

THE MACMILLAN ENCYCLOPEDIA



1993 EDITION

THE MACMILLAN ENCYCLOPEDIA

麦克米伦百科全书

¥: 286.54元

00779

M
MACMILLAN

Copyright © Market House Books Limited, Aylesbury, 1981, 1983, 1986, 1987, 1988, 1989, 1990, 1991, 1992.

All rights reserved. No reproduction, copy or transmission of this publication may be made without written permission. No paragraph of this publication may be reproduced, copied or transmitted save with written permission or in accordance with the provisions of the Copyright, Designs and Patents Act 1988, or under the terms of any licence permitting limited copying issued by the Copyright Licensing Agency, 90 Tottenham Court Road, London W1P 9HE. Any person who does any unauthorised act in relation to this publication may be liable to criminal prosecution and civil claims for damages.

First published in 1981 by
Macmillan London Limited
4 Little Essex Street London WC2R 3LF
and Basingstoke

Associated companies in Auckland, Delhi, Dublin, Gaborone, Hamburg, Harare, Hong Kong, Johannesburg, Kuala Lumpur, Lagos, Manzini, Melbourne, Mexico City, Nairobi, New York, Singapore and Tokyo

Revised edition published 1983
Revised and updated, 1984, 1986, 1987, 1988, 1990
Reprinted with corrections, 1990, 1991, 1992

British Cataloguing in Publication Data
A CIP catalogue for this book is available from the British Library.
ISBN 0-333-57477-X

Printed and bound in Great Britain by The Bath Press Ltd.

Picture Credits

Black and White

The names of the agencies appear first, followed by the relevant page numbers. Where applicable the photographers' names follow immediately after the page number.

Reproduced by gracious permission of Her Majesty the Queen: 249 (housed in the Local History Museum, Durban), 257, 377, 715. Biofotos/Heather Angel: 296, 380, 440, 940, 1081, 1121, 1152. Adrea, London: 18 John Mason: 197 Clem Haagner: 209 Wardene Weisser: 225 Adrian Warren: 558 J. B. and S. Bottomley: 596 Dennis Avon and Tony Tilford: 812 B. N. Douetil: 833 Pat Morris: 912 Dennis Avon: 1001 David and Katie Urry: 1289 Acans Weaving: 1144, 1311 R. J. C. Blewitt. Ashmolean Museum, Oxford: 62, 1244. Australian Information Service, London: 74 (below left), 827, 879. Barnabys Picture Library: 74 (above, centre left, below right), 102, 117, 589 (below right), 653, 1214, 1299. BBC Hulton Picture Library: 85, 158, 250, 291, 328, 356, 369, 383, 399, 487: 580 Bettmann Archive, USA: 668, 648 Bert Hardy: 713, 785, 848, 1007, 1011, 1035, 1049, 1090, 1207, 1238, 1288, 1322. Thomas Bewick: 147 (*History of British Birds*, vol. 1, 1847 edn). Bodleian Library, Oxford: 689 (Ms. bod. 264 f. 220). Reproduced by courtesy of the Trustees of the British Library: 908, 1271 (India Office Library). Reproduced by courtesy of the Trustees of the British Museum: 3 (Museum of Mankind), 271, 567, 727, 1029, 1174, 1303. Courtesy of the British Tourist Authority: 981, 1203 (below right). Camera Press: 36, 65, 79, 91, 114, 129, 138, 142, 169, 171, 178, 181, 183, 189, 211, 234, 238, 256, 265, 322, 353, 371, 389, 392, 450, 598, 646, 651, 755, 775, 792, 828, 831, 840, 859 (above), 860, 943, 949, 956, 1059, 1119, 1147, 1178, 1183, 1202, 1219, 1321. *Cassell's Family Magazine*, 1877: 13. Cavendish Laboratory, University of Cambridge: 1061. Christie's, London: 1149. Bruce Coleman Ltd: 12 M. P. Kahl: 503, 752 Graham Pizze. Country Life: 750. Danish Tourist Board: 49. Deutsches Museum, Munich: 1320. Patrick Eagar: 1130. Earthscan: 8 Jiri Polacek: 42 Sean Sprague: 273, 360, 717 Mark Edwards. Professor William D. Ehmann: 564. Mary Evans Picture Library: 105, 216, 258, 298 (below), 473 (Sigmund Freud Collection), 526, 587, 591 (Harry Price Collection, University of London), 649, 725, 740, 743, 876, 1015, 1188, 1203, 1328, 1332. French Government Tourist Office, London: 926. Vivien Fifield Picture Library: 931. Fotomas Index: 729, 1029. Granada TV: 899. Handmade Films: 1127 David Farrell, Eric and David Hosking: 1, 26, 219, 444, 555, 604, 922, 1112. Courtesy of the Imperial War Museum: 723. The Independent/David Rose: 638. Courtesy of the Italian State Tourist Office, London: 1075. Japan National Tourist Organisation, London: 254. A F Kersting, London: 499, 670, 977, 1262, 1277, 1295. Crown Copyright. Reproduced with the permission of the Controller of Her Majesty's Stationery Office and the Director, Royal Botanic Gardens, Kew: 5. Kobal Collection: 278, 365, 488, 712. Frank Lane Picture Agency: 100 Dennis L. Sanders: 252 Yves Temple: 385 Arthur Christensen: 506 Steve McCutcheon: Alaska Picture Service: 896 R. Van Nostrand. Macmillan Publishers Ltd: 243, 434, 757, 1021. Mansell Collection, London: 27, 31, 34 (above), 50, 90, 96, 97, 118, 125, 131, 133, 135, 163, 175, 176, 194, 231, 236, 241, 260, 281, 285, 315, 335, 346, 387, 391, 407 (above), 469, 507, 522, 603, 608, 616, 618, 660, 677, 685, 687, 700, 731, 774, 854, 874, 881, 900, 910, 914, 920, 1018, 1033, 1048, 1089, 1115, 1121, 1153, 1165, 1215, 1221, 1240, 1247, 1251, 1276, 1291, 1293, 1301. Merseyside County Museums, Liverpool: 245. Tony Morrison/South American Pictures: 610, 1071. Museum of London: 738, 1067. Reproduced by courtesy of the Trustees of the National Gallery, London: 483, 799, 982, 1056,

