the temptation to make tint do instead of solid lines; but the more workmanlike practice, and the usual one, was to get difference of tint, as a pen-draughtsman does, by lines of solid opaque colour. In comparatively colourless glass (*grisaille*) the pattern was often made to stand out by cross-hatching the background; and another common practice was to coat the glass with paint all over, and scrape the design out of it. The effect of either proceeding was to lower the tone of the glass without dirtying the colour, as a smear of thin paint would do.

Towards the 14th century, when Gothic design took a more naturalistic direction, the desire to get something like modelling made it necessary to carry painting farther, and they got rid to some extent of the ill effect of shading-colour smeared on the glass by stippling it. This not only softened the tint and allowed of gradation according to the amount of stippling, but let some light through, where the bristles of the stippling-tool took up the pigment. Shading of this kind enforced by touches of strong brushwork, cross-hatching and some scratching out of high lights was the method of glass painting adopted in the 14th century.

Glass was never at the best a pleasant surface to paint on; and glass painting, following the line of least resistance, developed in the later Gothic and early Renaissance periods into something unlike any other form of painting. The outlines continued to be traced upon the glass and fixed in the fire; but, after that, the process of painting consisted mainly in the removal of paint. The entire surface of the glass was coated with an even “matt” of pale brown; this was allowed to dry; and then the high lights were rubbed off, and the modelling was got by scrubbing away the paint with a dry hog-hair brush, more or less, according to the gradations required. Perfect modelling was got by repeating the operation—how often depended upon the dexterity of the painter. A painter’s method is partly the outcome of his individuality. One man would float on his colour and manipulate it to some extent in the

moist state; another would work entirely upon the dry matt. Great use was made of the pointed stick with which sharp lines of light were easily scraped out; and in the 16th century Swiss glass painters, working upon a relatively small scale, got their modelling entirely with a needle-point, scraping away the paint just as an etcher scratches away the varnish from his etching plate. The practice of the two craftsmen is, indeed, identical, though the one scratches out what are to be black lines and the other lines of light. In the end, then, though a painter would always use touches of the brush to get crisp lines of dark, the manipulation of glass painting consisted more in erasing lights than in painting shadows, more in rubbing out or scraping off paint than in putting it on in brush strokes.

So far there was no thought of getting colour by means of paint. The colour was in the glass itself, permeating the mass ("pot-metal"). There was only one exception to this—ruby glass, the colour of which was so dense that red glass thick enough for its purpose would have been practically obscure; and so they made a colourless pot-metal coated on one side only with red glass. This led to a practice which forms an exception to the rule that in "pot-metal" glass every change of colour, or from colour to white, is got by the use of a separate piece of glass. It was possible in the ease of this "flashed" ruby to grind away portions of the surface and thus obtain white on red or red on white. Eventually they made coated glass of blue and other colours, with a view to producing similar effects by abrasion. (The same result is arrived at nowadays by means of etching. The skin of coloured glass, in old days laboriously ground or cut away, is now easily eaten off by fluoric acid.) One other exceptional expedient in colouring had very considerable effect upon the development of glass design from about the beginning of the 14th century. The discovery that a solution of silver applied to glass would under the action of the fire stain it yellow enabled the glass painter to get yellow upon colourless glass, green upon grey-blue, and (by staining only the abraded portions) yellow upon blue or ruby. This yellow was neither enamel nor pot-metal colour, but stain—the only staining actually done by the glass painter as distinct from the glass maker. It varied in colour from pale lemon to deep orange, and was singularly pure in quality. As what is called "white" glass became purer and was employed in greater quantities it was lavishly used; so much so that a brilliant effect of silvery white and golden yellow is characteristic of later Gothic windows.

The last stage of glass painting was the employment of enamel not for stopping out light but to get colour. It began to be used in the early part of the 16th century—at first only in the form of a flesh tint; but it was not long before other colours were introduced. This use of colour no longer *in* the glass but *upon* it marks quite a new departure in technique. Enamel colour was finely powdered coloured glass mixed with gum or some such substance into a pigment which could be applied with a brush. When the glass painted with it was brought to a red heat in the oven, the powdered glass melted and was fused to it, just like the opaque brown employed from the very beginning of glass-painting.

This process of enamelling was hardly called for in the interests of art. Even the red flesh-colour (borrowed from the Limoges enamellers upon copper) did not in the least give the quality of flesh, though it enabled the painter to suggest by contrast the whiteness of a man's beard. As for the brighter enamel colours, they had nothing like the depth or richness of "stained" glass. What enamel really did was to make easy much that had been impossible in mosaic, as, for example, to represent upon the very smallest shield of arms any number of "charges" all in the correct tinctures. It encouraged the minute workmanship characteristic of Swiss glass painting; and, though this was not altogether inappropriate to domestic window panes, the painter was tempted by it to depart from the simplicity and breadth of design inseparable from the earlier mosaic practice. In the end he introduced coloured glass only where he could hardly help it, and glazed the great part of his window in rectangular panes of clear glass, upon which he preferred to paint his picture in opaque brown and translucent enamel colours.

Enamel upon glass has not stood the test of time. Its presence is usually to be detected in old windows by specks of light shining through the colour. This is where the enamel has crumbled off. There is a very good reason for that. Enamel must melt at a temperature at which the glass it is painted on keeps its shape. The lower the melting point of the powdered glass the more easily it is fused. The painter is consequently inclined to use enamel of which the contraction and expansion is much greater than that of his glass—with the result that, under the action of the weather, the colour is apt to work itself free and expose the bare white glass beneath. The only enamel which has held its own is that of the Swiss glass-painters of the 16th and 17th centuries. The domestic window panes they painted may not in all cases have been tried by the sudden changes of atmosphere to which church windows are subject; but credit must be given them for exceptionally skilful and conscientious workmanship.

The story of stained glass is bound up with the history of architecture, to which it was subsidiary, and of the church, which was its patron. Its only possible course of development was in the wake of church building. From its very inception it was Gothic and ecclesiastical. And, though it survived the upheaval of the Renaissance and was turned to civil and domestic use, it is to church windows that we must go to see what stained glass really was—or is; for time has been kind to it. The charm of medieval glass lies to a great extent in the material, and especially in the inequality of it. Chemically impure and mechanically imperfect, it was rarely crude in tint or even in texture. It shaded off from light to dark according to its thickness; it was speckled with air bubbles; it was streaked and clouded; and all these imperfections of manufacture went to perfection of colour. And age has improved it: the want of homogeneousness in the material has led to the disintegration of its surface; soft particles in it have been dissolved away by the action of the weather, and the surface, pitted like an oyster-shell, refracts the light in a way which adds greatly to the effect; at the same time there is roothold for the lichen

which (like the curtains of black cobwebs) veils and gives mystery to the colour. An appreciable part of the beauty of old glass is the result of age and accident. In that respect no new glass can compare with it. There is, however, no such thing as “the lost secret” of glass-making. It is no secret that age mellows.

Stained and painted glass is commonly apportioned to its “period,” Gothic or Renaissance, and further to the particular phase of the style to which it belongs. C. Winston, who was the first to inquire thoroughly into English glass, adopting T. Rickman’s classification, divided Gothic windows into Early English (to *c.* 1280), Decorated (to *c.* 1380) and Perpendicular (to *c.* 1530). These dates will do. But the transition from one phase of design to another is never so sudden, nor so easily defined, as any table of dates would lead us to suppose. The old style lingered in one district long after the new fashion was flourishing in another. Besides, the English periods do not quite coincide with those of other countries. France, Germany and the Low Countries count for much in the history of stained glass; and in no two places was the pace of progress quite the same. There was, for example, scarcely any 13th-century Gothic in Germany, where the “geometric” style, equivalent to our Decorated, was preceded by the Romanesque period; in France the Flamboyant took the place of our Perpendicular; and in Italy Gothic never properly took root at all. All these considered, a rather rough and ready division presents the least difficulty to the student of old glass; and it will be found convenient to think of Gothic glass as (1) Early, (2) Middle and (3) Late, and of the subsequent windows as (1) Renaissance and (2) Late Renaissance. The three periods of Gothic correspond approximately to the 13th, 14th and 15th centuries. The limits of the two periods of the Renaissance are not so easily defined. In the first part of the 16th century (in Italy long before that) the Renaissance and Gothic periods overlapped; in the latter part of it, glass painting was already on the decline; and in the 17th and 18th centuries it sank to deeper depths of degradation.

The likeness of early windows to translucent enamel (which is also glass) is obvious. The lines of lead glazing correspond absolutely to the “cloisons” of Byzantine goldsmith’s work. Moreover, the extreme minuteness of the leading (not always either mechanically necessary or architecturally desirable) suggests that the starting point of all this gorgeous illumination was the idea of reproducing on a grandiose scale the jewelled effect produced in small by cloisonné enamellers. In other respects the earliest glass shows the influence of Byzantine tradition. It is mainly according to the more or less Byzantine character of its design and draughtsmanship that archaeologists ascribe certain remains of old glass to the 12th or the 11th century. Apart from documentary or direct historic evidence, it is not possible to determine the precise date of any particular fragment. In the “restored” windows at St Denis there are remnants of glass belonging to the year 1108. Elsewhere in France (Reims, Anger, Le Mans, Chartres, &c.) there is to be found very early glass, some of it probably not much later than the end of the 10th century, which is the date confidently ascribed to certain windows at St Remi (Reims) and at Tegernsee. The rarer the specimen the greater may be its technical and antiquarian interest. But, even if we could be quite sure of its date, there is not enough of this very early work, and it does not sufficiently distinguish itself from what followed, to count artistically for much. The glory of early glass belongs to the 13th century.

The design of windows was influenced, of course, by the conditions of the workshop, by the nature of glass, the difficulty of shaping it, the way it could be painted, and the necessity of lead glazing. The place of glass in the scheme of church decoration led to a certain severity in the treatment of it. The growing desire to get more and more light into the churches, and the consequent manufacture of purer and more transparent glass, affected the glazier’s colour scheme. For all that, the fashion of a window was, *mutatis mutandis*, that of the painting, carving, embroidery, goldsmith’s work, enamel and other craftsmanship of the period. The design of an ivory triptych is very much that of a three-light window. There is a little enamelled shrine of German workmanship in the Victoria and Albert Museum which might almost have been designed for glass; and the famous painted ceiling at Hildesheim is planned precisely on the lines of a medallion window of the 13th century. By that time glass had fallen into ways of its own, and there were already various types of design which we now recognize as characteristic of the first great period, in some respects the greatest of all.

Pre-eminently typical of the first period is the “medallion window.” Glaziers began by naïvely accepting the iron bars across the light as the basis of their composition, and planned a window as a series of panels, one above the other, between the horizontal crossbars and the upright lines of the border round it. The next step was to mitigate the extreme severity of this composition by the introduction of a circular or other medallion within the square boundary lines. Eventually these were abandoned altogether, the iron bars were shaped according to the pattern, and there was evolved the “medallion window,” in which the main divisions of the design are emphasized by the strong bands of iron round them. Medallions were invariably devoted to picturing scenes from Bible history or from the lives of the saints, set forth in the simplest and most straightforward manner, the figures all on one plane, and as far as possible clear-cut against a sapphire-blue or ruby-red ground. Scenery was not so much depicted as suggested. An arch or two did duty for architecture, any scrap of foliated ornament for landscape. Simplicity of silhouette was absolutely essential to the readableness of pictures on the small scale allowed by the medallion. As it is, they are so difficult to decipher, so confused and broken in effect, as to give rise (the radiating shape of “rose windows” aiding) to the misconception that the design of early glass is kaleidoscopic—which it is not. The intervals between subject medallions were filled in England (Canterbury) with scrollwork, in France (Chartres) more often with geometric diaper, in which last sometimes the red and blue merge into an unpleasant purple. Design on this small scale was obviously unsuited to distant windows. Clerestory lights were occupied by figures, sometimes on a gigantic scale, entirely occupying the window, except for the border and perhaps the slightest pretence

of a niche. This arrangement lent itself to broad effects of colour. The drawing may be rude; at times the figures are grotesque; but the general impression is one of mysterious grandeur and solemnity.

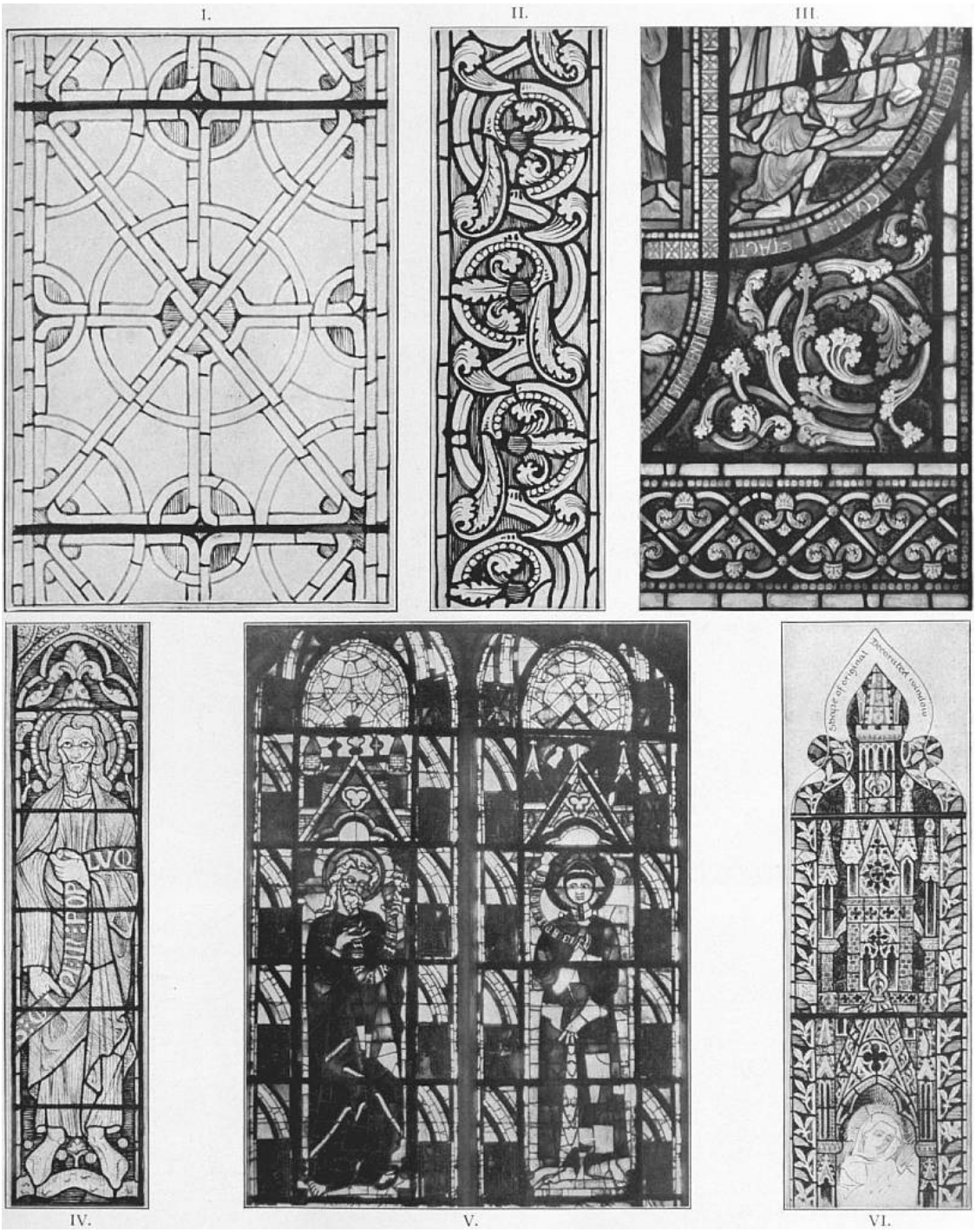
The depth and intensity of colour in the windows so far described comes chiefly from the quality of the glass, but partly also from the fact that very little white or pale-coloured glass was used. It was not the custom at this period to dilute the colour of a rich window with white. If light was wanted they worked in white, enlivened, it might be, by colour. Strictly speaking, 13th-century glass was never colourless, but of a greenish tint, due to impurities in the sand, potash or other ingredients; it was of a horny consistency, too; but it is convenient to speak of all would-be-clear glass as “white.” The greyish windows in which it prevails are technically described as “in grisaille.” There are examples (Salisbury, Châlons, Bonlieu, Angers) of “plain glazing” in grisaille, in which the lead lines make very ingenious and beautiful pattern. In the more usual case of painted grisaille the lead lines still formed the groundwork of the design, though supplemented by foliated or other detail, boldly outlined in strong brown and emphasized by a background of cross-hatching. French grisaille was frequently all in white (Reims, St Jean-aux-Bois, Sens), English work was usually enlivened by bands and bosses of colour (Salisbury); but the general effect of the window was still grey and silvery, even though there might be distributed about it (the “five sisters,” York minster) a fair amount of coloured glass. The use of grisaille is sufficiently accounted for by considerations of economy and the desire to get light; but it was also in some sort a protest (witness the Cistercian interdict of 1134) against undue indulgence in the luxury of colour. At this stage of its development it was confined strictly to patternwork; figure subjects were always in colour. For all that, some of the most restful and entirely satisfying work of the 13th century was in grisaille (Salisbury, Chartres, Reims, &c.).

The second or Middle period of Gothic glass marks a stage between the work of the Early Gothic artist who thought out his design as glazing, and that of the later draughtsman who conceived it as something to be painted. It represents to many the period of greatest interest—probably because of its departure from the severity of Early work. It was the period of more naturalistic design; and a touch of nature is more easily appreciated than architectural fitness. Middle Gothic glass, halting as it does between the relatively rude mosaic of early times and the painter-like accomplishment of fully-developed glass painting, has not the salient merits of either. In the matter of tone also it is intermediate between the deep, rich, sober harmonies of Early windows and the lighter, brighter, gayer colouring of later glass. Now for the first time grisaille ornament and coloured figurework were introduced into the same window. And this was done in a very judicious way, in alternate bands of white and deep rich colour, binding together the long lights into which windows were by this time divided (chapter-house, York minster). A similar horizontal tendency of design is noticeable in windows in which the figures are enshrined under canopies, henceforth a feature in glass design. The pinnaclework falls into pronounced bands of brassy yellow between the tiers of figures (nave, York minster) and serves to correct the vertical lines of the masonry. Canopywork grew sometimes to such dimensions as quite to overpower the figure it was supposed to frame; but, then, the sense of scale was never a directing factor in Decorated design. A more interesting form of ornament is to be found in Germany, where it was a pleasing custom (Regensburg) to fill windows with conventional foliage without figurework. There is abundance of Middle Gothic glass in England (York, Wells, Ely, Oxford), but the best of it, such as the great East window at Gloucester cathedral, has features more characteristic of the 15th than of the 14th century.

The keynote of Late Gothic glass is brilliancy. It had a silvery quality. The 15th century was the period of white glass, which approached at last to colourlessness, and was employed in great profusion. Canopywork, more universal than ever, was represented almost entirely in white touched with yellow stain, but not in sufficient quantities to impair its silveriness. Whatever the banality of the idea of imitation stonework in glass, the effect of thus framing coloured pictures in delicate white is admirable: at last we have white and colour in perfect combination. Fifteenth-century figurework contains usually a large proportion of white glass; flesh tint is represented by white; there is white in the drapery; in short, there is always white enough in the figures to connect them with the canopywork and make the whole effect one. The preponderance of white will be better appreciated when it is stated that very often not a fifth or sixth part of the glass is coloured. It is no uncommon thing to find figures draped entirely in white with only a little colour in the background; and figurework all in grisaille upon a ground of white latticework is quite characteristic of Perpendicular glass.

One of the most typical forms of Late English Gothic canopy is where (York minster) its slender pinnacles fill the upper part of the window, and its solid base frames a picture in small of some episode in the history of the personage depicted as large as life above. A much less satisfactory continental practice was to enrich only the lower half of the window with stained glass and to make shift above (Munich) with “roundels” of plain white glass, the German equivalent for diamond latticework.

PLATE I.



I. EARLY GLAZING. From S. Serge, Angers, Grisaille, with colour introduced in the small circles.

II. AN EARLY BORDER. From S. Kunibert, Cologne.

III. PORTION OF AN EARLY MEDALLION WINDOW. From Canterbury, showing the plan of the design and the ornamental details.

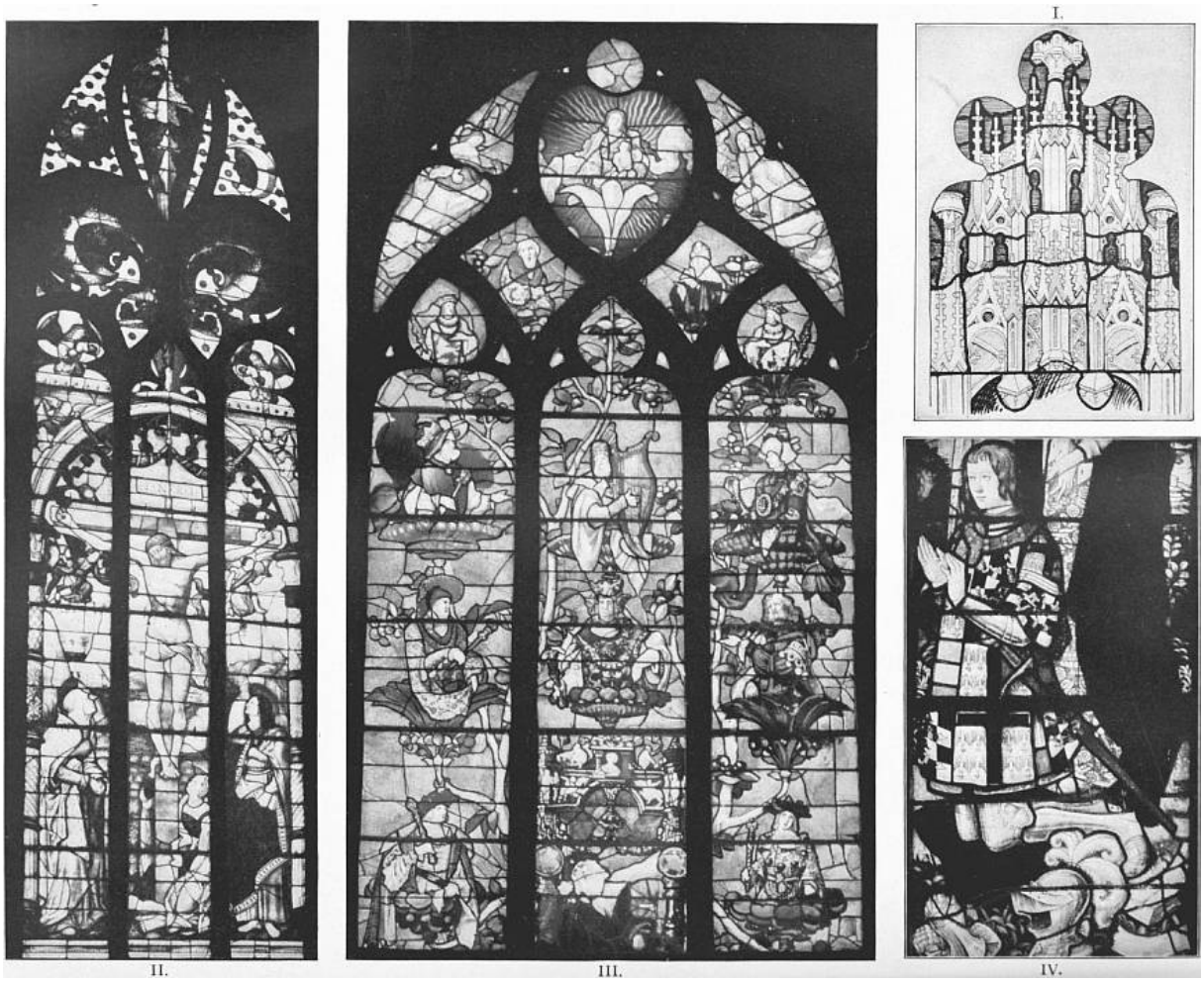
IV. AN EARLY FIGUREJFROM LYONS. Showing the leading of the eyes, hair, nimbus, and drapery.

V. DECORATED LIGHTS. From S. Urbain, Troyes, showing both the influence of the early period in the figures, and the beginning of the architectural canopy.

VI. TYPICAL DECORATED CANOPY. From Exeter.

Nos. I., II., III., IV., VI. are taken from illustrations in Lewis F. Day, *Windows*, by permission of B. T. Batsford.

PLATE II.



I. A TYPICAL PERPENDICULAR CANOPY (from Lewis F. Day, *Windows*, by permission of B. T. Batsford).
II. A WINDOW FROM AUCH. Illustrating the transition from Perpendicular to Renaissance.
III. A SIXTEENTH-CENTURY JESSE WINDOW. From Beauvais (source as in Fig. I.).
IV. PORTION OF A RENAISSANCE WINDOW. From Montmorency, showing the perfection of glass painting.

From Lutien Magne, *Oeuvre des Peintres Verriers Français*, by permission of Firmin-Didot et C^{ie}.

A sign of later times is the way pictures spread beyond the confines of a single light. This happened by degrees. At first the connexion between the figures in separate window openings was only in idea, as when a central figure of the crucified Christ was flanked by the Virgin and St John in the side lights. Then the arms of the cross would be carried through, or as it were behind, the mullions. The expansion to a picture right across the window was only a question of time. Not that the artist ventured as yet to disregard the architectural setting of his picture—that happened later on—but that he often composed it with such cunning reference to intervening stonework that it did not interfere with it. It has been argued that each separate light of a window ought to be complete in itself. On the other hand it has proved possible to make due acknowledgment of architectural conditions without cramping design in that way. There can be no doubt as to the variety and breadth of treatment gained by accepting the whole window as field for a design. And, when a number of lights go to make a window, it is the window, and no separate part of it, which is the main consideration.

By the end of the Gothic period, glass painters proceeded on an entirely different method from that of the 13th century. The designer of early days began with glazing: he thought in mosaic and leadwork; the lines he first drew were the lines of glazing; painting was only a supplementary process, enabling him to get what lead lines would not give. The Late Gothic draughtsman began with the idea of painting; glazing was to him of secondary importance; he reached a stage (Creation window, Great Malvern) where it is clear that he first sketched out his design, and then bethought him how to glaze it in such wise that the leadwork (which once boldly outlined everything) should not interfere with the picture. The artful way in which he would introduce little bits of colour into a window almost entirely white, makes it certain that he had always at the back of his mind the consideration of the glazing to come. So long as he thought of that, and did not resent it, all was fairly well with glass painting, but there came a point where he found it difficult, if not impossible, to reconcile the extreme delicacy of his painting upon white glass with the comparatively brutal strength of his lead lines. It is here that the conditions of painting and glazing clash at last.

It must not be supposed that Late Gothic windows were never by any chance rich in colour. Local conservatism and personal predilection prevented anything like monotonous progress in a single direction. There is (St Sebald, Nuremberg) Middle Gothic glass as dense in colour as any 13th-century work, and Late Gothic (Troyes cathedral) which, from its colour, one might take at first to be a century earlier than it is. In Italy (Florence) and to some extent in Spain (Seville) it was the custom to make canopywork so rich in colour that it was more like part of the picture than a frame to it. But that was

by exception. The tendency was towards lighter windows. Glass itself was less deeply stained when painters depended more upon their power of deepening it by paint. It was the seeking after delicate effects of painting, quite as much as the desire to let light into the church, which determined the tone of later windows. The clearer the glass the more scope it gave for painting.

It is convenient to draw a line between Gothic art and Renaissance. Nothing is easier than to say that windows in which crocketed canopywork occurs are Gothic, and that those with arabesque are Renaissance. But that is an arbitrary distinction, which does not really distinguish. Some of the most beautiful work in glass, such for example as that at Auch, is so plainly intermediate between two styles that it is impossible to describe it as anything but “transitional.” And, apart from particular instances, we have only to look at the best Late Gothic work to see that it is informed by the new spirit, and at fine Renaissance glass to observe how it conforms to Gothic traditions of workmanship. The new idea gave a spurt to Gothic art; and it was Gothic impetus which carried Renaissance glass painting to the summit of accomplishment reached in the first half of the 16th century. When that subsided, and the pictorial spirit of the age at last prevailed, the bright days of glass were at an end. If we have to refer to the early Renaissance as the culminating period of glass painting, it is because the technique of an earlier period found in it freer and fuller expression. With the Renaissance, design broke free from the restraints of tradition.

An interesting development of Renaissance design was the framing of pictures in golden-yellow arabesque ornament, scarcely architectural enough to be called canopywork, and reminiscent rather of beaten goldsmith’s work than of stone carving. This did for the glass picture what a gilt frame does for a painting in oil. Very often framework of any kind was dispensed with. The primitive idea of accepting bars and mullions as boundaries of design, and filling the compartments formed by them with a medley of little subjects, lingered on. The result was delightfully broken colour, but inevitable confusion; for iron and masonry do not effectively separate glass pictures. There was no longer in late glass any pretence of preserving the plane of the window. It was commonly designed to suggest that one saw out of it. Throughout the period of the Renaissance, architectural and landscape backgrounds play an important part in design. An extremely beautiful feature in early 16th-century French glass pictures (Rouen, &c.) is the little peep of distant country delicately painted upon the pale-blue glass which represents the sky. In larger work landscape and architecture were commonly painted upon white (King’s College, Cambridge). The landscape effect was always happiest when one or other of these conventions was adopted. Canopywork never went quite out of fashion. For a long while the plan was still to frame coloured pictures in white. Theoretically this is no less effectually to be done by Italian than by Gothic shrinework. Practically the architectural setting assumed in the 16th century more and more the aspect of background to the figures, and, in order that it should take its place in the picture, they painted it so heavily that it no longer told as white. Already in van Orley’s magnificent transept windows at St Gudule, Brussels, the great triumphal arch behind the kneeling donors and their patron saints (in late glass donors take more and more the place of holy personages) tells dark against the clear ground. There came a time, towards the end of the century, when, as in the wonderful windows at Gouda, the very quality of white glass is lost in heavily painted shadow.

The pictorial ambition of the glass painter, active from the first, was kept for centuries within the bounds of decoration. Medallion subjects were framed in ornament, standing figures in canopywork, and pictures were conceived with regard to the window and its place in architecture. Severity of treatment in design may have been due more to the limitations of technique than to restraint on the part of the painter. The point is that it led to unsurpassed results. It was by absolute reliance upon the depth and brilliancy of self-coloured glass that all the beautiful effects of early glass were obtained. We need not compare early mosaic with later painted glass; each was in its way admirable; but the early manner is the more peculiar to glass, if not the more proper to it. The ruder and more archaic design gives in fullest measure the glory of glass—for the loss of which no quality of painting ever got in glass quite makes amends. The pictorial effects compatible with glass design are those which go with pure, brilliant and translucent colour. The ideal of a “primitive” Italian painter was more or less to be realized in glass: that of a Dutch realist was not. It is astonishing what glass painters did in the way of light and shade. But the fact remains that heavy painting obscured the glass, that shadows rendered in opaque surface-colour lacked translucency, and that in seeking before all things the effects of shadow and relief, glass painters of the 17th century fell short of the qualities on the one hand of glass and on the other of painting.

The course of glass painting was not so even as this general survey of its progress might seem to imply. It was quickened here, impeded there, by historic events. The art made a splendid start in France; but its development was stayed by the disasters of war, just when in England it was thriving under the Plantagenets. It revived again under Francis I. In Germany it was with the prosperity of the free cities of the Empire that glass painting prospered. In the Netherlands it blossomed out under the favour of Charles V. In the Swiss Confederacy its direction was determined by civil and domestic instead of church patronage. In most countries there were in different districts local schools of glass painting, each with some character of its own. To what extent design was affected by national temperament it is not easy to say. The marked divergence of the Flemish from the French treatment of glass in the 16th century is not entirely due to a preference on the one part for colour and on the other for light and shade, but is partly owing to the circumstance that, whilst in France design remained in the hands of craftsmen, whose trade was glass painting, in the Netherlands it was entrusted by the emperor to his court painter, who concerned himself as little as possible with a technique of which he knew nothing. If in France we come also upon the names of well-known artists, they seem, like Jean Cousin, to have been closely connected with glass painting: they designed so like glass painters that

they might have begun their artistic career in the workshop.

The attribution of fine windows to famous artists should not be too readily accepted; for, though it is a foible of modern times to father whatever is noteworthy upon some great name, the masterpieces of medieval art are due to unknown craftsmen. In Italy, where glass painting was not much practised, and it seems to have been the custom either to import glass painters as they were wanted or to get work done abroad, it may well be that designs were supplied by artists more or less distinguished. Ghiberti and Donatello may have had a hand in the cartoons for the windows of the Duomo at Florence; but it is not to any sculptor that we can give the entire credit of design so absolutely in the spirit of colour decoration. The employment of artists not connected with glass design would go far to explain the great difference of Italian glass from that of other countries. The 14th-century work at Assisi is more correctly described as "Trecento" than as Gothic, and the "Quattrocento" windows at Florence are as different as could be from Perpendicular work. One compares them instinctively with Italian paintings, not with glass elsewhere. And so with the 15th-century Italian glass. The superb 16th-century windows of William of Marseilles at Arezzo, in which painting is carried to the furthest point possible short of sacrificing the pure quality of glass, are more according to contemporary French technique. Both French and Italian influence may be traced in Spanish glass (Avila, Barcelona, Burgos, Granada, Leon, Seville, Toledo). Some of it is said to have been executed in France. If so it must have been done to Spanish order. The coarse effectiveness of the design, the strength of the colour, the general robustness of the art, are characteristically Spanish; and nowhere this side of the Pyrenees do we find detail on a scale so enormous.

We have passed by, in following the progressive course of craftsmanship, some forms of design, peculiar to no one period but very characteristic of glass. The "quarry window," barely referred to, its diamond-shaped or oblong panes painted, richly bordered, relieved by bosses of coloured ornament often heraldic, is of constant occurrence. Entire windows, too, were from first to last given up to heraldry. The "Jesse window" occurs in every style. According to the fashion of the time the "Stem of Jesse" burst out into conventional foliage, vine branches or arbitrary scrollwork. It appealed to the designer by the scope it gave for freedom of design. He found vent, again, for fantastic imagination in the representation of the "Last Judgment," to which the west window was commonly devoted. And there are other schemes in which he delighted; but this is not the place to dwell upon them.

The glass of the 17th century does not count for much. Some of the best in England is the work of the Dutch van Linge family (Wadham and Balliol Colleges, Oxford). What glass painting came to in the 18th century is nowhere better to be seen than in the great west window of the ante-chapel at New College, Oxford. That is all Sir Joshua Reynolds and the best china painter of his day could do between them. The very idea of employing a china painter shows how entirely the art of the glass painter had died out.