1160, 1244, 1263. National Portrait Gallery, London: 191, 203, 206, 308, 364, 519, 530, 541, 579, 707, 806, 861, 869, 1017, 1037, 1102, 1266, 1283, 1312. Natural History Photographic Agency: 388 Stephen Dalton (above and below). Courtesy of the High Commissioner for New Zealand: 502. Peter Newark's Western Americana and Historical Pictures: 282. Network Photographers: 151 Steve Benbow, 1090 Chris Davies. Courtesy of the Oxford Mail and Times: 835. Photo Source/Keystone: 407 (below), 454, 512, 577, 741, 815. Popperfoto: 204, 218, 266, 276, 340, 368, 568, 589 (below centre), 662, 663, 675, 753, 772, 801, 849, 937, 955, 958, 987, 1083, 1118, 1142, 1217, 1256, 1279. Press Association: 763. David Redfern: 644. Royal Geographical Society, London: 428, 664 Nigel Winsor. Royal Greenwich Observatory: 859 (below), 1133, 1171. SATOUR: 224. Science Museum, London: 298 (above). Science Photo Library: 1042 Jerry Mason, 1085 Dr Gary Settles. Scottish Tourist Board: 626. Ronald Sheridan's Photo Library: 269, 817, 1253. Harry Smith Collection: 349, 614. Frank Spooner Pictures: 46, 794, 1125. Sport and General Press Agency: 656. Sporting Pictures (UK) Ltd: 873. Syndication International: 34 (below). Tate Gallery, London: 745, 1166 (on loan to Tate Gallery. *Joseph Smyth, Esq., Lieutenant of Whittlebury Forest, Northamptonshire, c.1762-4*), 1274. John Topham Picture Library: 153, 534, 589 (below left), 710, 783, 903, 1020. USAF/General Dynamics: 887. Victoria and Albert Museum, London: 143, 157, 192, 270, 496, 575, 609, 632, 642, 692, 696, 698, 822, 841, 851, 1024, 1158, 1203. VDN Picture Library, Paris: 196, 544, 844, 1009. H. Roger Viollet: 1233. Vision International: 74 Angelo Hornak (above right), 74 Paolo Koch (centre right), 589 Elizabeth Weiland (above left, above centre, above right). Reproduced by permission of the Trustees, The Wallace Collection, London: 466, 535. Peter Warren: 71. Werner Foreman Archive: 103, 786. Windsor Safari Park: 674. Zoological Society of London: 1257.

Colour

Plate I Oxford Scientific Films Ltd.

Plate II Artwork: Elaine Keenan. *Photographs*: Below left, Amey Roadstone Corporation Ltd. Below centre, Roger Wood. Below right, Scala.

Plate III Selection of gemstones reproduced by permission of the Director, Institute of Geological Sciences; NERC copyright reserved. Above left inset, Institute of Geological Sciences/Christie's, London. Above right inset, Institute of Geological Sciences/Christie's, London. Below left inset, Institute of Geological Sciences/Christie's, London. Below right inset, De Beers Consolidated Mines Ltd.

Plate IV Paul Cooper/Tony Lodge.

Plate V Artwork: Hilary Burn. *Photograph*: H. Schrempf/Frank Lane Picture Agency.

Plate VI Artwork: David Draper. *Photographs*: Left hand page, above centre, SAAB Great Britain Ltd. Above right, Jerry Mason/Science Photo Library. Below left, Heini Schneebeli/Science Photo Library. Below centre, West Midlands Gas/Baggeridge Brick Company Ltd. Right hand page, left Jesco v. Puttkamer/Hutchison. Centre, Martin Bond/Science Photo Library. Above right, Jerry Mason/Science Photo Library. Below right, Martin Bond/Science Photo Library.

Plate VII Artwork: David Weeks. *Photographs*: Above left, AGA Infrared Systems Ltd. Above right, Paul Brierley. Below right, Bridgeman Art Library.

Flags Barclays Bank International Ltd.

Maps Macmillan Education Ltd.

Endpapers Artwork: Berry/Fallon Design.

Preface

Alvin Hayes BSc, PhD, DIC, ACGI
Subject Editors
Richard Barron BA
John Dainton BSc, Phil
Alison Balden MA
T.J. Boardman BA
Charles Boyle BA, BLitt
O.M.C. Bodman BA, MA
W.P. Cass MA
Kathleen Clarke BA
Valentine Pochan MA
David A. Ramsay BSc, MEd, PhD
Charles H. Rogers BA
Ellen Savaris BA
Michael Schenk BA

Foreword to the first edition by the Rt Hon Harold Macmillan (later Lord Stockton)

In 1877 my great-uncle Alexander Macmillan published Autenrieth's *Homeric Dictionary*. This standard work of reference is still available (though no longer, alas, at its original price of six shillings). In the course of a hundred years many dictionaries and encyclopedias have appeared over the imprint of Macmillan. They have dealt, for instance, with Quotations, with Music and Musicians, and with many more specialised subjects such as Educational Media, Labour Biography and even Diseased English. But the present work is our first attempt to produce a comprehensive general encyclopedia covering the whole field of human knowledge within the compass of a single volume. This is indeed a formidable task, for in these hundred years progress in science and technology has been vast and all too often bewildering. It is my hope and belief – and I speak as one whose Fellowship of the Royal Society is more a mark of his respect for the Sciences than of any personal proficiency in them – that the articles in these pages upon such matters, clearly written in precise and reasonably simple terms, will serve to alleviate that bewilderment. Nor is it only upon scientific questions that this work should provide instant answers. The team of editors has drawn upon a wide range of authoritative skills in compiling succinct entries upon many other aspects of the physical world, upon men and women, upon the arts, upon the ideas which we need to understand in order to appreciate the intellectual currents of our time. More than usual care has been taken to ensure that the hundreds of illustrations, many of them in colour, should enlighten the mind as well as please the eye. Moreover this encyclopedia, taking advantage of the technology which it is one of its functions to elucidate, has been compiled with the aid of a computer, which vastly simplifies the task of revising subsequent editions and keeping them up to date. Accordingly, I have every hope that this new encyclopedia will have a fair chance of following Autenrieth's precedent and being on sale in a hundred years' time. Be that as it may, there is no doubt in my mind that it will help to provide thousands of readers with those many rudiments of knowledge without which even the greatest wisdom is powerless to act.

Harold Macmillan

Preface

"I have taken all knowledge to be my province"
(Francis Bacon in a letter to Lord Burleigh)

Following Bacon, we have tried in this entirely new encyclopedia to cover, in some 25 000 articles and almost 1.5 million words, the whole range of human activity – arts, sciences, ideas, beliefs, history, biography, and geography, as well as sports, hobbies, and pastimes. To accomplish this somewhat daunting undertaking we have made extensive use of our own computerized system, designed to assist in the compilation and typesetting of large reference books. This system has enabled us to create an easily and quickly updatable data base with automatic checking of cross references. It has also enabled us to compile the book by subject, rather than alphabetically, thus ensuring an even and consistent treatment within each subject. Automatic alphabetization meant that the rules of alphabetization could be laid down and followed without fear of human error.

To cover such a wide range of subjects in a relatively compact volume we have also been obliged to discipline our contributors and editors to provide the maximum amount of information in the space allotted to them and to confine themselves to facts rather than opinions. We were also faced with the problem of making complex and sometimes sophisticated concepts intelligible in a limited space to readers with no specialized knowledge of a subject. Our solution to this problem has been guided by three principles. The first is not to distort the facts by oversimplification; the second is to avoid all forms of jargon and to write in simple nontechnical language comprehensible to the general reader; and the last is to ensure that the articles are sufficiently informative to be of value to students. It should, however, be said that a one-volume general encyclopedia containing 25 000 articles cannot provide the depth of knowledge possible in a multivolume set. Each kind of encyclopedia fulfils its own purpose. This book is essentially for quick, easy, and accurate reference. Who was *Gurdjieff* and what did he believe? What is a *capybara* and what does it look like? When did *Martin Luther King* die and who killed him? Where is *Samarkand* and how many people live there? What is the theory of *relativity* about and what are its practical applications? How does Australian Rules football differ from Rugby football and what size ball is used in each? What is the *theatre of the absurd* and who are its chief exponents? It is to this kind of question that we have sought to provide precise and intelligible answers.