It re-awoke in England with the Gothic revival of the 19th century; and the Gothic revival determined the direction modern glass should take. Early Victorian doings are interesting only as marking the steps of recovery (cf. the work of T. Willement in the choir of the Temple church; of Ward and Nixon, lately removed from the south transept of Westminster Abbey; of Wailes). Better things begin with the windows at Westminster inspired by A. C. Pugin, who exercised considerable influence over his contemporaries. John Powell (Hardman & Co.) was an able artist content to walk, even after that master's death, reverently in his footsteps. Charles Winston, whose *Hints on Glass Painting* was the first real contribution towards the understanding of Gothic glass, and who, by the aid of the Powells (of Whitefriars) succeeded in getting something very like the texture and colour of old glass, was more learned in ancient ways of workmanship than appreciative of the art resulting from them. (He is responsible for the Munich glass in Glasgow cathedral.) So it was that, except for here and there a window entrusted by exception to W. Dyce, E. Poynter, D. G. Rossetti, Ford Madox Brown or E. Burne-Jones, glass, from the beginning of its recovery, fell into the hands of men with a strong bias towards archaeology. The architects foremost in the Gothic revival (W. Butterfield, Sir G. Scott, G. E. Street, &c.) were all inclined that way; and, as they had the placing of commissions for windows, they controlled the policy of glass painters. Designers were constrained to work in the pedantically archaeological manner prescribed by architectural fashion. Unwillingly as it may have been, they made mock-medieval windows, the interest in which died with the popular illusion about a Gothic revival. But they knew their trade; and when an artist like John Clayton (master of a whole school of later glass painters) took a window in hand (St Augustine's, Kilburn; Truro cathedral; King's College Chapel, Cambridge) the result was a work of art from which, tradework as it may in a sense be, we may gather what such men might have done had they been left free to follow their own artistic impulse. It is necessary to refer to this because it is generally supposed that whatever is best in recent glass is due to the romantic movement. The charms of Burne-Jones's design and of William Morris's colour, place the windows done by them among the triumphs of modern decorative art; but Morris was neither foremost in the reaction, nor quite such a master of the material he was working in as he showed himself in less exacting crafts. Other artists to be mentioned in connexion with glass design are: Clement Heaton, Bayne, N. H. J. Westlake and Henry Holiday, not to speak of a younger generation of able men.

Foreign work shows, as compared with English, a less just appreciation of glass, though the foremost draughtsmen of their day were enlisted for its design. In Germany, King Louis of Bavaria employed P. von Cornelius and W. von Kaulbach (Aix-la-Chapelle, Cologne, Glasgow); in France the Bourbons employed J. A. D. Ingres, F. V. E. Delacroix, Vernet and J. H. Flandrin (Dreux); and the execution of their designs was entrusted to the most expert painters to be procured at Munich and Sèvres; but all to

little effect. They either used pot-metal glass of poor quality, or relied upon enamel—with the result that their colour lacks the qualities of glass. Where it is not heavy with paint it is thin and crude. In Belgium happier results were obtained. In the chapel of the Holy Sacrament at Brussels there is one window by J. B. Capronnier not unworthy of the fine series by B. van Orley which it supplements. At the best, however, foreign artists failed to appreciate the quality of glass; they put better draughtsmanship into their windows than English designers of the mid-Victorian era, and painted them better; but they missed the glory of translucent colour.

Modern facilities of manufacture make possible many things which were hitherto out of the question. Enamel colours are richer; their range is extended; and it may be possible, with the improved kilns and greater chemical knowledge we possess, to make them hold permanently fast. It was years ago demonstrated at Sèvres how a picture may be painted in colours upon a sheet of plate-glass measuring 4 ft. by 2½ ft. We are now no doubt in a position to produce windows painted on much larger sheets. But the results achieved, technically wonderful as they are, hardly warrant the waste of time and labour upon work so costly, so fragile, so lacking in the qualities of a picture on the one hand and of glass on the other.

In America, John la Farge, finding European material not dense enough, produced pot-metal more heavily charged with colour. This was wilfully streaked, mottled and quasi-accidentally varied; some of it was opalescent; much of it was more like agate or onyx than jewels. Other forms of American enterprise were: the making of glass in lumps, to be chipped into flakes; the ruckling it; the shaping it in a molten state, or the pulling it out of shape. It takes an artist of some reserve to make judicious use of glass like this. La Farge and L. C. Tiffany have turned it to beautiful account; but even they have put it to purposes more pictorial than it can properly fulfil. The design it calls for is a severely abstract form of ornament verging upon the barbaric.

Examples of Important Historical Stained Glass.

There are remains of the earliest known glass: in France—at Le Mans, Chartres, Châlons-sur-Marne, Angers and Poitiers cathedrals, the abbey church of St Denis and at St Remi, Reims: in England—at York minster (fragments): in Germany—at Augsburg and Strassburg cathedrals: in Austria—in the cloisters of Heiligen Kreuz.

The following is a classified list of some of the most characteristic and important windows, omitting for the most part isolated examples, and giving by preference the names of churches where there is a fair amount of glass remaining; the country in which at each period the art throve best is put first.

EARLY GOTHIC

France.	*England.*	*Germany.*
Chartres Le Mans Bourges Reims Auxerre Ste Chapelle, Paris. Church of St Jean-aux-Bois.	Canterbury Salisbury Lincoln York minster.	Church of St Kunibert, Cologne (Romanesque). Cologne cathedral.

MIDDLE GOTHIC

England.	*Germany.*	*France.*
York minster. Ely cathedral. Wells cathedral. Tewkesbury abbey.	Church of St Sebald, Nuremberg. Strassburg Regensburg Augsburg Erfurt Freiburg Church of Nieder Haslach.	Évreux cathedral. Church of St Pierre, Chartres. Cathedral and church of St Urbain Troyes. Church of Ste Radegonde, Poitiers Cathedral and church of St Ouen, Rouen.
Italy.		*Spain.*
Church of St Francis, Assisi. Church of Or San Michele, Florence. Church of S. Petronio, Bologna.		Toledo cathedral.

LATE GOTHIC

England.	*France.*	*Germany.*
New College, Oxford. Gloucester cathedral. York, minster and other churches. Great Malvern abbey. Church of St Mary, Shrewsbury. Fairford church.	Bourges Troyes Church of Notre Dame, Alençon.	Cologne Ulm Munich Church of St Lorenz, Nuremberg.
Italy.		*Spain.*
The Duomo, Florence.		Toledo cathedral.

TRANSITION PERIOD

The choir of the cathedral at Auch.

RENAISSANCE

France.	*Netherlands.*	*Switzerland.*

St Vincent St Patrice St Godard	Rouen.	Church of St Jacques Church of St Martin Cathedral	Liége.	Lucerne and most of the other principal museums.	
Church of St Foy, Conches. Church of St Gervais, Paris. Church of St Étienne-du-Mont, Paris. Church of St Martin, Montmorency. Church of Écouen. Church of St Étienne, Beauvais. Church of St Nizier, Troyes. Church of Brou, Bourg-en-Bresse. The Château de Chantilly.		Brussels cathedral.			
England.		*Italy.*			*Spain.*
King’s College chapel, Cambridge. Lichfield cathedral. St George’s church, Hanover Square, London. St Margaret’s church, Westminster.		Arezzo Milan	cathedrals.	Granada Seville	cathedrals.
		Certosa di Pavia. Church of S. Petronio, Bologna. Church of Sta Maria Novella, Florence.			
Germany.					
Freiburg cathedral.					

Late Renaissance

Netherlands.	*France.*		*England.*
Groote Kirk, Gouda. Choir of Brussels cathedral. Antwerp cathedral.	Church of St Martin-ès-Vignes, Troyes. Nave and transepts of Auch cathedral.	Wadham Balliol New	colleges, Oxford.
Switzerland.			
Most museums.			

Of late years each country has been learning so much from the others that the newest effort is very much in one direction. It seems to be agreed that the art of the window-maker begins with glazing, that the all-needful thing is beautiful glass, that painting may be reduced to a minimum, and on occasion (thanks to new developments in the making of glass) dispensed with altogether. A tendency has developed itself in the direction not merely of mosaic, but of carrying the glazier’s art farther than has been done before and rendering landscapes and even figure subjects in unpainted glass. When, however, it comes to the representation of the human face, the limitations of simple lead-glazing are at once apparent. A possible way out of the difficulty was shown at the Paris Exhibition of 1900 by M. Tournel, who, by fusing together coloured tesserae on to larger pieces of colourless glass, anticipated the discovery of the already mentioned fragment of Byzantine mosaic now in the Victoria and Albert Museum. He may have seen or heard Of something of the sort. There would be no advantage in building up whole windows in this way; but for the rendering of the flesh and sundry minute details in a window for the most part heavily leaded, this fusing together of tesserae, and even of little pieces of glass cut carefully to shape, seems to supply the want of something more in keeping with severe mosaic glazing than painted flesh proves to be.

Glass painters are allowed to-day a freer hand than formerly. They are no longer exclusively engaged upon ecclesiastical work; domestic glass is an important industry; and a workman once comparatively exempt from pedantic control is not so easily restrained from self-expression. Moreover, the recognition of the artistic position of craftsmen in general makes it possible for a man to devote himself to glass without sinking to the rank of a mechanic; and artists begin to realize the scope glass offers them. What they lack as yet is experience in their craft, and perhaps due workmanlike respect for traditional ways of workmanship. When the old methods come to be superseded it will be only by new ones evolved out of them. At present the conditions of glass painting remain very much what they were. The supreme beauty of glass is still in the purity, the brilliancy, the translucency of its colour. To make the most of this the designer must be master of his trade. The test of window design is, now as ever, that it should have nothing to lose and everything to gain by execution in stained glass.

Bibliography.—Theophilus, *Arts of the Middle Ages* (London, 1847); Charles Winston, *An Inquiry into the Difference of Style observable in Ancient Glass Painting, especially in England* (Oxford, 1847), and *Memoirs illustrative of the Art of Glass Painting* (London, 1865); N. H. J. Westlake, *A History of Design in Painted Glass* (4 vols., London, 1881-1894); L. F. Day, *Windows, A Book about Stained and Painted Glass* (London, 1909), and *Stained Glass* (London, 1903); A. W. Franks, *A Book of Ornamental Glazing Quarries* (London, 1849); *A Booke of Sundry Draughtes, principaly serving for Glasiers* (London, 1615, reproduced 1900); F. G. Joyce, *The Fairford Windows* (coloured plates) (London, 1870); *Divers Works of Early Masters in Ecclesiastical Decoration*, edited by John Weale (2 vols., London, 1846); Ferdinand de Lasteyrie, *Histoire de la peinture sur verre d’après ses monuments en France* (2 vols., Paris, 1852), and *Quelques mots sur la théorie de la peinture sur verre* (Paris, 1853); L. Magne, *Œuvre des peintres verriers français* (2 vols., Paris, 1885); Viollet le Duc, “Vitrail,” vol. ix. of the *Dictionnaire raisonné de l’architecture* (Paris, 1868); O. Merson, “Les Vitraux,” *Bibliothèque de l’enseignement des beaux-arts* (Paris, 1895); E. Levy and J. B. Capronnier, *Histoire de la peinture sur verre* (coloured plates) (Brussels, 1860); Ottin, *Le Vitrail, son histoire à travers les âges* (Paris); Pierre le Vieil, *L’Art de la peinture sur verre et de la vitrerie* (Paris, 1774); C. Cahier and A. Martin, *Vitraux peints de Bourges du XIII^{e} siècle* (2 vols., Paris, 1841-1844); S. Clement and A. Guitard, *Vitraux du XIII^{e} siècle de la cathédrale de Bourges* (Bourges, 1900): M. A. Gessert, *Geschichte der Glasmalerei in Deutschland und den Niederlanden, Frankreich, England, &c., von ihrem Ursprung bis auf die neueste Zeit* (Tübingen and Stuttgart, 1839; also an English translation, London, 1851); F. Geiges, *Der alte Fensterschmuck*

des Freiburger Münsters, 5 parts (Freiburg im Breisgau, 1902, &c.); A. Hafner, *Chefs-d'œuvre de la peinture suisse sur verre* (Berlin).

(L. F. D.)

GLASSBRENNER, ADOLF (1810-1876), German humorist and satirist, was born at Berlin on the 27th of March 1810. After being for a short time in a merchant's office, he took to journalism, and in 1831 edited *Don Quixote*, a periodical which was suppressed in 1833 owing to its revolutionary tendencies. He next, under the pseudonym *Adolf Brennglas*, published a series of pictures of Berlin life, under the titles *Berlin wie es ist und—trinkt* (30 parts, with illustrations, 1833-1849), and *Buntes Berlin* (14 parts, with illustrations, Berlin, 1837-1858), and thus became the founder of a popular satirical literature associated with modern Berlin. In 1840 he married the actress Adele Peroni (1813-1895), and removed in the following year to Neustrelitz, where his wife had obtained an engagement at the Grand ducal theatre. In 1848 Glassbrenner entered the political arena and became the leader of the democratic party in Mecklenburg-Strelitz. Expelled from that country in 1850, he settled in Hamburg, where he remained until 1858; and then he became editor of the *Montagszeitung* in Berlin, where he died on the 25th of September 1876.

Among Glassbrenner's other humorous and satirical writings may be mentioned: *Leben und Treiben der feinen Welt* (1834); *Bilder und Träume aus Wien* (2 vols., 1836); Gedichte (1851, 5th ed. 1870); the comic epics, *Neuer Reineke Fuchs* (1846, 4th ed. 1870) and *Die verkehrte Welt* (1857, 6th ed. 1873); also *Berliner Volksleben* (3 vols., illustrated; Leipzig, 1847-1851). Glassbrenner has published some charming books for children, notably *Lachende Kinder* (14th ed., 1884), and *Sprechende Tiere* (20th ed., Hamburg, 1899).

See R. Schmidt-Cabanis, "Adolf Glassbrenner," in *Unsere Zeit* (1881).

GLASS CLOTH, a textile material, the name of which indicates the use for which it was originally intended. The cloths are in general woven with the plain weave, and the fabric may be all white, striped or cheeked with red, blue or other coloured threads; the checked cloths are the most common. The real article should be all linen, but a large quantity is made with cotton warp and tow weft, and in some cases they are composed entirely of cotton. The short fibres of the cheaper kind are easily detached from the cloth, and hence they are not so satisfactory for the purpose for which they are intended.

GLASSIUS, SALOMO (1593-1656), theologian and biblical critic, was born at Sondershausen, in the principality of Schwarzburg-Sondershausen, on the 20th of May 1593. In 1612 he entered the university of Jena. In 1615, with the idea of studying law, he moved to Wittenberg. In consequence of an illness, however, he returned to Jena after a year. Here, as a student of theology under Johann Gerhard, he directed his attention especially to Hebrew and the cognate dialects; in 1619 he was made an "adjunctus" of the philosophical faculty, and some time afterwards he received an appointment to the chair of Hebrew. From 1625 to 1638 he was superintendent in Sondershausen; but shortly after the death of Gerhard (1637) he was, in accordance with Gerhard's last wish, appointed to succeed him at Jena. In 1640, however, at the earnest invitation of Duke Ernest the Pious, he removed to Gotha as court preacher and general superintendent in the execution of important reforms which had been initiated in the ecclesiastical and educational establishments of the duchy. The delicate duties attached to this office he discharged with tact and energy; and in the "syncretistic" controversy, by which Protestant Germany was so long vexed, he showed an unusual combination of firmness with liberality, of loyalty to the past with a just regard to the demands of the present and the future. He died on the 27th of July 1656.

His principal work, *Philologia sacra* (1623), marks the transition from the earlier views on questions of biblical criticism to those of the school of Spener. It was more than once reprinted during his lifetime, and appeared in a new and revised form, edited by J. A. Dathe (1731-1791) and G. L. Bauer at Leipzig. Glassius succeeded Gerhard as editor of the Weimar *Bibelwerk*, and wrote the commentary on the poetical books of the Old Testament for that publication. A volume of his *Opuscula* was printed at Leiden in 1700.

See the article in Herzog-Hauck, *Realencyklopädie*.

GLASSWORT, a name given to *Salicornia herbacea* (also known as marsh samphire), a salt-marsh herb with succulent, jointed, leafless stems, in reference to its former use in glass-making, when it was burnt for barilla. *Salsola Kali*, an allied plant with rigid, fleshy, spinous-pointed leaves, which was used for the same purpose, was known as prickly glasswort. Both plants are members of the natural order Chenopodiaceae.

GLASTONBURY, a market town and municipal borough in the Eastern parliamentary division of Somersetshire, England, on the main road from London to Exeter, 37 m. S.W. of Bath by the Somerset & Dorset railway. Pop. (1901) 4016. The town lies in the midst of orchards and water-meadows, reclaimed from the fens which encircled Glastonbury Tor, a conical height once an island, but now, with the surrounding flats, a peninsula washed on three sides by the river Brue.

The town is famous for its abbey, the ruins of which are fragmentary, and as the work of destruction has in many places descended to the very foundations it is impossible to make out the details of the plan. Of the vast range of buildings for the accommodation of the monks hardly any part remains except the abbot's kitchen, noteworthy for its octagonal interior (the exterior plan being square, with the four corners filled in with fireplaces and chimneys), the porter's lodge and the abbey barn. Considerable portions are standing of the so-called chapel of St Joseph at the west end, which has been identified with the Lady chapel, occupying the site of the earliest church. This chapel, which is the finest part of the ruins, is Transitional work of the 12th century. It measures about 66 ft. from east to west and about 36 from north to south. Below the chapel is a crypt of the 15th century inserted beneath a building which had no previous crypt. Between the chapel and the great church is an Early English building which appears to have served as a Galilee porch. The church itself was a cruciform structure with a choir, nave and transepts, and a tower surmounting the centre of intersection. From east to west the length was 410 ft. and the breadth of the nave was about 80 ft. The nave had ten bays and the choir six. Of the nave three bays of the south side are still standing, and the windows have pointed arches externally and semicircular arches internally. Two of the tower piers and a part of one arch give some indication of the grandeur of the building. The foundations of the Edgar chapel, discovered in 1908, make the whole church the longest of cathedral or monastic churches in the country. The old clock, presented to the abbey by Adam de Sodbury (1322-1335), and noteworthy as an early example of a clock striking the hours automatically with a count-wheel, was once in Wells cathedral, but is now preserved in the Victoria and Albert Museum.

The Glastonbury thorn, planted, according to the legend, by Joseph of Arimathea, has been the object of considerable comment. It is said to be a distinct variety, flowering twice a year. The actual thorn visited by the pilgrims was destroyed about the Reformation time, but specimens of the same variety are still extant in various parts of the country.

The chief buildings, apart from the abbey, are the church of St John Baptist, Perpendicular in style, with a fine tower and some 15th-century monuments; St Benedict's, dating from 1493-1524; St John's hospital, founded 1246; and the George Inn, built in the time of Henry VII. or VIII. The present stone cross replaced a far finer one of great age, which had fallen into decay. The Antiquarian Museum contains an excellent collection, including remains from a prehistoric village of the marshes, discovered in 1892, and consisting of sixty mounds within a space of five acres. There is a Roman Catholic missionaries' college. In the 16th century the woollen industry was introduced by the duke of Somerset; and silk manufacture was carried on in the 18th century. Tanning and tile-making, and the manufacture of boots and sheep-skin rugs are practised. The town is governed by a mayor, 4 aldermen and 12 councillors. Area, 5000 acres.

The lake-village discovered in 1892 proves that there was a Celtic settlement about 300-200 B.C. on an island in the midst of swamps, and therefore easily defensible. British earthworks and Roman roads and relics prove later occupation. The name of Glastonbury, however, is of much later origin, being a corruption of the Saxon *Glæstyngabyrig*. By the Britons the spot seems to have been called Ynys yr Afalon (latinized as Avallonia) or Ynysvitrin (see AVALON), and it became the local habitation of various fragments of Celtic romance. According to the legends which grew up under the care of the monks, the first church of Glastonbury was a little wattled building erected by Joseph of Arimathea as the leader of the twelve apostles sent over to Britain from Gaul by St Philip. About a hundred years later, according to the same authorities, the two missionaries, Phaganus and Deruvianus, who came to king Lucius from Pope Eleutherius, established a fraternity of anchorites on the spot, and after three hundred years more St Patrick introduced among them a regular monastic life. The British monastery founded about 601 was succeeded by a Saxon abbey built by Ine in 708. From the decadent state into which Glastonbury was brought by the Danish invasions it was recovered by Dunstan, who had been educated within its walls and was appointed its abbot about 946. The church and other buildings of his erection remained till the installation, in 1082, of the first Norman abbot, who inaugurated the new epoch by commencing a new church. His successor Herlewin (1101-1120), however, pulled it down to make way for a finer structure. Henry of Blois (1126-1172) added greatly to the extent of the monastery. In 1184 (on 25th May) the whole of the buildings were laid in ruins by fire; but Henry II. of England, in whose hands the monastery then was, entrusted his chamberlain Rudolphus with the work of restoration, and

caused it to be carried out with much magnificence. The great church of which the ruins still remain was then erected. In the end of the 12th century, and on into the following, Glastonbury was distracted by a strange dispute, caused by the attempt of Savaric, the ambitious bishop of Bath, to make himself master of the abbey. The conflict was closed by the decision of Innocent III., that the abbacy should be merged in the new see of Bath and Glastonbury, and that Savaric should have a fourth of the property. On Savaric's death his successor gave up the joint bishopric and allowed the monks to elect their own abbot. From this date to the Reformation the monastery, one of the chief Benedictine abbeys in England, continued to flourish, the chief events in its history being connected with the maintenance of its claims to the possession of the bodies or tombs of King Arthur and St Dunstan. From early times through the middle ages it was a place of pilgrimage. As early at least as the beginning of the 11th century the tradition that Arthur was buried at Glastonbury appears to have taken shape; and in the reign of Henry II., according to Giraldus Cambrensis and others, the abbot Henry de Blois, causing search to be made, discovered at the depth of 16 ft. a massive oak trunk with an inscription "Hic jacet sepultus inclitus rex Arthurus in insula Avalonia." After the fire of 1184 the monks asserted that they were in possession of the remains of St Dunstan, which had been abstracted from Canterbury after the Danish sack of 1011 and kept in concealment ever since. The Canterbury monks naturally denied the assertion, and the contest continued for centuries. In 1508 Warham and Goldston having examined the Canterbury shrine reported that it contained all the principal bones of the saint, but the abbot of Glastonbury in reply as stoutly maintained that this was impossible. The day of such disputes was, however, drawing to a close. In 1539 the last and 60th abbot of Glastonbury, Robert Whyting, was lodged in the Tower on account of "divers and sundry treasons." "The 'account' or 'book' of his treasons ... seems to be lost, and the nature of the charges ... can only be a matter of speculation" (Gairdner, *Cal. Pap.* on Hen. VIII., xiv. ii. *pref.* xxxii). He was removed to Wells, where he was "arraigned and next day put to execution for robbing of Glastonbury church." The execution took place on Glastonbury Tor. His body was quartered and his head fixed on the abbey gate. A darker passage does not occur in the annals of the English Reformation than this murder of an able and high-spirited man, whose worst offence was that he defended as best he could from the hand of the spoiler the property in his charge.

In 1907, the site of the abbey with the remains of the buildings, which had been in private hands since the granting of the estate to Sir Peter Carew by Elizabeth in 1559, was bought by Mr Ernest Jardine for the purpose of transferring it to the Church of England. Bishop Kennion of Bath and Wells entered into an agreement to raise a sum of £31,000, the cost of the purchase; this was completed, and the site and buildings were formally transferred at a dedicatory service in 1909 to the Diocesan Trustees of Bath and Wells, who are to hold and manage the property according to a deed of trust. This deed provided for the appointment of an advisory council, consisting of the archbishop of Canterbury, the bishop of Bath and Wells and four other bishops, each with power to nominate one clerical and one lay member. The council has the duty of deciding the purpose for which the property is to be used "in connexion with and for the benefit of the Church of England." To give time for further collection of funds and deliberation, the property was re-let for five years to the original purchaser.

In the 8th century Glastonbury was already a borough owned by the abbey, which continued to be overlord till the Dissolution. The abbey obtained charters in the 7th century, but the town received its first charter from Henry II., who exempted the men of Glastonbury from the jurisdiction of royal officials and freed them from certain tolls. This was confirmed by Henry III. in 1227, by Edward I. in 1278, by Edward II. in 1313 and by Henry VI. in 1447. The borough was incorporated by Anne in 1706, and the corporation was reformed by the act of 1835. In 1319 Glastonbury received a writ of summons to parliament, but made no return, and has not since been represented. A fair on the 8th of September was granted in 1127; another on the 29th of May was held under a charter of 1282. Fairs known as Torr fair and Michaelmas fair are now held on the second Mondays in September and October and are chiefly important for the sale of horses and cattle. The market day every other Monday is noted for the sale of cheese. Glastonbury owed its medieval importance to its connexion with the abbey. At the Dissolution the introduction of woollen manufacture checked the decay of the town. The cloth trade flourished for a century and was replaced by silk-weaving, stocking-knitting and glove-making, all of which have died out.

See Abbot Gasquet. *Henry VIII. and the English Monasteries* (1906), and *The Last Abbot of Glastonbury* (1895 and 1908); William of Malmesbury, "De antiq. Glastoniensis ecclesiae," in *Rerum Anglicarum script. vet.* tom. i. (1684) (also printed by Hearne and Migne); John of Glastonbury, *Chronica sive de hist. de rebus Glast.*, ed. by Hearne (2 vols., Oxford, 1726); Adam of Domerham, *De rebus gestis Glast.*, ed. by Hearne (2 vols., Oxford, 1727); *Hist. and Antiq. of Glast.* (London, 1807); *Avalonian Guide to the Town of Glastonbury* (8th ed., 1839); Warner, *Hist. of the Abbey and Town* (Bath, 1826); Rev. F. Warre, "Glastonbury Abbey," in *Proc. of Somersetshire Archaeol. and Nat. Hist. Soc.*, 1849; Rev. F. Warre, "Notice of Ruins of Glastonbury Abbey," *ib.* 1859; Rev. W. A. Jones, "On the Reputed Discovery of King Arthur's Remains at Glastonbury," ib. 1859; Rev. J. R. Green, "Dunstan at Glastonbury" and "Giso and Savaric," *ib.* 1863; Rev. Canon Jackson, "Savaric, Bishop of Bath and Glastonbury," *ib.* 1862, 1863; E. A. Freeman, "King Ine," *ib.* 1872 and 1874; Dr W. Beattie, in *Journ. of Brit. Archaeol. Ass.* vol. xii., 1856; Rev. R. Willis, *Architectural History of Glastonbury Abbey* (1866); W. H. P. Greswell, *Chapters on the Early History of Glastonbury Abbey* (1909); Views and plans of the abbey building will be found in Dugdale's *Monasticon* (1655); Stevens's *Monasticon* (1720); Stukeley, *Itinerarium curiosum* (1724); Grose, *Antiquities* (1754); Carter, *Ancient Architecture* (1800); Storer, *Antiq. and Topogr. Cabinet*, ii., iv., v. (1807), &c.; Britton's *Architectural Antiquities*, iv. (1813); *Vetusta monumenta*, iv. (1815); and *New Monasticon*, i. (1817).

GLATIGNY, JOSEPH ALBERT ALEXANDRE (1830-1873), French poet, was born at Lillebonne (Seine Inférieure) on the 21st of May 1839. His father, who was a carpenter and afterwards a gendarme, removed in 1844 to Bernay, where Albert received an elementary education. Soon after leaving school he was apprenticed to a printer at Pont Audemer, where he produced a three-act play at the local theatre. He then joined a travelling company of actors to whom he acted as prompter. Inspired primarily by the study of Théodore de Banville, he published his *Vignes folles* in 1857; his best collection of lyrics, *Les Flèches d'or*, appeared in 1864; and a third volume, *Gilles et pasquins*, in 1872. After Glatigny settled in Paris he improvised at café concerts and wrote several one-act plays. On an expedition to Corsica with a travelling company he was on one occasion arrested and put in irons for a week through being mistaken by the police for a notorious criminal. His marriage with Emma Dennie brought him great happiness, but the hardships of his life weakened his health and he died at Sèvres on the 16th of April 1873.

See Catulle Mendès, *Légende du Parnasse contemporain* (1884), and *Glatigny, drame funambulesque* (1906).

GLATZ (Slav. *Kladsko*), a fortified town of Germany, in the Prussian province of Silesia, in a narrow valley on the left bank of the Neisse, not far from the Austrian frontier, 58 m. S.W. from Breslau by rail. Pop. (1905) 16,051. The town with its narrow streets winds up the fortified hill which is crowned by the old citadel. Across the river, on the Schäferberg, lies a more modern fortress built by the Prussians about 1750. Before the town on both banks of the river there is a fortified camp by which bombardment from the neighbouring heights can be hindered and which affords accommodation for 10,000 men. The inner ceinture of walls was razed in 1891 and their site is now occupied by new streets. There are a Lutheran and two Roman Catholic churches, one of which, the parish church, contains the monuments of seven Silesian dukes. Among the other buildings the principal are the Royal Catholic gymnasium and the military hospital. The industries include machine shops, breweries, and the manufacture of spirits, linen, damask, cloth, hosiery, beads and leather.

Glatz existed as early as the 10th century, and received German settlers about 1250. It was besieged several times during the Thirty Years' War and during the Seven Years' War and came into the possession of Prussia in 1742. In 1821 and 1883 great devastation was caused here by floods. The county of Glatz was long contended for by the kingdoms of Poland and of Bohemia. Eventually it became part of the latter country, and in 1534 was sold to the house of Habsburg, from whom it was taken by Frederick the Great during his attack on Silesia.

See Ludwig, *Die Grafschaft Glatz in Wort und Bild* (Breslau, 1897); Kutzen, *Die Grafschaft Glatz* (Glogau, 1873); and *Geschichtsquellen der Grafschaft Glatz*, edited by F. Volkmer and Hohaus (1883-1891).

GLAUBER, JOHANN RUDOLF (1604-1668), German chemist, was born at Karlstadt, Bavaria, in 1604 and died at Amsterdam in 1668. Little more is known of his life than that he resided successively in Vienna, Salzburg, Frankfurt and Cologne before settling in Holland, where he made his living chiefly by the sale of secret chemical and medicinal preparations. Though his writings abound in universal solvents and other devices of the alchemists, he made some real contributions to chemical knowledge. Thus he clearly described the preparation of hydrochloric acid by the action of oil of vitriol on common salt, the manifold virtues of sodium sulphate—*sal mirabile*, Glauber's salt—formed in the process being one of the chief themes of his *Miraculum mundi*; and he noticed that nitric acid was formed when nitre was substituted for the common salt. Further he prepared a large number of substances, including the chlorides and other salts of lead, tin, iron, zinc, copper, antimony and arsenic, and he even noted some of the phenomena of double decomposition. He was always anxious to turn his knowledge to practical account, whether in preparing medicines, or in furthering industrial arts such as dyeing, or in increasing the fertility of the soil by artificial manures. One of his most notable works was his *Teutschlands Wohlfarth* in which he urged that the natural resources of Germany should be developed for the profit of the country and gave various instances of how this might be done.

His treatises, about 30 in number, were collected and published at Frankfort in 1658-1659, at Amsterdam in 1661, and, in an English translation by Packe, at London in 1689.

GLAUBER'S SALT, decahydrated sodium sulphate, Na_2SO_4, $10H_2O$. It is said by J. Kunkel to have been known as an *arcanum* or secret medicine to the electoral house of Saxony in the middle of the 16th century, but it was first described by J. R. Glauber (*De natura salium*, 1658), who prepared it by the action of oil of vitriol or sulphuric acid on common salt, and, ascribing to it many medicinal virtues, termed it *sal mirabile Glauberi*. As the mineral thenardite or mirabilite, which crystallizes in the rhombic system, it occurs in many parts of the world, as in Spain, the western states of North America and the Russian Caucasus; in the last-named region, about 25 m. E. of Tiflis, there is a thick bed of the pure salt about 5 ft. below the surface, and at Balalpashinsk there are lakes or ponds the waters of which are an almost pure solution. The substance is the active principle of many mineral waters, *e.g.* Frederickshall; it occurs in sea-water and it is a constant constituent of the blood. In combination with calcium sulphate, it constitutes the mineral glauberite or brongniartite, $Na_2SO_4{\cdot}CaSO_4$, which assumes forms belonging to the monoclinic system and occurs in Spain and Austria. It has a bitter, saline, but not acrid taste. At ordinary temperatures it crystallizes from aqueous solutions in large colourless monoclinic prisms, which effloresce in dry air, and at 35°C. melt in their water of crystallization. At 100° they lose all their water, and on further heating fuse at 843°. Its maximum solubility in water is at 34°; above that temperature it ceases to exist in the solution as a decahydrate, but changes to the anhydrous salt, the solubility of which decreases with rise of temperature. Glauber's salt readily forms supersaturated solutions, in which crystallization takes place suddenly when a crystal of the salt is thrown in; the same effect is obtained by exposure to the air or by touching the solution with a glass rod. In medicine it is employed as an aperient, and is one of the safest and most innocuous known. For children it may be mixed with common salt and the two be used with the food without the child being conscious of any difference. Its simulation of the taste of common salt also renders it suitable for administration to insane patients and others who refuse to take any drug. If, however, its presence is recognized sodium phosphate may be substituted.

GLAUCHAU, a town of Germany, in the kingdom of Saxony, on the right bank of the Mulde, 7 m. N. of Zwickau and 17 W. of Chemnitz by rail. Pop. (1875) 21,743; (1905) 24,556. It has important manufactures of woollen and half-woollen goods, in regard to which it occupies a high position in Germany. There are also dye-works, print-works, and manufactories of paper, linen, thread and machinery. Glauchau possesses a high grade school, elementary schools, a weaving school, an orphanage and an infirmary. Some portions of the extensive old castle date from the 12th century, and the Gottesacker church contains interesting antiquarian relics. Glauchau was founded by a colony of Sorbs and Wends, and belonged to the lords of Schönburg as early as the 12th century.

See R. Hofmann, *Rückblick über die Geschichte der Stadt Glauchau* (1897).

GLAUCONITE, a mineral, green in colour, and chemically a hydrous silicate of iron and potassium. It especially occurs in the green sands and muds which are gathering at the present time on the sea bottom at many different places. The wide extension of these sands and muds was first made known by the naturalists of the "Challenger," and it is now found that they occur in the Mediterranean as well as in the open ocean, but they have not been found in the Black Sea or in any fresh-water lakes. These deposits are not in a true sense abyssal, but are of terrigenous origin, the mud and sand being derived from the wear of the continents, transported by marine currents. The greater part of the mass consists in all cases of minerals such as quartz, felspar (often labradorite), mica, chlorite, with more or less calcite which is probably always derived from shells or other organic sources. Many accessory minerals such as tourmaline and zircon have been identified also, while augite, hornblende and other volcanic minerals occur in varying proportion as in all the sediments of the open sea. The depth in which they accumulate varies a good deal, viz. from 200 up to 2000 fathoms, but as a rule is less than 1000 fathoms, and it is believed that the most common situations are where the continental shores slope rather steeply into moderate depths of water. Many of the blue muds, which owe their colour to fine particles of sulphide of iron, contain also a small quantity of glauconite; in Globigerina oozes this substance has also been found, and in fact there exists every gradation between the glauconitic deposits and the other types of sands and muds which are found at similar depths.