Finally, I would like to take this opportunity of thanking all the editors, contributors, and advisers whose industry enables me to claim the accuracy, wide scope, and comprehensibility essential to a reference book of this kind.

A. I.

Notes

1. Cross references

The extensive use of cross references has made the book virtually self-indexing. Few abbreviations have been used in the text and only two symbols occur: an asterisk (*) preceding a word tells the reader that further information on the entry he is reading will be found at the article on the word asterisked; a raised square (□) tells the reader that an illustration relevant to the article he is reading will be found at or near the word so marked; the article itself at that word may also contain pertinent information. The colour plates, to which the reader may also be directed (e.g. see Plate I), are collected at the centre of the book.

2. Chinese transliterations

This encyclopedia follows official Chinese practice in using the pinyin system of transliterating Chinese names. Thus, almost all articles appear under the pinyin transliteration of the subject's name. However, the transliteration of the name in the Wade-Giles system (formerly the system most commonly used in the English-speaking world) will also be found in its alphabetical place, where the reader will be cross referred to the pinyin name under which the article appears. The Wade-Giles equivalent (unless the Wade-Giles and pinyin transliterations are almost identical) and, when it exists, the conventional western name is given in brackets following the pinyin name. A small number of names are so well known in their Wade-Giles or conventional western forms that it has become usual to retain these very familiar spellings. They are Canton, Chiang Kai-shek, China, Chou En-lai, Inner Mongolia, Mao Tse-tung, Peking, Sun Yat-sen, Tibet, Yangtze River, Yellow River.

3. Population figures

For towns and cities the population figures given refer, wherever possible, to the town or city proper rather than the urban agglomeration of which it forms part.

Editor

Alan Isaacs BSc, PhD, DIC, ACGI

Subject Editors

Barbara Barrett BA
John Daintith BSc, PhD
Jonathan Law BA
Thomas Hill Long MA
Elizabeth Martin MA
David Pickering MA
Judith Ravenscroft BA, MPhil
Michael Scott Rohan BA
Jennifer Speake MA, MPhil
Edmund Wright MA, DPhil

Assistant Editors

Hazel Egerton BA
Robert Hine BSc, MSc
Jonathan Hunt MA
Susan O'Neill BSc
Carol Russell BSc
Mary Shields BA, PhD
Jacqueline Smith BA
Anne Stibbs BA
Elizabeth Tootill BSc
Maurice Waite BA
Rosalind Fergusson BA

Illustration and Design

Barbara Barrett BA
Jennifer Speake MA, MPhil
Robert Updegraff (colour section design)

Picture Research

Juliet Brightmore (consultant)
Jacqueline Smith BA
Valerie Walker

Artwork (black and white)

Oxford Illustrators Ltd

Contributors

J. E. Abbott BA
Francis Absalom BSc
Joan Ashley BA, LRAM
Howard H. R. Bailes BA, PhD
Jill Bailey MSc
Helen Banks BSc
Antoinette Bates BA

Alison Bideleux MA

T. J. Boardman BA
Charles Boyle BA, BLitt
O. M. C. Buchan BA, MA
W. P. Cass MA
Kathleen Clarke BA
P. B. Clarke MA, MPhil
J. A. Cudden MA, BLitt
S. R. Elliot BComm
Martin Elliott BSc, ARCS
Jane A. Freeman BA
B. J. Golding BA, PhD
Chris Gray BA
M. B. Hamilton BSc, MPhil
P. W. Hanks MA

Stephen G. Harris, Attorney at Law
G. R. Hawting BA, PhD
Vincent Hetreed MA
Anne Holloway BA
Glyn Alyn Hughes BA
Valerie Illingworth BSc, MPhil
Yvonne Jacobs MA
J. B. Katz MA
Helen Kearsley BA
Susan Laker BA
N. R. M. de Lange MA, DPhil
David Langford MA
Marise Larkin MA
Richard Latham Barrister at Law
Bridget Loney MA
Michael MacCarthy-Morrogh BA
Iseabail Macleod MA
Martin Meggs BA, MSc
Denise Mitchell BA
J. S. Morris BA
Sa'id Mosteshar-Gharai BSc, MSc, PhD, ACA
Jocelyn Murray BA, PhD
H. M. Nahmad MLitt
Ruth D. Newell MSc, DIC
Pastor Stuart Olyott BD, M.Theol, ALBC
John Oram MSc
Stephanie L. Pain BSc
Ann Palmer MA, MPhil
Christopher D. Parker BA, DipLib
Kathleen A. Pavelko BA, MA
I. G. Pears BA

Volodimir Pechenuk MA

David A. Ramsay BSc, MB, ChB
Brian Russell Davis MA,
LLB, Barrister at Law
Elfrida Saviger BSc
Michael Scherk BA
Kenneth Scholes
Nigel Sellar MA
J. H. Shaw
N. Shiel BA, MPhil, FRNS
Adrian Shubert BA, MA
Laurel Thomas Silantien AB, MM
R. L. Sims BA, PhD
Richard Smith BSc, MB, ChB
Jane Southern BSc, MSc
Stella Stiegeler BSc
B. R. Stratton BSc, PhD
Stephanie Stuart BA
Eric A. Taylor MA, MB, BChir,
MRCP, MRCPsych
Ivan Vince BSc, MSc, PhD
Margaret Wallis MA
C. S. P. Wolstenholme MA
Rebecca Woodell BA, MS
R. Wrigley BA