The colouring matter is believed in every case to be glauconite. Other ingredients, such as lime, alumina and magnesia are usually shown to be present by the analyses, but may perhaps be regarded as non-essential: it is impossible to isolate this substance in a pure state as it occurs only in fine aggregates, mixed with other minerals. The glauconite, though crystalline, never occurs well crystallized but only as dense clusters of very minute particles which react feebly on polarized light. They have one well-marked characteristic inasmuch as they often form rounded lumps. In many cases it is certain that these are casts, which fill up the interior of empty shells of Foraminifera. They may be seen occupying these shells, and when the shell is dissolved away perfect casts of glauconite are set

free. Apparently in some manner not understood, the decaying organic matter in the shell of the dead organism initiated or favoured the chemical reactions by which the glauconite was formed. That the mineral originated on the sea bottom among the sand and mud is quite certainly established by these facts; moreover, since it is so soft and friable that it is easily powdered up by pressure with the fingers, it cannot have been transported from any great distance by currents. Small rounded glauconite lumps, which are common on the sands but show no trace of having filled the chambers of Foraminifera, may have arisen by a re-deposit of broken-down casts such as have been described; probably slight movement of the deposits, occasioned by currents, may have broken up the glauconite casts and scattered the soft material through the water. Films or stains of glauconite on shells, sand grains and phosphate nodules are explained by a similar deposit of fragmental glauconite.

In a small number of Tertiary and older rocks glauconite occurs as an essential component. It is found in the Pliocene sands of Holland, the Eocene sands of Paris and the "Molasse" of Switzerland, but is much more abundant in the Lower Cretaceous rocks of N. Europe, especially in the subdivision known as the Greensand. Rounded lumps and casts like those of the green sands of the present day are plentiful in these rocks, and it is obvious that the mode of formation was in all respects the same. The green sand when weathered is brown or rusty coloured, the glauconite being oxidized to limonite. Calcareous sands or impure limestones with glauconite are also by no means rare, an example being the well-known Kentish Rag. In the Chalk-rock and Chalk-marl of some parts of England glauconite is rather frequent, and glauconitic chalk is known also in the north of France. Among the oldest rocks which contain this mineral are the Lower Silurian of the St Petersburg district, but it is very rare in the Palaeozoic formations, possibly because it undergoes crystalline change and is also liable to be oxidized and converted into other ferruginous minerals. It has been suggested that certain deposits of iron ores may owe their origin to deposits of glauconite, as for example those of the Mesabi range, Minnesota, U.S.A.

(J. S. F.)

GLAUCOUS (Gr. γλαυκός, bright, gleaming), a word meaning of a sea-green colour, in botany covered with bloom, like a plum or a cabbage-leaf.

GLAUCUS ("bright"), the name of several figures in Greek mythology, the most important of which are the following:

1. Glaucus, surnamed *Pontius*, a sea divinity. Originally a fisherman and diver of Anthedon in Boeotia, having eaten of a certain magical herb sown by Cronus, he leapt into the sea, where he was changed into a god, and endowed with the gift of unerring prophecy. According to others he sprang into the sea for love of the sea-god Melicertes, with whom he was often identified (Athenaeus vii. 296). He was worshipped not only at Anthedon, but on the coasts of Greece, Sicily and Spain, where fishermen and sailors at certain seasons watched for his arrival during the night in order to consult him (Pausanias ix. 22). In art he is depicted as a vigorous old man with long hair and beard, his body terminating in a scaly tail, his breast covered with shells and seaweed. He was said to have been the builder and pilot of the Argo, and to have been changed into a god after the fight between the Argonauts and Tyrrhenians. He assisted the expedition in various ways (Athenaeus, *loc. cit.*; see also Ovid, *Metam.* xiii. 904). Glaucus was the subject of a satyric drama by Aeschylus. He was famous for his amours, especially those with Scylla and Circe.

> See the exhaustive monograph by R. Gaedechens, *Glaukos der Meergott* (1860), and article by the same in Roscher's *Lexikon der Mythologie*; and for Glaucus and Scylla, E. Vinet in *Annali dell' Instituto di Correspondenza archeologica*, xv. (1843).

2. Glaucus, usually surnamed *Potnieus*, from Potniae near Thebes, son of Sisyphus by Merope and father of Bellerophon. According to the legend he was torn to pieces by his own mares (Virgil, *Georgics*, iii. 267; Hyginus, *Fab.* 250, 273). On the isthmus of Corinth, and also at Olympia and Nemea, he was worshipped as Taraxippus ("terrifier of horses"), his ghost being said to appear and frighten the horses at the games (Pausanias vi. 20). He is closely akin to Glaucus Pontius, the frantic horses of the one probably representing the stormy waves, the other the sea in its calmer mood. He also was the subject of a lost drama of Aeschylus.

3. Glaucus, the son of Minos and Pasiphaë. When a child, while playing at ball or pursuing a mouse, he fell into a jar of honey and was smothered. His father, after a vain search for him, consulted the oracle, and was referred to the person who should suggest the aptest comparison for one of the cows of Minos which had the power of assuming three different colours. Polyidus of Argos, who had likened it to a mulberry (or bramble), which changes from white to red and then to black, soon afterwards discovered the child; but on his confessing his inability to restore him to life, he was shut up in a vault

with the corpse. Here he killed a serpent which was revived by a companion, which laid a certain herb upon it. With the same herb Polyidus brought the dead Glaucus back to life. According to others, he owed his recovery to Aesculapius. The story was the subject of plays by the three great Greek tragedians, and was often represented in mimic dances.

See Hyginus, *Fab.* 136; Apollodorus iii. 3. 10; C. Höck, *Kreta*, iii. 1829; C. Eckermann, *Melampus*, 1840.

4. Glaucus, son of Hippolochus, and grandson of Bellerophon, mythical progenitor of the kings of Ionia. He was a Lycian prince who, along with his cousin Sarpedon, assisted Priam in the Trojan War. When he found himself opposed to Diomedes, with whom he was connected by ties of hospitality, they ceased fighting and exchanged armour. Since the equipment of Glaucus was golden and that of Diomedes brazen, the expression "golden for brazen" (*Iliad*, vi. 236) came to be used proverbially for a bad exchange. Glaucus was afterwards slain by Ajax.

All the above are exhaustively treated by R. Gaedechens in Ersch and Gruber's *Allgemeine Encyclopädie*.

GLAZING.—The business of the glazier may be confined to the mere fitting and setting of glass (*q.v.*), even the cutting up of the plates into squares being generally an independent art, requiring a degree of tact and judgment not necessarily possessed by the building artificer. The tools generally used by the glazier are the diamond for cutting, laths or straight edges, tee square, measuring rule, glazing knife, hacking knife and hammer, duster, sash tool, two-foot rule and a glazier's cradle for carrying the glass. Glaziers' materials are glass, putty, priming or paint, springs, wash-leather or india-rubber for door panels, size, black. The glass is supplied by the manufacturer and cut to the sizes required for the particular work to be executed. Putty is made of whiting and linseed oil, and is generally bought in iron kegs of ½ or 1 cwt.; the putty should always be kept covered over, and when found to be getting hard in the keg a little oil should be put on it to keep it moist. Priming is a thin coat of paint with a small amount of red lead in it. In the majority of cases after the sashes for the windows are fitted they are sent to the glazier's and primed and glazed, and then returned to the job and hung in their proper positions. When priming sashes it is important that the rebates be thoroughly primed, else the putty will not adhere. All wood that is to be painted requires before being primed to have the knots coated with knotting. When the priming is dry, the glass is cut and fitted into its place; each pane should fit easily with about $\frac{1}{16}$th in. play all round. The glazier runs the putty round the rebates with his hands, and then beds the glass in it, pushing it down tight, and then further secures it by knocking in small nails, called glaziers' sprigs, on the rebate side. He then trims up the edges of the protruding putty and bevels off the putty on the rebate or outside of the sash with a putty knife. The sash is then ready for painting. Large squares and plate glass are usually inserted when the sashes are hung to avoid risks of breakage. For inside work the panes of glass are generally secured with beads (not with putty), and in the best work these beads are fixed with brass screws and caps to allow of easy removal without breaking the beads and damaging the paint, &c. In the case of glass in door panels where there is much vibration and slamming, the glass is bedded in wash-leather or india-rubber and secured with beads as before mentioned.

Varieties of glass.

The most common glass and that generally used is clear sheet in varying thicknesses, ranging in weight from 15 to 30 oz. per sq. ft. This can be had in several qualities of English or foreign manufacture. But there are many other varieties—obscured, fluted, enamelled, coloured and ornamental, rolled and rough plate, British polished plate, patent plate, fluted rolled, quarry rolled, chequered rough, and a variety of figured rolled, and stained glass, and crown-glass with bulls'-eyes in the centre.

Lead light glazing is the glazing of frames with small squares of glass, which are held together by reticulations of lead; these are secured by means of copper wire to iron saddle bars, which are let into mortices in the wood frames or stone jambs. This is formed with strips of lead, soldered at the angles; the glass is placed between the strips and the lead flattened over the edges of glass to secure it. This is much used in public buildings and private residences. In Weldon's method the saddle bars are bedded in the centre of the strips of lead, thus strengthening the frame of lead strips and giving a better appearance.

Wired rolled plate or wired cast plate, usually ¼ in. thick, has wire netting embedded in it to prevent the glass from falling in the case of fire; its use is obligatory in London for all lantern and skylights, screens and doors on the staircases of public and warehouse buildings, in accordance with the London Building Act. It is also used for the decks of ships and for port and cabin lights, as it is much stronger than plain glass, and if fractured is held together by the wire.

Patent prismatic rolled glass, or "refrax" (fig. 1), consists of an effectual application of the well-known properties of the prism; it absorbs all the light that strikes the window opening, and diffuses it in the most efficient manner possible in the darkest portions of the apartment. It can be fixed in the ordinary way or placed over the existing glass.

Pavement lights (fig. 2) and stallboard lights are constructed with iron frames in small squares and glazed with thick prismatic glass, and are used to light basements. They are placed on the pavement and under shop fronts in the portion called the stallboard, and are also inserted in iron coal plates.

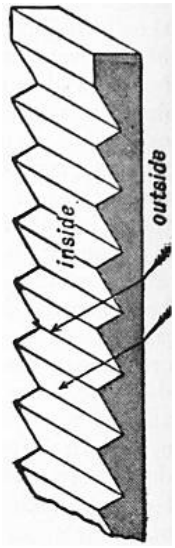


FIG. 1.—Prism Window Glass.

Great skill has of late years been displayed in the ornamentation of glass such as is seen in public saloons, restaurants, &c., as, for instance, in bevelling the edges, silvering, brilliant cutting, embossing, bending, cutting shelving to fancy shapes and polishing, and in glass ventilators.

Roof glazing.

There are several patent methods of roof glazing, such as are applied to railway stations, studios and printing and other factories requiring light. Some of the first patents of this kind were erected with wood glazing bars; these were unsightly, since they required to be of large sectional area when spanning a distance of 7 or 8 ft., and also required to be constantly painted. This was a source of trouble; the roof was constantly leaking and, moreover, it was not fire-resisting.

Of subsequent patents one includes the use of steel **T**-bars, in which the glass is bedded and covered with a capping of copper or zinc secured with bolts and nuts. Another employs steel bars covered with lead; and this is a very good method, as the bars are of small section, require no painting, and are also fire-resisting. There is one reason for preferring wood to steel, namely, that wood does not expand and contract like steel does. After the sun has been on steel bars, especially those in long lengths, they tend to buckle and then when cold contract, thus getting out of shape; there is also the possibility that when expanding they may break the glass. This is more noticeable in the case of iron ventilating frames in this glazing, which after having weathered for a year or two will begin to get out of shape and so give trouble in opening and closing.

Care should be taken not to fit the glass in iron bars tightly, but a good ⅛th in. play all round should be allowed. A few of the systems of patent roof glazing will be described in the following pages, together with illustrations.

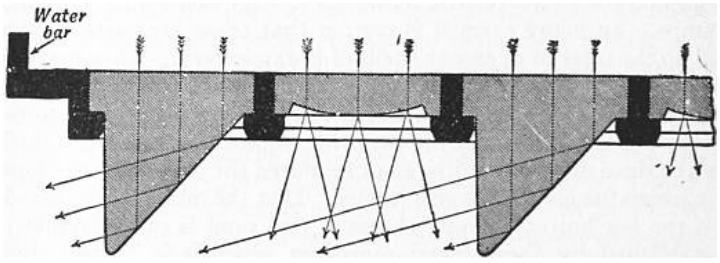


FIG. 2.—Section through Prism Pavement Light, the direction of light rays being indicated by arrows.


FIG. 3.—"British Challenge" Glazing.

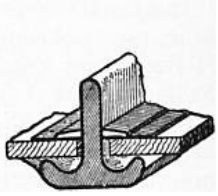


FIG. 4.—Mellowes' Glazing.

The system of glazing known as the "British Challenge" (fig. 3), with steel bars encased with a sheeting of 4-lb lead, is very simple and durable, needs no painting, and can be fixed at as much as 8 ft. clear bearings, with the bars spaced 2 ft. apart. The ends of the bars rest on the wood or steel purlins or plates, and are either notched and screwed down, or simply fitted with a bracket which is screwed. The bar is of **T** section with condensation grooves, and the lead wings on top are turned down on to the glass after fitting. This lead-covered steel bar is a great improvement on the plain steel bar as it is entirely unaffected by smoke, acids or exhaust fumes from steam engines; this is important in the case of a railway station, where the fumes would otherwise eat the steel away and so weaken the bars that in time they would snap. Another somewhat similar system is known as "Mellowes' Eclipse Roof Glazing" (fig. 4). It consists of steel **T**-bars having lead wings on top to turn on to the glass in a similar manner to the last, the top wings being double and the underside of the bar having an additional wing to catch the condensation. The Heywood combination system (fig. 5) is composed of galvanized steel **T**-bars, sometimes encased in lead and sometimes partly encased. It has a capping and condensation gutters of lead, and the glass is bedded on asbestos packing to get a better bearing edge, so as to be held more securely. Hope's glazing is very similar, but the bars are either **T** or cross according to the span. The "Perfection" glazing used by Messrs Helliwell & Co. (fig. 6) is composed of steel


FIG. 5.—Heywood's Glazing.

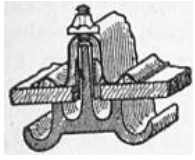


FIG. 6.—Helliwell's "Perfection" Glazing.

shaped **T** bars with copper capping, secured with bolts and nuts and having asbestos packing on top of the glass under the edges of the capping. Pennycook's glazing is composed of steel shaped **T** bars encased with lead and lead wings. Rendle's "Invincible" glazing (fig. 7) is composed of steel **T** bars with specially shaped copper water and condensation channels, all formed in the one piece and resting on top of the **T** steel; the glass rests on the zinc channel, and a copper capping is fixed over the edges of the glass and secured with bolts and nuts. Deard's glazing is very similar, and is composed of **T** steel encased with lead; it claims to save all drilling for fixing to iron roofs. There are also other systems composed of wood bars with condensation gutter and capping of copper secured with bolts and nuts, and asbestos packing with slight differences in some minor matters, but these systems are but little used.

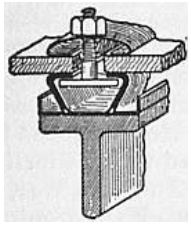


FIG. 7.—Rendle's "Invincible" Glazing.

Cloisonné glass is a patent ornamental glass formed by placing two pieces flat against each other enclosing a species of glass mosaic. Designs are worked and shaped in gilt wire and placed on one sheet of glass; the space between the wire is then filled in with coloured beads, and another sheet of glass is placed on top of it to keep them in position, and the edges of the glass are bound with linen, &c., to keep them firmly together.

Use in building.

Glass is now used for decorative purposes, such as wall tiling and ceilings; it is coloured and decorated in almost any shade and presents a very effective appearance. An invention has been patented for building houses entirely of glass; the walls are constructed of blocks or bricks of opaque glass, the several walls being varied in thickness according to the constructional requirements.

It is certainly true that daylight has much to do with the sanitary condition of all buildings, and this being so the proper distribution of daylight to a building is of the greatest possible importance, and must be effected by an ample provision of windows judiciously arranged. The heads of all windows should be kept as near the ceiling as possible, as well to obtain easy ventilation as to ensure good lighting. As far as is practicable a building should be planned so that each room receives the sun's rays for some part of the day. This is rarely an easy matter, especially in towns where the aspect of the building is out of the architect's hands. The best sites for light are found in streets running north and south and east and west, and lighting areas or courts in buildings should always if possible be arranged on these lines. The task of adequately lighting lofty city buildings has been greatly minimized by the introduction of many forms of reflecting and intensifying contrivances, which are used to deflect light into those apartments into which daylight does not directly penetrate, and which would otherwise require the use of artificial light to render them of any use; the most useful of these inventions are the various forms of prism glass already referred to and illustrated in this article.

See L. F. Day, *Stained and Painted Class*; and W. Eckstein, *Interior Lighting*.

(J. BT.)

GLAZUNOV, ALEXANDER CONSTANTINOVICH (1865-), Russian musical composer, was born in St Petersburg on the 10th of August 1865, his father being a publisher and bookseller. He showed an early talent for music, and studied for a year or so with Rimsky-Korsakov. At the age of sixteen he composed a symphony (afterwards elaborated and published as *op.* 5), but his *opus* 1 was a quartet in D, followed by a pianoforte suite on *S-a-c-h-a*, the diminutive of his name Alexander. In 1884 he was taken up by Liszt, and soon became known as a composer. His first symphony was played that year at Weimar, and he appeared as a conductor at the Paris exhibition in 1889. In 1897 his fourth and fifth symphonies were performed in London under his own conducting. In 1900 he became professor at the St Petersburg conservatoire. His separate works, including orchestral symphonies, dance music and songs, make a long list. Glazunov is a leading representative of the modern Russian school, and a master of orchestration; his tendency as compared with contemporary Russian composers is towards classical form, and he was much influenced by Brahms, though in "programme music" he is represented by such works as his symphonic poems *The Forest*, *Stenka Razin*, *The Kremlin* and his suite *Aus dem Mittelalter*. His ballet music, as in *Raymonda*, achieved much popularity.

GLEBE (Lat. *glaeba*, *gleba*, clod or lump of earth, hence soil, land), in ecclesiastical law the land devoted to the maintenance of the incumbent of a church. Burn (*Ecclesiastical Law, s.v.* "Glebe Lands") says: "Every church of common right is entitled to house and glebe, and the assigning of them at the first was of such absolute necessity that without them no church could be regularly consecrated. The house and glebe are both comprehended under the word *manse*, of which the rule of the canon law is, *sancitum est ut unicuique ecclesiae unus mansus integer absque ullo servitio tribuatur*." In the technical language of English law the fee-simple of the glebe is said to be in *abeyance*, that is, it exists

“only in the remembrance, expectation and intendment of the law.” But the freehold is in the parson, although at common law he could alienate the same only with proper consent,—that is, in his case, with the consent of the bishop. The disabling statutes of Elizabeth (Alienation by Bishops, 1559, and Dilapidations, &c., 1571) made void all alienations by ecclesiastical persons, except leases for the term of twenty-one years or three lives. By an act of 1842 (5 & 6 Vict. c. 27, Ecclesiastical Leases) glebe land and buildings may be let on lease for farming purposes for fourteen years or on an improving lease for twenty years. But the parsonage house and ten acres of glebe situate most conveniently for occupation must not be leased. By the Ecclesiastical Leasing Acts of 1842 (5 & 6 Vict. c. 108) and 1858 glebe lands may be let on building leases for not more than ninety-nine years and on mining leases for not more than sixty years. The Tithe Act 1842, the Glebe Lands Act 1888 and various other acts make provision for the sale, purchase, exchange and gift of glebe lands. In Scots ecclesiastical law, the manse now signifies the minister’s dwelling-house, the glebe being the land to which he is entitled in addition to his stipend. All parish ministers appear to be entitled to a glebe, except the ministers in royal burghs proper, who cannot claim a glebe unless there be a landowner’s district annexed; and even in that case, when there are two ministers, it is only the first who has a claim.

See Phillimore, *Ecclesiastical Law* (2nd ed.); Cripps, *Law of Church and Clergy*; Leach, *Tithe Acts* (6th ed.); Dart, *Vendors and Purchasers* (7th ed.).

GLEE, a musical term for a part-song of a particular kind. The word, as well as the thing, is essentially confined to England. The technical meaning has been explained in different ways; but there is little doubt of its derivation through the ordinary sense of the word (*i.e.* merriment, entertainment) from the A.S. *gleov*, *gleo*, corresponding to Lat. *gaudium*, *delectamentum*, hence *ludus musicus*; on the other hand, a musical “glee” is by no means necessarily a merry composition. Gleeman (A.S. “gleo-man”) is translated simply as “musicus” or “cantor,” to which the less distinguished titles of “mimus, jocista, scurra,” are frequently added in old dictionaries. The accomplishments and social position of the gleeman seem to have been as varied as those of the Provençal “joglar.” There are early examples of the word “glee” being used as synonymous with harmony or concerted music. The former explanation, for instance, is given in the *Promptorium parvulorum*, a work of the 15th century. Glee in its present meaning signifies, broadly speaking, a piece of concerted vocal music, generally unaccompanied, and for male voices, though exceptions are found to the last two restrictions. The number of voices ought not to be less than three. As regards musical form, the glee is little distinguished from the catch,—the two terms being often used indiscriminately for the same song; but there is a distinct difference between it and the madrigal—one of the earliest forms of concerted music known in England. While the madrigal does not show a distinction of contrasted movements, this feature is absolutely necessary in the glee. In the madrigal the movement of the voices is strictly contrapuntal, while the more modern form allows of freer treatment and more compact harmonies. Differences of tonality are fully explained by the development of the art, for while the madrigal reached its acme in Queen Elizabeth’s time, the glee proper was little known before the Commonwealth; and its most famous representatives belong to the 18th century and the first quarter of the 19th. Among the numerous collections of the innumerable pieces of this kind, only one of the earliest and most famous may be mentioned, *Catch that Catch can, a Choice Collection of Catches, Rounds and Canons, for three and four voices*, published by John Hilton in 1652. The name “glee,” however, appears for the first time in John Playford’s *Musical Companion*, published twenty-one years afterwards, and reprinted again and again, with additions by later composers—Henry Purcell, William Croft and John Blow among the number. The originator of the glee in its modern form was Dr Arne, born in 1710. Among later English musicians famous for their glees, catches and part-songs, the following may be mentioned:—Attwood, Boyce, Bishop, Crotch, Callcott, Shield, Stevens, Horsley, Webb and Knyvett. The convivial character of the glee led, in the 18th century, to the formation of various societies, which offered prizes and medals for the best compositions of the kind and assembled for social and artistic purposes. The most famous amongst these—The Glee Club—was founded in 1787, and at first used to meet at the house of Mr Robert Smith, in St Paul’s churchyard. This club was dissolved in 1857. A similar society—The Catch Club—was formed in 1761 and is still in existence.

GLEICHEN, two groups of castles in Germany, thus named from their resemblance to each other (Ger. *gleich* = like, or resembling). The first is a group of three, each situated on a hill in Thuringia between Gotha and Erfurt. One of these called Gleichen, the Wanderslebener Gleiche (1221 ft. above the sea), was besieged unsuccessfully by the emperor Henry IV. in 1088. It was the seat of a line of counts, one of whom, Ernest III., a crusader, is the subject of a romantic legend. Having been captured, he was released from his imprisonment by a Turkish woman, who returned with him to Germany and became his wife, a papal dispensation allowing him to live with two wives at the same time (see Reineck, *Die Sage von der Doppelehe eines Grafen von Gleichen*, 1891). After belonging to

the elector of Mainz the castle became the property of Prussia in 1803. The second castle is called Mühlburg (1309 ft. above the sea). This existed as early as 704 and was besieged by Henry IV. in 1087. It came into the hands of Prussia in 1803. The third castle, Wachsenburg (1358 ft.), is still inhabited and contains a collection of weapons and pictures belonging to its owner, the duke of Saxe-Coburg-Gotha, whose family obtained possession of it in 1368. It was built about 935 (see Beyer, *Die drei Gleichen*, Erfurt, 1898). The other group consists of two castles, Neuen-Gleichen and Alten-Gleichen. Both are in ruins and crown two hills about 2 m. S.E. from Göttingen.

The name of Gleichen is taken by the family descended from Prince Victor of Hohenlohe-Langenburg through his marriage with Miss Laura Seymour, daughter of Admiral Sir George Francis Seymour, a branch of the Hohenlohe family having at one time owned part of the county of Gleichen.

GLEIG, GEORGE (1753-1840), Scottish divine, was born at Boghall, Kincardineshire, on the 12th of May 1753, the son of a farmer. At the age of thirteen he entered King's College, Aberdeen, where the first prize in mathematics and physical and moral sciences fell to him. In his twenty-first year he took orders in the Scottish Episcopal Church, and was ordained to the pastoral charge of a congregation at Pittenweem, Fife, whence he removed in 1790 to Stirling. He became a frequent contributor to the *Monthly Review*, the *Gentleman's Magazine*, the *Anti-Jacobin Review* and the *British Critic*. He also wrote several articles for the third edition of the *Encyclopaedia Britannica*, and on the death of the editor, Colin Macfarquhar, in 1793, was engaged to edit the remaining volumes. Among his principal contributions to this work were articles on "Instinct," "Theology" and "Metaphysics." The two supplementary volumes were mainly his own work. He was twice chosen bishop of Dunkeld, but the opposition of Bishop Skinner, afterwards primus, rendered the election on both occasions ineffectual. In 1808 he was consecrated assistant and successor to the bishop of Brechin, in 1810 was preferred to the sole charge, and in 1816 was elected primus of the Episcopal Church of Scotland, in which capacity he greatly aided in the introduction of many useful reforms, in fostering a more catholic and tolerant spirit, and in cementing a firm alliance with the sister church of England. He died at Stirling on the 9th of March 1840.

Besides various sermons, Gleig was the author of *Directions for the Study of Theology*, in a series of letters from a bishop to his son on his admission to holy orders (1827); an edition of *Stackhouse's History of the Bible* (1817); and a life of Robertson the historian, prefixed to an edition of his works. See *Life of Bishop Gleig*, by the Rev. W. Walker (1879). Letters to Henderson of Edinburgh and John Douglas, bishop of Salisbury, are in the British Museum.

His third and only surviving son, George Robert Gleig (1796-1888), was educated at Glasgow University, whence he passed with a Snell exhibition to Balliol College, Oxford. He abandoned his scholastic studies to enter the army, and served with distinction in the Peninsular War (1813-14), and in the American War, in which he was thrice wounded. Resuming his work at Oxford, he proceeded B.A. in 1818, M.A. in 1821, and, having been ordained in 1820, held successively curacies at Westwell in Kent and Ash (to the latter the rectory of Ivy Church was added in 1822). He was subsequently appointed chaplain of Chelsea hospital (1824), chaplain-general of the forces (1844-1875) and inspector-general of military schools (1846-1857). From 1848 till his death on the 9th of July 1888 he was prebend of Willesden in St Paul's cathedral. During the last sixty years of his life he was a prolific, if not very scientific, writer; he wrote for *Blackwood's Magazine* and *Fraser's Magazine*, and produced a large number of historical works.

Among the latter were (besides histories of the campaigns in which he served), *Life of Sir Thomas Munro* (3 vols., 1830); *History of India* (4 vols., 1830-1835); *The Leipsic Campaign and Lives of Military Commanders* (1831); *Story of the Battle of Waterloo* (1847); *Sketch of the Military History of Great Britain* (1845); *Sale's Brigade in Afghanistan* (1847); biographies of Lord Clive (1848), the duke of Wellington (1862), and Warren Hastings (1848; the subject of Macaulay's essay, in which it is described as "three big bad volumes full of undigested correspondence and undiscerning panegyric").

GLEIM, JOHANN WILHELM LUDWIG (1719-1803), German poet, was born on the 2nd of April 1719 at Ermsleben, near Halberstadt. Having studied law at the university of Halle he became secretary to Prince William of Brandenburg-Schwedt at Berlin, where he made the acquaintance of Ewald von Kleist, whose devoted friend he became. When the prince fell at the battle of Prague, Gleim became secretary to Prince Leopold of Dessau; but he soon gave up his position, not being able to bear the roughness of the "Old Dessauer." After residing a few years in Berlin he was appointed, in 1747, secretary of the cathedral chapter at Halberstadt. "Father Gleim" was the title accorded to him throughout all literary Germany on account of his kind-hearted though inconsiderate and undiscriminating patronage alike of the poets and poetasters of the period. He wrote a large number of feeble imitations of Anacreon, Horace and the minnesingers, a dull didactic poem entitled *Halladat*

oder das rote Buch (1774), and collections of fables and romances. Of higher merit are his *Preussische Kriegslieder von einem Grenadier* (1758). These, which were inspired by the campaigns of Frederick II., are often distinguished by genuine feeling and vigorous force of expression. They are also noteworthy as being the first of that long series of noble political songs in which later German literature is so rich. With this exception, Gleim's writings are for the most part tamely commonplace in thought and expression. He died at Halberstadt on the 18th of February 1803.

Gleim's *Sämtliche Werke* appeared in 7 vols. in the years 1811-1813; a reprint of the *Lieder eines Grenadiers* was published by A. Sauer in 1882. A good selection of Gleim's poetry will be found in F. Muncker, *Anakreontiker und preussisch-patriotische Lyriker* (1894). See W. Körte, *Gleims Leben aus seinen Briefen und Schriften* (1811). His correspondence with Heinse was published in 2 vols. (1894-1896); with Uz (1889), in both cases edited by C. Schüddekopf.

GLEIWITZ, a town of Germany, in the Prussian province of Silesia, on the Klodnitz, and the railway between Oppeln and Cracow, 40 m. S.E. of the former town. Pop. (1875) 14,156; (1905) 61,324. It possesses two Protestant and four Roman Catholic churches, a synagogue, a mining school, a convent, a hospital, two orphanages, and barracks. Gleiwitz is the centre of the mining industry of Upper Silesia. Besides the royal foundry, with which are connected machine manufactories and boiler-works, there are other foundries, meal mills and manufactories of wire, gas pipes, cement and paper.

See B. Nietsche, *Geschichte der Stadt Gleiwitz* (1886); and Seidel, *Die königliche Eisengiesserei zu Gleiwitz* (Berlin, 1896).

GLENALMOND, a glen of Perthshire, Scotland, situated to the S.E. of Loch Tay. It comprises the upper two-thirds of the course of the Almond, or a distance of 20 m. For the greater part it follows a direction east by south, but at Newton Bridge it inclines sharply to the south-east for 3 m., and narrows to such a degree that this portion is known as the Small (or Sma') Glen. At the end of this pass the glen expands and runs eastwards as far as the well-known public school of Trinity College, where it may be considered to terminate. The most interesting spot in the glen is that traditionally known as the grave of Ossian. The district east of Buchanty, near which are the remains of a Roman camp, is said to be the Drumtochty of Ian Maclaren's stories. The mountainous region at the head of the glen is dominated by Ben y Hone or Ben Chonzie (3048 ft. high).

GLENCAIRN, EARLS OF. The 1st earl of Glencairn in the Scottish peerage was Alexander Cunningham (d. 1488), a son of Sir Robert Cunningham of Kilmaurs in Ayrshire. Made a lord of the Scottish parliament as Lord Kilmaurs not later than 1469, Cunningham was created earl of Glencairn in 1488; and a few weeks later he was killed at the battle of Sauchieburn whilst fighting for King James III. against his rebellious son, afterwards James IV. His son and successor, Robert (d. *c.* 1490), was deprived of his earldom by James IV., but before 1505 this had been revived in favour of Robert's son, Cuthbert (d. *c.* 1540), who became 3rd earl of Glencairn, and whose son William (*c.* 1490-1547) was the 4th earl. This noble, an early adherent of the Reformation, was during his public life frequently in the pay and service of England, although he fought on the Scottish side at the battle of Solway Moss (1542), where he was taken prisoner. Upon his release early in 1543 he promised to adhere to Henry VIII., who was anxious to bring Scotland under his rule, and in 1544 he entered into other engagements with Henry, undertaking *inter alia* to deliver Mary queen of Scots to the English king. However, he was defeated by James Hamilton, earl of Arran, and the project failed; Glencairn then deserted his fellow-conspirator, Matthew Stewart, earl of Lennox, and came to terms with the queen-mother, Mary of Guise, and her party.

William's son, Alexander, the 5th earl (d. 1574), was a more pronounced reformer than his father, whose English sympathies he shared, and was among the intimate friends of John Knox. In March 1557 he signed the letter asking Knox to return to Scotland; in the following December he subscribed the first "band" of the Scottish reformers; and he anticipated Lord James Stewart, afterwards the regent Murray, in taking up arms against the regent, Mary of Guise, in 1558. Then, joined by Stewart and the lords of the congregation, he fought, against the regent, and took part in the attendant negotiations with Elizabeth of England, whom he visited in London in December 1560. When in August 1561 Mary queen of Scots returned to Scotland, Glencairn was made a member of her council; he remained loyal to her after she had been deserted by Murray, but in a few weeks rejoined Murray and the other

Protestant lords, returning to Mary's side in 1566. After the queen had married the earl of Bothwell she was again forsaken by Glencairn, who fought against her at Carberry Hill and at Langside. The earl, who was always to the fore in destroying churches, abbeys and other "monuments of idolatry," died on the 23rd of November 1574. His short satirical poem against the Grey Friars is printed by Knox in his *History of the Reformation*.

James, the 7th earl (d. *c.* 1622), took part in the seizure of James VI., called the raid of Ruthven in 1582. William, the 9th earl (*c.* 1610-1664), a somewhat lukewarm Royalist during the Civil War, was a party to the "engagement" between the king and the Scots in 1647; for this proceeding the Scottish parliament deprived him of his office as lord justice-general, and nominally of his earldom. In March 1653 Charles II. commissioned the earl to command the Royalist forces in Scotland, pending the arrival of General John Middleton, and the insurrection of this year is generally known as Glencairn's rising. After its failure he was betrayed and imprisoned, but although excepted from pardon he was not executed; and when Charles II. was restored he became lord chancellor of Scotland. After a dispute with his former friend, James Sharp, archbishop of St Andrews, he died at Belton in Haddingtonshire on the 30th of May 1664. This earl's son John (d. 1703), who followed his brother Alexander as 11th earl in 1670, was a supporter of the Revolution of 1688. His descendant, James, the 14th earl (1749-1791), is known as the friend and patron of Robert Burns. He performed several useful services for the poet; and when he died on the 30th of January 1791 Burns wrote a *Lament* beginning, "The wind blew hollow frae the hills," and ending with the lines, "But I'll remember thee, Glencairn, and a' that thou hast done for me." The 14th earl was never married, and when his brother and successor, John, died childless in September 1796 the earldom became extinct, although it was claimed by Sir Adam Fergusson, Bart., a descendant of the 10th earl.