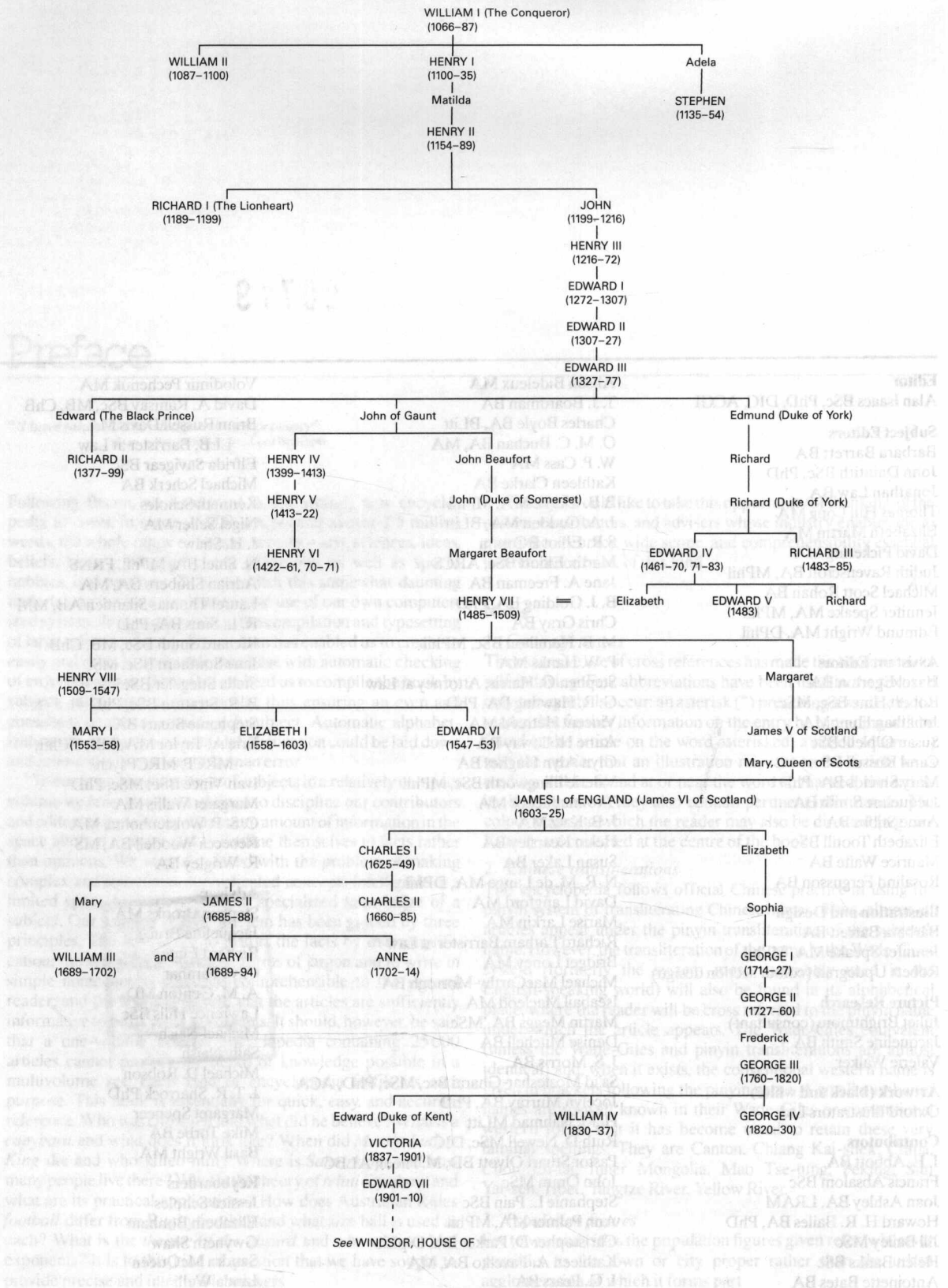
Advisers

Stephen Brooks MA
Jacqueline Bruce
Richard Elms
Clive Farahar
A. M. Genton MD
Lawrence Hills BSc
Michael Naish
Sally Naish
Michael D. Robson
J. T. R. Sharrock PhD
Margaret Spencer
Mike Torbe BA
Basil Wright MA

Keyboarders

Jessica Scholes
Elizabeth Bonham
Gwyneth Shaw
Sandra McQueen
Linda Wells

KINGS AND QUEENS OF ENGLAND (1066-1910) AND OF SCOTLAND (1603-1910)



A

Aachen (French name: Aix-la-Chapelle) 50 46N 06 06E A spa city in W Germany, in North Rhine-Westphalia near the Belgian and Dutch borders. It is an important industrial centre with iron and steel and textile industries. Its technical university was established in 1870. *History:* it was the N capital of Charlemagne's empire and many Holy Roman Emperors were crowned in the cathedral (founded in 796 AD). It was annexed by France in 1801 and passed to Prussia (1815). Extensively damaged during World War II, it was the first major German city captured by the Allies (1944). Population (1987): 239 200.

Aalborg. See Ålborg.

Aalst (French name: Alost) 50 47N 05 12E A town in N central Belgium, on the River Dender. It possesses the country's oldest town hall (begun 1200). Industries include textiles and brewing. Population (1988 est): 76 714.

Aalto, Alvar (1898–1976) Finnish architect and furniture designer. Aalto established a distinctive "Finnish" style, with his use of timber and high pitched roofs. He established his reputation with the tuberculosis sanatorium (1923–33) at Paimio and founded his own furniture-making firm. After World War II he became increasingly individualistic and his hall of residence (1947–48) at the Massachusetts Institute of Technology (USA), the town hall at Säynätsalo (1949–52), and the Helsinki Hall of Culture (1958) are among his best work.

Aaltonen, Wäinö (1894–1966) Finnish sculptor. He is known for the portrait sculptures of the Finnish Olympic runner Paavo Nurmi (1924) and of Sibelius (1928).



AARDVARK This strange animal feeds entirely on termites and ants. It has very few teeth, which are weak and peg-shaped and specialized to cope with its diet.

aardvark (Afrikaans: earth pig) A nocturnal African mammal, *Orycteropus afer*, also called ant bear. It is about 1.5 m long, lives in grassland, and has a long snout, large ears, and a thick tail. Its strong claws are used to dig burrows and tear open the mounds of termites, which are picked up with its long sticky tongue. The aardvark is the only member of its order (*Tubulidentata*).

aardwolf A nocturnal mammal, *Proteles cristatus*, that lives in open and bushy regions of southern and eastern Africa. It resembles a small striped hyena, about 50 cm high at the shoulder, but has small simple teeth suitable for feeding on termites (which form the main part of its diet). It spends the day in burrows, often those deserted by other animals. Family: *Hyaenidae* (hyenas); order: *Carnivora*.

Aarhus. See Århus.

Aaron In the Old Testament, the elder brother of Moses,

whom he assisted as leader of the Israelites in their journey from Egypt to the Promised Land (Canaan). Although he yielded to demands to build the *golden calf, he and his descendants were confirmed by Jehovah as priests of the Hebrew nation.

abaca (or Manila hemp) A fibre obtained from the leafstalks of a palmlike plant, *Musa textilis* of the Philippines, related to the banana. It is used for ships' ropes and similar objects as it is buoyant and resistant to the action of sea water.

abacus A calculating device consisting of balls strung on wires or rods set in a frame. It is probably of Babylonian origin but its use declined in Europe with the introduction of *Arabic numerals in about the 10th century AD. It is still in use in the Middle East and Japan.

Abadan 30 20N 48 15E A city in SW Iran, on an island in the Shatt (river) al-Arab. Much of Iran's oil is brought here by pipeline for refining or exporting, although its oil installations were heavily damaged during the Gulf War. Population (1985 est): 294 068.

Abakan 53 43N 91 25E A city in S central Russia. It is in a coalmining district and has metal, footwear, and food processing industries. Population (1983 est): 143 000.

abalone A marine *gastropod mollusc belonging to the widely distributed family *Haliotidae*, of rocky coasts, also called ear shell or ormer. Up to 30 cm long, their dishlike shells have a row of holes along the outer edge through which deoxygenated water and waste products are expelled from the body. The large foot is considered a delicacy and the shells are used as mother-of-pearl for ornaments.

abandonment In law, the voluntary relinquishment of property or rights without passing them on to another. For example, when a ship is left crewless and adrift, notice of abandonment can be issued to the insurers and a claim made for a constructive total loss (as opposed to an actual total loss if it sinks).