GLENCOE, a glen in Scotland, situated in the north of Argyllshire. Beginning at the north-eastern base of Buchaille Etive, it takes a gentle north-westerly trend for 10 m. to its mouth on Loch Leven, a salt-water arm of Loch Linnhe. On both sides it is shut in by wild and precipitous mountains and its bed is swept by the Coe—Ossian's "dark Cona,"—which rises in the hills at its eastern end. About half-way down the glen the stream forms the tiny Loch Triochatan. Towards Invercoe the landscape acquires a softer beauty. Here Lord Strathcona, who, in 1894, purchased the heritage of the Macdonalds of Glencoe, built his stately mansion of Mount Royal. The principal mountains on the south side are the various peaks of Buachaille Etive, Stob Dearg (3345 ft.), Bidean nam Bian (3756 ft.) and Meall Mor (2215 ft.), and on the northern side the Pap of Glencoe (2430 ft.), Sgor nam Fiannaidh (3168 ft.) and Meall Dearg (3118 ft.). Points of interest are the Devil's Staircase, a steep, boulder-strewn "cut" (1754 ft. high) across the hills to Fort William; the Study; the cave of Ossian, where tradition says that he was born, and the Iona cross erected in 1883 by a Macdonald in memory of his clansmen who perished in the massacre of 1692. About 1 m. beyond the head of the glen is Kingshouse, a relic of the old coaching days, when it was customary for tourists to drive from Ballachulish via Tyndrum to Loch Lomond. Now the Glencoe excursion is usually made from Oban—by rail to Achnacloich, steamer up Loch Etive, coach up Glen Etive and down Glencoe and steamer at Ballachulish to Oban. One mile to the west of the Glen lies the village of Ballachulish (pop. 1143). It is celebrated for its slate quarries, which have been worked since 1760. The industry provides employment for 600 men and the annual output averages 30,000 tons. The slate is of excellent quality and is used throughout the United Kingdom. Ballachulish is a station on the Callander and Oban extension line to Fort William (Caledonian railway). The pier and ferry are some 2 m. W. of the village.

GLENCORSE, JOHN INGLIS, Lord (1810-1891), Scottish judge, son of a minister, was born at Edinburgh on the 21st of August 1810. From Glasgow University he went to Balliol College, Oxford. He was admitted a member of the Faculty of Advocates, and soon became known as an eloquent and successful pleader. In 1852 he was made solicitor-general for Scotland in Lord Derby's first ministry, three months later becoming Lord Advocate. In 1858 he resumed this office in Lord Derby's second administration, being returned to the House of Commons as member for Stamford. He was responsible for the Universities of Scotland Act of 1858, and in the same year he was elevated to the bench as lord justice clerk. In 1867 he was made lord justice general of Scotland and lord president of the court of session, taking the title of Lord Glencorse. Outside his judicial duties he was responsible for much useful public work, particularly in the department of higher education. In 1869 he was elected chancellor of Edinburgh University, having already been rector of the university of Glasgow. He died on the 20th August 1891.

GLENDALOUGH, VALE OF, a mountain glen of Co. Wicklow, Ireland, celebrated and frequently visited both on account of its scenic beauty and, more especially, because of the collection of ecclesiastical remains situated in it. Fortunately for its appearance, it is not approached by any railway, but services of cars are maintained to several points, of which Rathdrum, 8½ m. S.E., is the nearest railway station, on the Dublin & South-Eastern. The glen is traversed by the stream of Glenealo, a tributary of the Avonmore, expanding into small loughs, the Upper and the Lower. The former of these is walled by the abrupt heights of Camaderry (2296 ft.) and Lugduff (2176 ft.), and here the extreme narrowness of the valley adds to its grandeur; while lower down, where it widens, the romantic character of the scenery is enhanced by the scattered ruins of the former monastic settlement. These ruins have the collective name of the “Seven Churches.” The settlement owed its foundation to the hermit St Kevin, who is reputed to have died on the 3rd of June 618; and it rapidly became a seat of learning of wide fame, but suffered much at the hands of the Danes and the Anglo-Normans. In close proximity to an hotel, and to one another, in an enclosure, are a round tower, one of the finest in Ireland, 110 ft. high and 52 in circumference; St Kevin’s kitchen or church (closely resembling the house of St Columba at Kells), which measures 25 ft. by 15, with a high-pitched roof and round belfry—supposed to be the earliest example of its type; and the cathedral, about 73 ft. in total length by 51 in width. This possesses a good square-headed doorway, and an east window of ornate character (the chancel being of later date than the nave), and there are also some early tombs, but the whole is in a decayed condition. In the enclosure are also a Lady chapel, chiefly remarkable for its doorway of wrought granite, in a style of architecture resembling Greek; a priest’s house (restored), and slight remains of St Chiaran’s church. Here is also St Kevin’s cross, a granite monolith never completed; and the enclosure is entered by a fine though dilapidated gateway. Other neighbouring remains are Trinity or the Ivy Church, towards Laragh, with beautiful detailed work; St Saviour’s monastery, carefully restored under the direction of the Board of Works, with a chancel arch of three orders (re-erected); while on the shores of the upper lough are Reefert Church, the burial-place of the O’Toole family, and Teampull-na-skellig, the church of the rock. St Kevin’s bed is a cave approachable with difficulty, above the lough, probably a natural cavity artificially enlarged, to which attaches the legend of St Kevin’s hermitage. Along the valley there are a number of monuments and stone crosses of various sizes and styles. The whole collection forms, with the possible exception of Clonmacnoise in King’s county, the most striking monument of monasticism in Ireland.

GLENDOWER, OWEN (*c.* 1359-1415), the last to claim the title of an independent prince of Wales, more correctly described as Owain ab Gruffydd, lord of Glyndyvrdwy in Merioneth, was a man of good family, with two great houses, Sycharth and Glyndyvrdwy in the north, besides smaller estates in south Wales. His father was called Gruffydd Vychan, and his mother Helen; on both sides he had pretensions to be descended from the old Welsh princes. Owen was probably born about 1359, studied law at Westminster, was squire to the earl of Arundel, and a witness for Grosvenor in the famous Scrope and Grosvenor lawsuit in 1386. Afterwards he was in the service of Henry of Bolingbroke, the future king, though by an error it has been commonly stated that he was squire to Richard II. Welsh sympathies were, however, on Richard’s side, and combined with a personal quarrel to make Owen the leader of a national revolt.

The lords of Glyndyvrdwy had an ancient feud with their English neighbours, the Greys of Ruthin. Reginald Grey neglected to summon Owen, as was his duty, for the Scottish expedition of 1400, and then charged him with treason for failing to appear. Owen thereupon took up arms, and when Henry IV. returned from Scotland in September he found north Wales ablaze. A hurried campaign under the king’s personal command was ineffectual. Owen’s estates were declared forfeit and vigorous measures threatened by the English government. Still the revolt gathered strength. In the spring of 1401 Owen was raiding in south Wales, and credited with the intention of invading England. A second campaign by the king in the autumn was defeated, like that of the previous year, through bad weather and the Fabian tactics of the Welsh. Owen had already been intriguing with Henry Percy (Hotspur), who during 1401 held command in north Wales, and with Percy’s brother-in-law, Sir Edmund Mortimer. During the winter of 1401-1402 his plans were further extended to negotiations with the rebel Irish, the Scots and the French. In the spring he had grown so strong that he attacked Ruthin, and took Grey prisoner. In the summer he defeated the men of Hereford under Edmund Mortimer at Pilleth, near Brynglas, in Radnorshire. Mortimer was taken prisoner and treated with such friendliness as to make the English doubt his loyalty; within a few months he married Owen’s daughter. In the autumn the English king was for the third time driven “bootless home and weather-beaten back.” The few English strongholds left in Wales were now hard pressed, and Owen boasted that he would meet his enemy in the field. Nevertheless, in May 1403 Henry of Monmouth was allowed to sack Sycharth and Glyndyvrdwy unopposed. Owen had a greater plot in hand. The Percies were to rise in arms, and meeting Owen at Shrewsbury, overwhelm the prince before help could arrive. But Owen’s share in the undertaking miscarried through his own defeat near Carmarthen on the 12th of July, and Percy was crushed at Shrewsbury ten days later. Still the Welsh revolt was never so formidable. Owen styled himself openly prince of Wales, established a regular government, and called a parliament at Machynlleth. As a result of a formal alliance the French sent troops to his aid, and in the course of 1404 the great castles of Harlech and Aberystwith fell into his hands.

In the spring of 1405 Owen was at the height of his power; but the tide turned suddenly. Prince Henry defeated the Welsh at Grosmont in March, and twice again in May, when Owen's son Griffith and his chancellor were made prisoners. Scrope's rebellion in the North prevented the English from following up their success. The earl of Northumberland took refuge in Wales, and the tripartite alliance of Owen with Percy and Mortimer (transferred by Shakespeare to an earlier occasion) threatened a renewal of danger. But Northumberland's plots and the active help of the French proved ineffective. The English under Prince Henry gained ground steadily, and the recovery of Aberystwith, after a long siege, in the autumn of 1408 marked the end of serious warfare. In February 1409 Harlech was also recaptured, and Owen's wife, daughter and grandchildren were taken prisoners. Owen himself still held out and even continued to intrigue with the French. In July 1415 Gilbert Talbot had power to treat with Owen and his supporters and admit them to pardon. Owen's name does not occur in the document renewing Talbot's powers in February 1416; according to Adam of Usk he died in 1415. Later English writers allege that he died of starvation in the mountains; but Welsh legend represents him as spending a peaceful old age with his sons-in-law at Ewyas and Monington in Herefordshire, till his death and burial at the latter place. The dream of an independent and united Wales was never nearer realization than under Owen's leadership. The disturbed state of England helped him, but he was indeed a remarkable personality, and has not undeservedly become a national hero. Sentiment and tradition have magnified his achievements, and confused his career with tales of portents and magical powers. Owen left many bastard children; his legitimate representative in 1433 was his daughter Alice, wife of Sir John Scudamore of Ewyas.

The facts of Owen's life must be pieced together from scattered references in contemporary chronicles and documents; perhaps the most important are Adam of Usk's *Chronicle* and Ellis's *Original Letters*. On the Welsh side something is given by the bards Iolo Goch and Lewis Glyn Cothi. For modern accounts consult J. H. Wylie's *History of England under Henry IV.* (4 vols., 1884-1898); A. C. Bradley's popular biography; and Professor Tout's article in the *Dictionary of National Biography*.

(C. L. K.)

GLENELG, CHARLES GRANT, Baron (1778-1866), eldest son of Charles Grant (*q.v.*), chairman of the directors of the East India Company, was born in India on the 26th of October 1778, and was educated at Magdalene College, Cambridge, of which he became a fellow in 1802. Called to the bar in 1807, he was elected member of parliament for the Inverness burghs in 1807, and having gained some reputation as a speaker in the House of Commons, he was made a lord of the treasury in December 1813, an office which he held until August 1819, when he became secretary to the lord-lieutenant of Ireland and a privy councillor. In 1823 he was appointed vice-president of the board of trade; from September 1827 to June 1828 he was president of the board and treasurer of the navy; then joining the Whigs, he was president of the board of control under Earl Grey and Lord Melbourne from November 1830 to November 1834. At the board of control Grant was primarily responsible for the act of 1833, which altered the constitution of the government of India. In April 1835 he became secretary for war and the colonies, and was created Baron Glenelg. His term of office was a stormy one. His differences with Sir Benjamin d'Urban (*q.v.*), governor of Cape Colony, were serious; but more so were those with King William IV. and others over the administration of Canada. He was still secretary when the Canadian rebellion broke out in 1837; his wavering and feeble policy was fiercely attacked in parliament; he became involved in disputes with the earl of Durham, and the movement for his supercession found supporters even among his colleagues in the cabinet. In February 1839 he resigned, receiving consolation in the shape of a pension of £2000 a year. From 1818 until he was made a peer Grant represented the county of Inverness in parliament, and he has been called "the last of the Canningites." Living mainly abroad during the concluding years of his life, he died unmarried at Cannes on the 23rd of April 1866 when his title became extinct.

Glenelg's brother, Sir Robert Grant (1779-1838), who was third wrangler in 1801, was, like his brother, a fellow of Magdalene College, Cambridge, and a barrister. From 1818 to 1834 he represented various constituencies in parliament, where he was chiefly prominent for his persistent efforts to relieve the disabilities of the Jews.[1] In June 1834 he was appointed governor of Bombay, and he died in India on the 9th of July 1838. Grant wrote a *Sketch of the History of the East India Co.* (1813), and is also known as a writer of hymns.

1 Sir S. Walpole (*History of England*, vol. v.) is wrong in stating that Charles Grant introduced bills to remove Jewish disabilities in 1833 and 1834. They were introduced by his brother Robert.

GLENELG, a municipal town and watering place of Adelaide county, South Australia, on Holdfast Bay, 6½ m. by rail S.S.W. of the city of Adelaide. Pop. (1901) 3949. It is a popular summer resort, connected with Adelaide by two lines of railway. In the vicinity is the "Old Gum Tree" under which

South Australia was proclaimed British territory by Governor Hindmarsh in 1836.

GLENGARRIFF, or GLENGARIFF ("Rough Glen"), a celebrated resort of tourists in summer and invalids in winter, in the west riding of county Cork, Ireland, on Glengarriff Harbour, an inlet on the northern side of Bantry Bay, 11 m. by coach road from Bantry on the Cork, Bandon & South Coast railway. Beyond its hotels, Glengarriff is only a small village, but the island-studded harbour, the narrow glen at its head and the surrounding of mountains, afford most attractive views, and its situation on the "Prince-of Wales'" route travelled by King Edward VII. in 1848, and on a fine mountain coach road from Macroom, brings it into the knowledge of many travellers to Killarney. Thackeray wrote enthusiastically of the harbour. The glaciated rocks of the glen are clothed with vegetation of peculiar luxuriance, flourishing in the mild climate which has given Glengarriff its high reputation as a health resort for those suffering from pulmonary complaints.

GLEN GREY, a division of the Cape province south of the Stormberg, adjoining on the east the Transkeian Territories. Pop. (1904) 55,107. Chief town Lady Frere, 32 m. N.E. of Queenstown. The district is well watered and fertile, and large quantities of cereals are grown. Over 96% of the inhabitants are of the Zulu-Xosa (Kaffir) race, and a considerable part of the district was settled during the Kaffir wars of Cape Colony by Tembu (Tambookies) who were granted a location by the colonial government in recognition of their loyalty to the British. Act No. 25 of 1894 of the Cape parliament, passed at the instance of Cecil Rhodes, which laid down the basis upon which is effected the change of land tenure by natives from communal to individual holdings, and also dealt with native local self-government and the labour question, applied in the first instance to this division, and is known as the Glen Grey Act (see CAPE COLONY: *History*). The provisions of the act respecting individual land tenure and local self-government were in 1898 applied, with certain modifications, to the Transkeian Territories. The division is named after Sir George Grey, governor of Cape Colony 1854-1861.

GLENS FALLS, a village of Warren county, New York, U.S.A., 55 m. N. of Troy, on the Hudson river. Pop. (1890) 9509; (1900) 12,613, of whom 1762 were foreign-born; (1910 census) 15,243. Glens Falls is served by the Delaware & Hudson and the Hudson Valley (electric) railways. The village contains a state armoury, the Crandall free public library, a Y.M.C.A. building, the Park hospital, an old ladies' home, and St Mary's (Roman Catholic) and Glens Falls (non-sectarian) academies. There are two private parks, open to the public, and a waterworks system is maintained by the village. An iron bridge crosses the river just below the falls, connecting Glens Falls and South Glens Falls (pop. in 1910, 2247). The falls of the Hudson here furnish a fine water-power, which is utilized, in connexion with steam and electricity, in the manufacture of lumber, paper and wood pulp, women's clothing, shirts, collars and cuffs, &c. In 1905 the village's factory products were valued at $4,780,331. About 12 m. above Glens Falls, on the Hudson, a massive stone dam has been erected; here electric power, distributed to a large area, is generated. In the neighbourhood of Glens Falls are valuable quarries of black marble and limestone, and lime, plaster and Portland cement works. Glens Falls was settled about the close of the French and Indian War (1763), and was incorporated as a village in 1839.

GLENTILT, a glen in the extreme north of Perthshire, Scotland. Beginning at the confines of Aberdeenshire, it follows a north-westerly direction excepting for the last 4 m., when it runs due S. to Blair Atholl. It is watered throughout by the Tilt, which enters the Garry after a course of 14 m., and receives on its right the Tarff, which forms some beautiful falls just above the confluence, and on the left the Fender, which has some fine falls also. The attempt of the 6th duke of Atholl (1814-1864) to close the glen to the public was successfully contested by the Scottish Rights of Way Society. The group of mountains—Carn nan Gabhar (3505 ft.), Ben y Gloe (3671) and Carn Liath (3193)—on its left side dominate the lower half of the glen. Marble of good quality is occasionally quarried in the glen, and the rock formation has attracted the attention of geologists from the time of James Hutton.

GLEYRE, MARC CHARLES GABRIEL (1806-1874), French painter, of Swiss origin, was born at Chevilly in the canton of Vaud on the 2nd of May 1806. His father and mother died while he was yet a boy of some eight or nine years of age; and he was brought up by an uncle at Lyons, who sent him to the industrial school of that city. Going up to Paris a lad of seventeen or nineteen, he spent four years in close artistic study—in Hersent's studio, in Suisse's academy, in the galleries of the Louvre. To this period of laborious application succeeded four years of meditative inactivity in Italy, where he became acquainted with Horace Vernet and Léopold Robert; and six years more were consumed in adventurous wanderings in Greece, Egypt, Nubia and Syria. At Cairo he was attacked with ophthalmia, and in the Lebanon he was struck down by fever; and he returned to Lyons in shattered health. On his recovery he proceeded to Paris, and, fixing his modest studio in the rue de Université, began carefully to work out the conceptions which had been slowly shaping themselves in his mind. Mention is made of two decorative panels—"Diana leaving the Bath," and a "Young Nubian"—as almost the first fruits of his genius; but these did not attract public attention till long after, and the painting by which he practically opened his artistic career was the "Apocalyptic Vision of St John," sent to the Salon of 1840. This was followed in 1843 by "Evening," which at the time received a medal of the second class, and afterwards became widely popular under the title of the Lost Illusions. It represents a poet seated on the bank of a river, with drooping head and wearied frame, letting his lyre slip from a careless hand, and gazing sadly at a bright company of maidens whose song is slowly dying from his ear as their boat is borne slowly from his sight.