Abbadids A Muslim dynasty in Andalusia (1023–91). Abbad I (reigned 1023–42) declared Seville's independence from Córdoba (1023) and by war and intrigue enlarged his territory. Abbad II (reigned 1042–69) continued this expansion, but failed to capture Córdoba. He is remembered for his delight in a flower garden planted over his enemies' skulls. Abbad III (d. 1095; reigned 1069–91), poet and king, made Seville an important cultural centre. The hostility of Spanish Christians forced him into an alliance with the *Almoravids, who later deposed him (1091) and exiled him to N Africa, where he died.

Abbado, Claudio (1933–) Italian conductor. Associated with *La Scala, Milan, since 1971, he was also director of the London Symphony Orchestra (1983–86) and of the Vienna State Opera (1986–91). In 1989 he succeeded von Karajan as conductor of the Berlin Philharmonic.

Abbas, Ferhat. See Front de Libération nationale.

'Abbasids A powerful dynasty of *caliphs, which ruled Islam from 750 AD to 1258. They were descended from Mohammed's uncle al-Abbas (566–652). In 750 they seized power from the Umayyads in Damascus and moved their capital to Baghdad. The 'Abbasids were known for their imposition of strict religious orthodoxy and their patronage of scholarship. Under *Harun ar-Rashid (786–809) the dynasty was at its peak. By the 10th century its powers were declining as provincial governors asserted their independence of Baghdad, which was still, however, an important

commercial, cultural, and intellectual centre. Baghdad fell to the Mongols in 1258 and a branch of the 'Abbasids was installed in Cairo until that city fell to the *Ottomans in 1517. The last of the line died in 1538.

Abbas (I) the Great (1557–1628) Shah of Persia (1588–1628) of the Safavid dynasty, who greatly extended Persian territory by defeating the Uzbeks (near Herat, 1598) and the Ottomans (1605, 1618). He created a standing army, established the Persian capital of Isfahan, and was an effective patron of the arts.

Abbas II (1874–1944) The last Khedive of Egypt (1892–1914), who supported nationalist opposition to British influence and was deposed when Britain declared a protectorate over Egypt in 1914.

Abbeville 50°06N 1°57E A town in N France, in the Somme department situated near the mouth of the River Somme. It was here that Louis XII married Mary, sister of Henry VIII of England. Notable buildings include a gothic church (15th–17th centuries) and there are brewing, sugar-refining, and carpet industries. Population (1982 est): 25 998.

Abbevillian A culture of the Lower *Palaeolithic in Europe. It is characterized by crude stone hand axes made by hammering flakes off a flint with another stone. Named after *Abbeville in France, the Abbevillian also appears in Britain but in Africa similar early hand axes are designated *Acheulian.

Abbey Theatre A Dublin theatre opened in 1904 and closely associated with the *Irish Literary Renaissance. Annie Horniman (1860–1937), a friend of W. B. Yeats, initiated the building of the theatre as a home for the Irish National Dramatic Society, a company founded by the actors Frank Fay (1870–1931) and his brother W. G. Fay (1872–1947). The Abbey Theatre produced plays by Yeats, Lady Gregory, Synge, George Russell (pseudonym AE; 1867–1935), Shaw, and (somewhat later) O'Casey and gained an international reputation as a repertory theatre dedicated to performing mainly plays by Irish playwrights on Irish subjects. The original playhouse burnt down in 1951, but a new theatre was built and opened in 1966.

Abd Allah (1846–99) Sudanese leader, known as the Khalifa (caliph). In 1885 he succeeded Muhammad Ahmad (see Mahdi, al-) as leader of the uprising against the Egyptian government of the Sudan. He was defeated by *Kitchener in 1898 and was killed in subsequent mopping-up operations.

'Abd al-Malik ibn Marwan (c. 646–705 AD) Fifth *caliph (685–705) of the Umayyad dynasty, who subdued opposition to Umayyad rule of Islam. He defeated the northern Arab tribes in 691 and, with the help of his general al-Hajjaj, overcame resistance in Iraq (692). In 697 he captured Carthage. During his reign, Arabic became the administrative language of the empire and a new Muslim currency was coined.

'Abd ar-Rahman III an-Nasir (891–961 AD) Emir (912–29) and first caliph (929–61) of the Umayyad Arab dynasty of Córdoba. He conquered Muslim Spain and also campaigned against the Christian north: in 924 he took Pampalona, the capital of Navarre, but was defeated by the King of León in 939. Under his rule, Córdoba became a noted centre of learning and the arts.

Abdelkader (c. 1807–83) Algerian nationalist, who resisted the French invasion. He became Emir of Mascara in 1832 and gained control of the Oran region. Victories against the French (1835–37) facilitated a further extension of his territories. Defeated in 1841, he withdrew to Morocco and finally surrendered to the French in 1847.

abdomen In mammals (including man), the region of the body extending from the lower surface of the diaphragm to the pelvis. The abdomen contains the intestines, liver, pancreas, kidneys, gall bladder, and—in females—the ovaries and womb. In arthropods, the abdomen is the posterior section of the body, which is usually segmented.

Abdulhamid II (1842–1918) Sultan of the Ottoman Empire (1876–1909), notorious for the Armenian massacres (1894–96). Following defeat by Russia (1877), he dismissed parliament and suspended the constitution. Thereafter he ruled autocratically, instituting many administrative reforms, especially in education, and opposing western interference in Ottoman affairs. The revolt of the *Young Turks in 1908 brought about his deposition.

Abdullah (1882–1951) Emir of Transjordan (1921–46) and first King of Jordan (1946–51). He fought in the Arab revolt against Turkish rule during World War I. He was assassinated in 1951.

Abdul Rahman, Tunku (1903–90) Malaysian statesman. He was the first prime minister of independent Malaya (1957–63) and of Malaysia (1963–70). He led the Alliance Party to electoral victory in 1955, becoming chief minister and negotiating Malayan independence from Britain (1957) and the formation of Malaysia (1963).

Abel. See Cain.

Abel, Sir Frederick Augustus (1827–1902) British chemist. He improved guncotton manufacture and helped Sir James Dewar (1842–1923) to invent cordite. Abel also invented an apparatus to determine the flashpoint of petroleum. He received the Bessemer medal (1897) for research into steel manufacture.

Abel, Niels Henrik (1802–29) Norwegian mathematician. One of the great mathematical problems of Abel's day was to find a general solution for a class of equations called quintics. Abel solved the problem by proving that such a solution was impossible, but died before his achievement could be recognized.

Abelard, Peter (1079–1142) French philosopher. His ill-fated marriage with Heloise, niece of a canon of Paris, ended when Abelard was castrated by thugs hired by the canon (1118). He retired to a monastery and she became a nun. Abelard turned his formidable powers as a logician to establishing a coherent relationship between faith and reason (see scholasticism). A quarrelsome disputant, Abelard was perpetually in trouble with the church authorities; his *Sic et Non* (*For and Against*), for example, outraged opponents by listing points on which acknowledged authorities differed.

abelmosk A flowering plant, *Hibiscus moschatus* (*H. abelmoschus*), native to India. It has large flowers with yellow petals and red centres and grows to a height of 60–180 cm. Abelmusk is cultivated for its seeds, which yield musk used in perfumes, and for its young fruits, which are used as vegetables. Family: *Malvaceae* (mallow family).

Abeokuta 7°10N 3°26E A city in SW Nigeria. It is an important quarrying and agricultural centre but manufacturing is limited. Population (1983): 308 800.

Abercrombie, Sir (Leslie) Patrick (1879–1957) British town planner and architect. His first venture was the replanning of Dublin (1913) but he is best known for his detailed schemes for London, *The County of London Plan* (1943) and *The Greater London Plan* (1944). Later plans include those for Edinburgh, Hull, and the West Midlands. He was professor at Liverpool University (1915–35) and London University (1935–46).

Abercromby, Sir Ralph (1734–1801) British general, whose successes against the French in the Netherlands and the West Indies during the French Revolutionary Wars helped to restore the morale of the British army. He brilliantly organized the landing at Aboukir of the Anglo-Turkish force that drove the French out of Egypt but was killed in battle a few days later.

Aberdare 51°43N 3°27W A town in South Wales, in Mid Glamorgan. Light industries, including the manufacture of electrical cables, have replaced coalmining as the principal economic activities. Population (1982 est): 38 000.

Aberdeen 57 10N 2 04W A city, port, and former county of NE Scotland, the administrative centre of Grampian Region situated on the North Sea coast between the mouths of the Rivers Don and Dee. Aberdeen is an old cathedral city with a university dating from 1494 (King's College). Fishing has always been important, as has the working of local granite; the "Granite City" provided stone for London's cobbled streets in the 18th century. Other industries include shipbuilding, paper making, textiles, chemicals, and engineering. Aberdeen's proximity to North Sea oil has transformed it into an important service centre for the oil industry. Aberdeen has well-known research institutes for fisheries, soils, and animal nutrition. Population (1988): 205 180.

Aberdeen (or Aberdeenshire) A former county of NE Scotland. Under local government reorganization in 1975 it became part of Grampian Region.

Aberdeen, George Hamilton-Gordon, 4th Earl of (1784–1860) British statesman; prime minister (1852–55). He was foreign secretary in Sir Robert *Peel's Conservative government (1841–46) and supported the repeal of the *Corn Laws (1846), which led Peel's supporters to break away from the Conservative Party. Aberdeen succeeded Peel as leader of the "Peelites" (1850) and became prime minister of a coalition government of Whigs and Peelites. He was forced to resign because of his mismanagement of the *Crimean War.

Aberdeen Angus A breed of polled (naturally hornless) beef cattle, originating from NE Scotland. Short, stocky, and usually black (some have red coats), they are hardy and adapt well to different climates. Angus bulls are commonly mated with dairy breeds to produce a polled beef cross.

Aberdeen terrier. See Scottish terrier.

Aberfan 51 42N 3 21W A coalmining village in South Wales, in Mid Glamorgan. In 1966 mining waste from a giant slag heap engulfed part of the village (including the school), with the loss of 144 lives, including 116 children.

aberration 1. A defect in a lens or mirror that causes blurring or distortion of the image. The three most important types are spherical aberration, chromatic aberration, and *astigmatism. Spherical aberration is caused by rays from the outside of the lens or mirror being brought to a focus at a different point from those nearer to the centre. In chromatic aberration, different colours are focused at different points, since the refractive index of glass varies with the wavelength (see achromatic lens). 2. An apparent displacement in the position of a star or other heavenly body due to the motion of the observer with the earth in its orbit round the sun.

Aberystwyth 52 25N 4 05W A town and resort in Wales, in Dyfed on Cardigan Bay. A college of the University of Wales was established in 1872 and the National Library of Wales, in 1911. Population (1981): 8666.

Abidjan 5 19N 4 00W The former capital of Côte d'Ivoire, off the Gulf of Guinea. A small village until developed by the French in the 1920s, it became the capital in 1934. It is now an important port, linked to the sea by the Vridi Canal. The National University was founded in 1964. Population (1982 est): 1 850 000.

Abilene 32 27N 99 45W A city in the USA, in central Texas. It has two universities and an air force base. A major trading centre for agricultural products and livestock, it has electronic and food-processing industries. Population (1980): 98 315.

Abingdon 51 41N 1 17W A market town in S England, in Oxfordshire on the River Thames. Its many historical buildings include the remains of a Benedictine abbey dissolved by Henry VIII. Among its varied industries are brewing and the manufacture of leather goods. Population (1989): 28 622.

Abjuration, Act of (1581) The declaration of independence by the United Provinces. The Dutch thus renounced their alle-

giance to Spain. See also Revolt of the Netherlands.

Abkhaz Autonomous Republic (or Abkhazia) An administrative division of Georgia between the Black Sea and the Caucasus Mountains. Most of the population is Abkhazian or Georgian and lives along the narrow subtropical coastal lowland. The region is predominantly agricultural, producing tobacco, tea, and citrus fruits, and the chief mineral is coal. There are several health resorts. *History:* invaded by the Romans, it later gained independence before coming under the Ottoman Turks in the 16th century. It became a Russian protectorate in 1810 and an autonomous republic of the Soviet Union in 1921. Area: 8600 sq km (3320 sq mi). Population (1986): 530 000. Capital: Sukhumi.

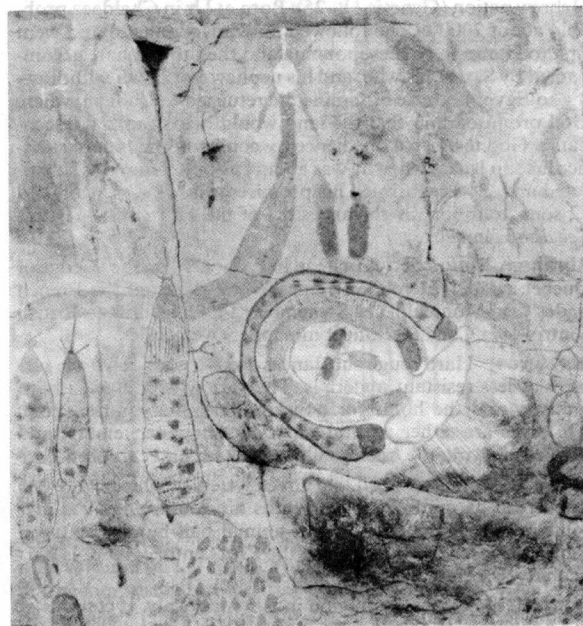
ABM. See antiballistic missiles.

Äbo. See Turku.

Abolition Movement The campaign to abolish *slavery in the USA. Opponents of slavery formed an antislavery society in 1833. They helped runaway slaves escape to Canada via their secret *Underground Railroad route; such publications as *Uncle Tom's Cabin* by Harriet Beecher *Stowe unveiled the slavery issue, which was ultimately settled by the *Civil War.

Abomey 7 14N 2 00E A town in S Benin. It was the capital of the Yoruba kingdom of Dahomey until captured by the French (1893). Population (1982): 54 418.

Abominable Snowman A creature, also called Yeti (Tibetan: Snowman), that is believed to live at high altitudes in the Himalayas. There have been no authenticated sightings, but gigantic footprints in the snow have been photographed (which may have other natural causes).