In spite of the success which attended these first ventures, Gleyre retired from public competition, and spent the rest of his life in quiet devotion to his own artistic ideals, neither seeking the easy applause of the crowd, nor turning his art into a means of aggrandizement and wealth. After 1845, when he exhibited the "Separation of the Apostles," he contributed nothing to the Salon except the "Dance of the Bacchantes" in 1849. Yet he laboured steadily and was abundantly productive. He had an "infinite capacity of taking pains," and when asked by what method he attained to such marvellous perfection of workmanship, he would reply, "En y pensant toujours." A long series of years often intervened between the first conception of a piece and its embodiment, and years not unfrequently between the first and the final stage of the embodiment itself. A landscape was apparently finished; even his fellow artists would consider it done; Gleyre alone was conscious that he had not "found his sky." Happily for French art this high-toned laboriousness became influential on a large number of Gleyre's younger contemporaries; for when Delaroche gave up his studio of instruction he recommended his pupils to apply to Gleyre, who at once agreed to give them lessons twice a week, and characteristically refused to take any fee or reward. By instinct and principle he was a confirmed celibate: "Fortune, talent, health,—he had everything; but he was married," was his lamentation over a friend. Though he lived in almost complete retirement from public life, he took a keen interest in politics, and was a voracious reader of political journals. For a time, indeed, under Louis Philippe, his studio had been the rendezvous of a sort of liberal club. To the last—amid all the disasters that befell his country—he was hopeful of the future, "la raison finira bien par avoir raison." It was while on a visit to the Retrospective Exhibition, opened on behalf of the exiles from Alsace and Lorraine, that he died suddenly on the 5th of May 1874. He left unfinished the "Earthly Paradise," a noble picture, which Taine has described as "a dream of innocence, of happiness and of beauty—Adam and Eve standing in the sublime and joyous landscape of a paradise enclosed in mountains,"—a worthy counterpart to the "Evening." Among the other productions of his genius are the "Deluge," which represents two angels speeding above the desolate earth, from which the destroying waters have just begun to retire, leaving visible behind them the ruin they have wrought; the "Battle of the Lemanus," a piece of elaborate design, crowded but not cumbered with figures, and giving fine expression to the movements of the various bands of combatants and fugitives; the "Prodigal Son," in which the artist has ventured to add to the parable the new element of mother's love, greeting the repentant youth with a welcome that shows that the mother's heart thinks less of the repentance than of the return; "Ruth and Boaz"; "Ulysses and Nausicaa"; "Hercules at the feet of Omphale"; the "Young Athenian," or, as it is popularly called, "Sappho"; "Minerva and the Nymphs"; "Venus πάνδημος"; "Daphnis and Chloë"; and "Love and the Parcae." Nor must it be omitted that he left a considerable number of drawings and water-colours, and that we are indebted to him for a number of portraits, among which is the sad face of Heine, engraved in the *Revue des deux mondes* for April 1852. In Clément's catalogue of his works there are 683 entries, including sketches and studies.

See Fritz Berthoud in *Bibliothèque universelle de Genève* (1874); Albert de Montet, *Dict. biographique des Genevois et des Vaudois* (1877); and *Vie de Charles Gleyre* (1877), written by his friend, Charles Clément, and illustrated by 30 plates from his works.

GLIDDON, GEORGE ROBINS (1809-1857), British Egyptologist, was born in Devonshire in 1809. His father, a merchant, was United States consul at Alexandria, and there Gliddon was taken at an early age. He became United States vice-consul, and took a great interest in Egyptian antiquities. Subsequently he lectured in the United States and succeeded in rousing considerable attention to the subject of Egyptology generally. He died at Panama in 1857. His chief work was *Ancient Egypt* (1850, ed. 1853). He wrote also *Memoir on the Cotton of Egypt* (1841); *Appeal to the Antiquaries of Europe on the Destruction of the Monuments of Egypt* (1841); *Discourses on Egyptian Archaeology* (1841); *Types*

of Mankind (1854), in conjunction with J. C. Nott and others; *Indigenous Races of the Earth* (1857), also in conjunction with Nott and others.

GLINKA, FEDOR NIKOLAEVICH (1788-1849); Russian poet and author, was born at Smolensk in 1788, and was specially educated for the army. In 1803 he obtained a commission as an officer, and two years later took part in the Austrian campaign. His tastes for literary pursuits, however, soon induced him to leave the service, whereupon he withdrew to his estates in the government of Smolensk, and subsequently devoted most of his time to study or travelling about Russia. Upon the invasion of the French in 1812, he re-entered the Russian army, and remained in active service until the end of the campaign in 1814. Upon the elevation of Count Milarodovich to the military governorship of St Petersburg, Glinka was appointed colonel under his command. On account of his suspected revolutionary tendencies he was, in 1826, banished to Petrozavodsk, but he nevertheless retained his honorary post of president of the Society of the Friends of Russian Literature, and was after a time allowed to return to St Petersburg. Soon afterwards he retired completely from public life, and died on his estates in 1849.

Glinka's martial songs have special reference to the Russian military campaigns of his time. He is known also as the author of the descriptive poem *Kareliya*, &c. (*Carelia, or the Captivity of Martha Joanovna*) (1830), and of a metrical paraphrase of the book of Job. His fame as a military author is chiefly due to his *Pisma Russkago Ofitsera* (*Letters of a Russian Officer*) (8 vols., 1815-1816).

GLINKA, MICHAEL IVANOVICH (1803-1857), Russian musical composer, was born at Novospassky, a village in the Smolensk government, on the 2nd of June 1803. His early life he spent at home, but at the age of thirteen we find him at the Blagorodrey Pension, St Petersburg, where he studied music under Carl Maier and John Field, the Irish composer and pianist, who had settled in Russia. We are told that in his seventeenth year he had already begun to compose romances and other minor vocal pieces; but of these nothing now is known. His thorough musical training did not begin till the year 1830, when he went abroad and stayed for three years in Italy, to study the works of old and modern Italian masters. His thorough knowledge of the requirements of the voice may be connected with this course of study. His training as a composer was finished under the contrapuntist Dehn, with whom Glinka stayed for several months at Berlin. In 1833 he returned to Russia, and devoted himself to operatic composition. On the 27th of September (9th of October) 1836, took place the first representation of his opera *Life for the Tsar* (the libretto by Baron de Rosen). This was the turning-point in Glinka's life,—for the work was not only a great success, but in a manner became the origin and basis of a Russian school of national music. The story is taken from the invasion of Russia by the Poles early in the 17th century, and the hero is a peasant who sacrifices his life for the tsar. Glinka has wedded this patriotic theme to inspiring music. His melodies, moreover, show distinct affinity to the popular songs of the Russians, so that the term "national" may justly be applied to them. His appointment as imperial chapelmaster and conductor of the opera of St Petersburg was the reward of his dramatic successes. His second opera *Russlan and Lyudmila*, founded on Pushkin's poem, did not appear till 1842; it was an advance upon *Life for the Tsar* in its musical aspect, but made no impression upon the public. In the meantime Glinka wrote an overture and four entre-actes to Kukolnik's drama *Prince Kholmsky*. In 1844 he went to Paris, and his *Jota Arragonesa* (1847), and the symphonic work on Spanish themes, *Une Nuit à Madrid*, reflect the musical results of two years' sojourn in Spain. On his return to St Petersburg he wrote and arranged several pieces for the orchestra, amongst which the so-called *Kamarinskaya* achieved popularity beyond the limits of Russia. He also composed numerous songs and romances. In 1857 he went abroad for the third time; he now wrote his autobiography, orchestrated Weber's *Invitation à la valse*, and began to consider a plan for a musical version of Gogol's *Tarass-Boulba*. Abandoning the idea and becoming absorbed in a passion for ecclesiastical music he went to Berlin to study the ancient church modes. Here he died suddenly on the 2nd of February 1857.

GLINKA, SERGY NIKOLAEVICH (1774-1847), Russian author, the elder brother of Fedor N. Glinka, was born at Smolensk in 1774. In 1796 he entered the Russian army, but after three years' service retired with the rank of major. He afterwards employed himself in the education of youth and in literary pursuits, first in the Ukraine, and subsequently at Moscow, where he died in 1847. His poems are spirited and patriotic; he wrote also several dramatic pieces, and translated Young's *Night*

Thoughts.

Among his numerous prose works the most important from an historical point of view are: *Russkoe Chtenie* (*Russian Reading: Historical Memorials of Russia in the 18th and 19th Centuries*) (2 vols., 1845); *Istoriya Rossii*, &c. (*History of Russia for the use of Youth*) (10 vols., 1817-1819, 2nd ed. 1822, 3rd ed. 1824); *Istoriya Armyan*, &c. (*History of the Migration of the Armenians of Azerbijan from Turkey to Russia*) (1831); and his contributions to the *Russky Vyestnik* (*Russian Messenger*), a monthly periodical, edited by him from 1808 to 1820.

GLOBE-FISH, or Sea-Hedgehog, the names by which some sea-fishes are known, which have the remarkable faculty of inflating their stomachs with air. They belong to the families Diodontidae and Tetrodontidae. Their jaws resemble the sharp beak of a parrot, the bones and teeth being coalesced into one mass with a sharp edge. In the Diodonts there is no mesial division of the jaws, whilst in the Tetrodonts such a division exists, so that they appear to have two teeth above and two below. By means of these jaws they are able to break off branches of corals, and to masticate other hard substances on which they feed. Usually they are of a short, thick, cylindrical shape, with powerful fins (fig. 1). Their body is covered with thick skin, without scales, but provided with variously formed spines, the size and extent of which vary in the different species. When they inflate their capacious stomachs with air, they assume a globular form, and the spines protrude, forming a more or less formidable defensive armour (fig. 2). A fish thus blown out turns over and floats belly upwards, driving before the wind and waves. Many of these fishes are highly poisonous when eaten, and fatal accidents have occurred from this cause. It appears that they acquire poisonous qualities from their food, which frequently consists of decomposing or poisonous animal matter, such as would impart, and often does impart, similar deleterious qualities to other fish. They are most numerous between the tropics and in the seas contiguous to them, but a few species live in large rivers, as, for instance, the *Tetrodon fahaka*, a fish well known to all travellers on the Nile. Nearly 100 different species are known.

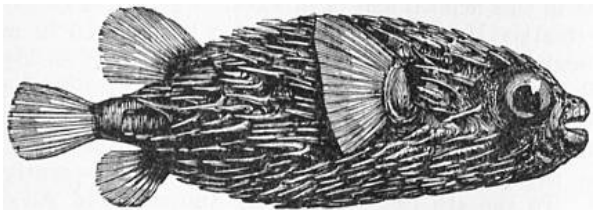


Fig. 1.—Diodon maculatus.

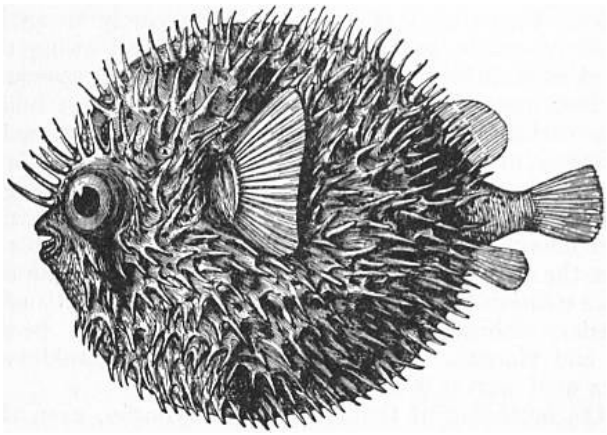


Fig. 2.—*Diodon maculatus* (inflated).

GLOBIGERINA, A. d’Orbigny, a genus of Perforate Foraminifera (*q.v.*) of pelagic habit, and formed of a conical spiral aggregate of spheroidal chambers with a crescentic mouth. The shells accumulate at the bottom of moderately deep seas to form “Globigerina ooze” and are preserved thus in the chalk. *Hastigerina* only differs in the “flat” or nautiloid spiral.

GLOCKENSPIEL, or Orchestral Bells (Fr. *carillon*; Ger. *Glockenspiel*, *Stahlharmonika*; Ital. *campanelli*; Med. Lat. *tintinnabulum*, *cymbalum*, *bombulum*), an instrument of percussion of definite musical pitch, used in the orchestra, and made in two or three different styles. The oldest form of glockenspiel, seen in illuminated MSS. of the middle ages, consists of a set of bells mounted on a frame and played by one performer by means of steel hammers. The name "bell" is now generally a misnomer, other forms of metal or wood having been found more convenient. The pyramid-shaped glockenspiel, formerly used in the orchestra for simple rhythmical effects, consists of an octave of semitone, hemispherical bells, placed one above the other and fastened to an iron rod which passes through the centre of each, the bells being of graduated sizes and diminishing in diameter as the pitch rises. The lyre-shaped glockenspiel, or steel harmonica (*Stahlharmonika*), is a newer model, which has instead of bells twelve or more bars of steel, graduating in size according to their pitch. These bars are fastened horizontally across two bars of steel set perpendicularly in a steel frame in the shape of a lyre. The bars are struck by little steel hammers attached to whalebone sticks.

Wagner has used the glockenspiel with exquisite judgment in the fire scene of the last act of *Die Walküre* and in the peasants' waltz in the last scene of *Die Meistersinger*. When chords are written for the glockenspiel, as in Mozart's *Magic Flute*, the keyed harmonica[1] is used. It consists of a keyboard having a little hammer attached to each key, which strikes a bar of glass or steel when the key is depressed. The performer, being able to use both hands, can play a melody with full harmonies, scale and arpeggio passages in single and double notes. A peal of hemispherical bells was specially constructed for Sir Arthur Sullivan's *Golden Legend*. It consists of four bells constructed of bell-metal about 1 in. thick, the largest measuring 27 in. in diameter, the smallest 23. They are fixed on a stand one above the other, with a clearance of about ¾ in. between them; the rim of the lowest and largest bell is 15 in. from the foot of the stand. The bells are struck by mallets, which are of two kinds—a pair of hard wood for forte passages, and a pair covered with wash-leather for piano effects. The peal was unique at the time it was made for the *Golden Legend*, but a smaller bell of the same shape, ¼ in. thick, with a diameter measuring about 16 in., specially made for the performance of Liszt's *St Elizabeth*, when conducted by the composer in London, evidently suggested the idea for the peal.

(K. S.)

1 See "The Keyed Harmonica improved by H. Klein of Pressburg," article in the *Allg. musik. Ztg.*, Bd. i. pp. 675-699 (Leipzig, 1798); also Becker, p. 254, *Bartel*.

GLOGAU, a fortified town of Germany, in the Prussian province of Silesia, 59 m. N.W. from Breslau, on the railway to Frankfort-on-Oder. Pop. (1905) 23,461. It is built partly on an island and partly on the left bank of the Oder; and owing to the fortified enceinte having been pushed farther afield, new quarters have been opened up. Among its most important buildings are the cathedral, in the Gothic, and a castle (now used as a courthouse), in the Renaissance style, two other Roman Catholic and three Protestant churches, a new town-hall, a synagogue, a military hospital, two classical schools (*Gymnasien*) and several libraries. Owing to its situation on a navigable river and at the junction of several lines of railway, Glogau carries on an extensive trade, which is fostered by a variety of local industries, embracing machinery-building, tobacco, beer, oil, sugar and vinegar. It has also extensive lithographic works, and its wool market is celebrated.

In the beginning of the 11th century Glogau, even then a populous and fortified town, was able to withstand a regular siege by the emperor Henry V.; but in 1157 the duke of Silesia, finding he could not hold out against Frederick Barbarossa, set it on fire. In 1252 the town, which had been raised from its ashes by Henry I., the Bearded, became the capital of a principality of Glogau, and in 1482 town and district were united to the Bohemian crown. In the course of the Thirty Years' War Glogau suffered greatly. The inhabitants, who had become Protestants soon after the Reformation, were dragooned into conformity by Wallenstein's soldiery; and the Jesuits received permission to build themselves a church and a college. Captured by the Protestants in 1632, and recovered by the Imperialists in 1633, the town was again captured by the Swedes in 1642, and continued in Protestant hands till the peace of Westphalia in 1648, when the emperor recovered it. In 1741 the Prussians took the place by storm, and during the Seven Years' War it formed an important centre of operations for the Prussian forces. After the battle of Jena (1806) it fell into the hands of the French; and was gallantly held by Laplane, against the Russian and Prussian besiegers, after the battle of Katzbach in August 1813 until the 17th of the following April.

See Minsberg, *Geschichte der Stadt und Festung Glogau's* (2 vols., Glogau, 1853); and H. von Below, *Zur Geschichte des Jahres* 1806. *Glogau's Belagerung und Verteidigung* (Berlin, 1893).

GLORIOSA, in botany, a small genus of plants belonging to the natural order Liliaceae, native of tropical Asia and Africa. They are bulbous plants, the slender stems of which support themselves by

tendril-like prolongations of the tips of some of the narrow generally lanceolate leaves. The flowers, which are borne in the leaf-axils at the ends of the stem, are very handsome, the six, generally narrow, petals are bent back and stand erect, and are a rich orange yellow or red in colour; the six stamens project more or less horizontally from the place of insertion of the petals. They are generally grown in cultivation as stove-plants.

GLORY (through the O. Fr. *glorie*, modern *gloire*, from Lat. *gloria*, cognate with Gr. κλεός, κλύειν), a synonym for fame, renown, honour, and thus used of anything which reflects honour and renown on its possessor. In the phrase “glory of God” the word implies both the honour due to the Creator, and His majesty and effulgence. In liturgies of the Christian Church are the *Gloria Patri*, the doxology beginning “Glory be to the Father,” the response *Gloria tibi, Domine*, “Glory be to Thee, O Lord,” sung or said after the giving out of the Gospel for the day, and the *Gloria in excelsis*, “Glory be to God on high,” sung during the Mass and Communion service. A “glory” is the term often used as synonymous with halo, nimbus or aureola (*q.v.*) for the ring of light encircling the head or figure in a pictorial or other representation of sacred persons.

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