ABORIGINES This piece of aboriginal art painted on a rock wall in the Kimberley area of northwest Australia represents a Dream-Time person created at the primordial dawn.

Aborigines 1. The dark-skinned hunters and gatherers who inhabited Australia before European settlement. There were about 500 Aboriginal tribes, which were linguistic groups having no social or political unity. The main social units were seminomadic bands. They were a diverse people culturally but, in general, material culture was rudimentary, while kinship organization and terminology were complex.

Political affairs were conducted by older men. Male initiation and circumcision were commonly practised. Aboriginal mythology was generally rich and elaborate and included accounts of creation during the primordial dawn, which they call "Dream Time." There are roughly 136 000 people of Aboriginal descent in Australia. The small proportion who maintain a nomadic way of life are threatened by encroachments upon their lands as these are opened up for mineral exploitation. A movement to protect Aborigines' rights has gathered momentum and in 1971 the first Aborigine MP was elected. 2. Any indigenous people, especially as contrasted with invaders or colonizers.

abortion The expulsion or removal of a fetus from the womb before it is capable of independent survival. In the UK a fetus is not legally viable until 24 weeks old. Expulsion of a dead fetus at any later time is called a stillbirth. Abortion may be natural, i.e. spontaneous (a miscarriage), or induced for therapeutic or social reasons. In the UK it is illegal to induce an abortion unless it is carried out under the terms of the Abortion Act (1968): two doctors must agree that termination of the pregnancy is necessary (e.g. to prevent the birth of a severely deformed or abnormal child or to preserve the health of the mother) and the operation must be performed in approved premises. Methods used include *dilatation and curettage, suction of the products of conception using a vacuum aspirator, and the administration of certain drugs.

Aboukir, Battle of (25 July, 1799) The land battle in which Napoleon defeated the Ottoman Turks during his occupation of Egypt. The 7000-strong French army defeated the unruly Turkish force of 18 000.

Aboukir Bay, Battle of. See Nile, Battle of the.

Abraham In the Old Testament, patriarch and founder of the Hebrew nation (Genesis 11–25). Born at Ur in Chaldea probably about 2000 BC, he followed a divine command and went first to Haran in N Mesopotamia and then to Canaan, accompanied by Sarah, his wife, and his nephew Lot. After withdrawing to Egypt because of famine, he returned to Canaan, where God promised him that the land would belong to his descendants. God tested his obedience by commanding him to sacrifice his son Isaac; when he was about to obey, a ram was substituted and God reaffirmed his promises. Isaac's son Jacob had 12 sons, traditionally the ancestors of the 12 *tribes of Israel. See also Ishmael.

Abraham, Plains of A plateau in E Canada, on the W edge of Quebec citadel. Here Gen James Wolfe defeated the French under Gen Montcalm (13 September, 1759), leading to British control over Canada. Both commanders were killed.

abrasives Hard rough substances used to wear down the surfaces of less resistant materials. They are widely used in both industry and the home for polishing, cleaning, and shaping. Abrasives are either natural, such as sandpaper, emery, and pumice, or synthetic, such as silicon carbide and carborundum.

abraxas A mystic word, the Greek letters of which make 365 when read as numbers. Such words are found engraved and sometimes personified as a half-animal half-human deity on gemstones used as charms until the 13th century AD. It is particularly associated with *Gnosticism.

Abruzzi (or *Abruzzo*) A region in E central Italy. It consists of the Apennines in the W and a coastal region in the E. Agriculture is limited, producing mainly cereals. Manufacturing industry is primarily for local needs but there is a large fishing fleet. Area: 10 794 sq km (4167 sq mi). Population (1987 est): 1 257 988. Capital: L'Aquila.

Absalom. See David.

Absalon (or *Axel*; c. 1128–1201) Danish ecclesiastic and statesman, who was chief adviser to Valdemar I and Canute VI (1163–1202; reigned 1182–1202) successively and the founder of Copenhagen. His campaign against the Wends in 1169 and on the S Baltic coast extended Danish territories. As Archbishop of Lund from 1177, he contributed to the systematization of

Danish ecclesiastical law.

abscess A pus-filled cavity surrounded by inflamed tissue, usually caused by bacterial infection. Abscesses may form anywhere in the body, including the skin, gums, and internal organs. They usually require draining and sometimes also antibiotics.

abscission The separation of a plant organ, such as a fruit or a leaf, from its stem. Individual cells at the base of the organ weaken by losing calcium from their cell walls and a sealant layer of cells protects the newly exposed surface. Abscission is controlled by plant hormones (see auxin).

absinthe A highly alcoholic drink made from spirits infused with herbs, including aniseed and wormwood. Absinthe has been banned in many countries because of the harmful effects of wormwood, and substitutes, known by different names (e.g. anis, pastis), are drunk instead. Absinthe is pale green and becomes cloudy when diluted with water.

absolute magnitude. See magnitude.

absolute zero The lowest temperature that can theoretically be attained. It is equal to -273.15°C or 0 K. In practice, absolute zero can never be reached, although temperatures of a few thousandths of a degree above absolute zero have been achieved. See cryogenics.

absolution. See confession.

absolutism A political system, characteristic of European monarchies between the 16th and 18th centuries, in which the sovereign attempted to centralize power in his own person. *Louis XIV of France is often regarded as the typical absolute monarch. Justified by the theory of the *divine right of kings, absolutism was associated in the 18th century with enlightened despotism (see Enlightenment) but was challenged by the ideals of the *American and *French Revolutions.

absorbed dose. See gray.

absorption The assimilation of a substance by a solid or liquid, with or without chemical reaction. Moisture, for instance, can be absorbed from air by dehydrating agents, such as sulphuric acid. Certain porous solids, such as charcoal and zeolites, are able to absorb large quantities of gas. The process is distinguished from *adsorption in that the absorbed substance is held in the bulk of the solid rather than on a surface.

abstract art A nonobjective and nonrepresentational form of art. Tendencies to abstraction can be found in almost any age or school of art, particularly oriental and decorative art. However, the widespread use of *photography in the 20th century to create a visual record of people, places, events, etc., made the representational function of painting less important. This shift of emphasis released artists from the confines of realism, enabling them to explore the fields of abstraction. In about 1910 *Kandinsky produced the first abstract watercolour, heralding the free expression of such artists as Jackson *Pollock; in contrast, *cubism led to the geometric abstract style of such painters as *Mondrian and *Malevich. A characteristic of abstract sculpture is the use of new materials, such as plastic, glass, and steel. See also action painting; constructivism; minimal art; op art; orphism; Stijl, de; suprematism.

abstract expressionism. See action painting.

Abstraction-Création An international group of abstract geometric artists, active from 1931 to 1936 and based in France under Georges Vantongerloo (1886–1965) and Auguste Herbin (1882–1960). It was also the name of their annual journal and exhibition.

Absurd, Theatre of the. See Theatre of the Absurd.

Abu al-Wafa (940–98 AD) Persian mathematician and astronomer, who made notable contributions to *trigonometry. He invented the secant and cosecant functions (the inverse of the sine and cosine), drawing up accurate tables for them and for the sine and tangent functions.

Abu Bakar (c. 1843–95) Sultan of Johore (now in Malay-

sia) from 1885 to 1895. He became ruler of Johore in 1862, a year after Britain gained control of the state's foreign affairs, and contributed greatly to the maintenance of internal stability, fostering trade and agricultural development.

Abu Bakr (c. 573–634 AD) The first *caliph (632–34), known as as-Siddiq (the righteous). One of the earliest Muslims, Abu Bakr accompanied Mohammed to Medina and became caliph on his death. As caliph he defeated the rebellious tribes and began the invasion of Syria and Iraq.

Abu Dhabi. See United Arab Emirates.

Abu Hanifah (700–67 AD) Influential Muslim theologian and teacher of jurisprudence. Of Persian origin, he lived in Kufa (now in Iraq), where he died, perhaps in prison, after refusing to accept a post under the ruling dynasty. He left virtually no writings, but was known as a champion of the use of reason and analogy in law. His teachings form the basis of one of the two orthodox schools of the *Sunnites.

Abuja 9 10N 7 06E The intended federal capital of Nigeria. In 1989 the new city was still in an early stage of construction. Agriculture is the most important activity with some local manufacturing.

Abu Nuwas (c. 762–c. 813 AD) Arab poet. Although he learned his craft from older poets and from the Bedouins, he abandoned traditional poetic forms for sophisticated lyrics celebrating the pleasures of wine and erotic affairs with women and boys. A favourite at the Abbasid court of *Harun ar-Rashid at Baghdad, he is portrayed in the *Arabian Nights* as a free-thinking pleasure-seeker.

Abu Simbel A monumental rock-cut temple complex constructed about 1250 BC by Pharaoh Ramses II in *Nubia. Four colossal statues of Ramses, each 20 m (66 ft) high, at the entrance were raised to escape inundation by Lake Nasser (1968).

Abutilon A genus of tropical and subtropical perennial herbs and shrubs (over 100 species). The plants reach a height of 30–150 cm and have drooping stems with bell-shaped flowers. Some species are grown as ornamental plants. *A. avicennae* is cultivated in China for fibre (China jute). Family: *Malvaceae* (mallow family).

Abydos An ancient city in Upper Egypt, founded before 3000 BC and continuously occupied until Roman times. It was a principal centre of *Osiris worship. The most impressive remaining structure is Seti I's Great Temple (c. 1300 BC), with shrines for six deities and the god pharaoh. The Table of Abydos, a king list carved on its walls, provides information about earlier pharaohs.

abyssal zone The ocean depths lying below 1000 m. It is the zone of greatest ocean depth, lying seawards of the continental slope (see continental shelf). Since no light penetrates to these depths, they contain relatively little marine life and the temperature never rises above 4°C. The ocean depths below 6000 m are sometimes classified as the **hadal zone**.

Abyssinia. See Ethiopia.

Abyssinian cat A breed of short-haired cat, many individuals of which are descendants of one exported to the UK from Abyssinia in the 19th century. They have slender bodies and wedge-shaped heads with large ears. The reddish-brown coat has black or brown markings and the eyes are green, yellow, or hazel. The Red Abyssinian is a rich copper-red.

Acacia A genus of tropical and subtropical trees and shrubs (over 700 species), particularly abundant in Australia (see wattle). Acacias have clusters of yellow or white flowers, produce long flattened pods, and usually have compound leaves consisting of many small leaflets. In some species the leaflets do not develop and the leafstalks assume their function, being broad and flattened. These species are often very spiny. Acacias yield a number of useful products: gums (including *gum arabic), tannins, dyes, and woods suitable for furniture. Many are grown as ornamental plants. Family: **Leguminosae*.

Académie Française The French literary academy founded

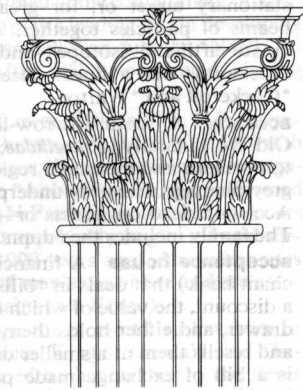
by Cardinal de Richelieu in 1634 (incorporated 1635), to preserve the French literary heritage. Its membership is limited at any one time to 40 "immortals," who have included Corneille, Racine, and Voltaire. It is continuously engaged in the revision of the official French dictionary.

Academy, Greek The college founded (c. 385 BC) near Athens by Plato, which continued in various guises until its dissolution by Justinian in 529 AD. It is famed mainly for contributions to philosophy and science. At first metaphysics and mathematics predominated but in the mid-3rd century BC philosophical scepticism took precedence.

Academy of Motion Picture Arts and Sciences An organization founded in Hollywood in 1927 to raise the artistic and technical standards of the film industry. It is responsible for the annual presentation of the Academy Awards, popularly known as Oscars, for excellence in acting, writing, directing, and other aspects of film production.

Acadia A former French colony in E Canada centred on present-day Nova Scotia. The original French settlement was destroyed by the British in 1613. Conflict over Acadia between French and British continued until 1763, when it fell finally to the British. Many Acadians were deported by the British and resettled in Louisiana, where their descendants, called Cajuns, still live. Longfellow's poem *Evangeline* tells their story.

Acanthus A genus of perennial herbaceous plants (about 50 species), mostly native to the Mediterranean region: *A. mollis* and *A. spinosus* are the species most commonly planted in temperate gardens. Growing to a height of 1–1.5 m, they have tough leaves, often spiny and with deeply cut margins, and spikes of purple and white flowers. The fruit—a capsule—explodes to disperse the seeds. Family: *Acanthaceae*.



ACANTHUS The spiky leaf of *Acanthus spinosus* inspired the decorative architectural motif used on Corinthian and Composite columns.

acanthus A decorative element of classical architecture. It is mainly found on the capitals of Corinthian and Composite columns, comprising heavy carvings of stylized leaves.

a cappella (Italian: in the church style) A marking on a piece of music for several voices, indicating that it is to be sung unaccompanied.

Acapulco 16 51N 99 56W A seaside resort in S Mexico, on the Pacific Ocean. Known as the Riviera of Mexico, it has fine sandy beaches and many hotels. Population (1985): 638 000.

ACAS (advisory, conciliation and arbitration service) A public body set up by parliament in 1975 to work with trade unions and employers to settle disputes and promote methods of collective bargaining.

Accademia The principal art gallery in Venice, opened in 1756 to display work by Venetian artists. Formerly a

monastery, it houses masterpieces by such painters as Bellini, Titian, and Canaletto in a collection with items dating from the 13th century.

acceleration The rate of change of a body's velocity. Linear acceleration is the rate of change of linear velocity. It is measured in such units as metres per second per second. Angular acceleration is the rate of change of angular velocity and is measured in such units as radians per second per second.

acceleration of free fall (g) Formerly called acceleration due to gravity; the acceleration of a falling body when air resistance is neglected. Caused by gravitational attraction between the body and the earth, it varies slightly at different points on the earth's surface. Its standard value is 9.806 metres per second per second.

accelerator principle The economic principle that investment will accentuate economic booms and *depressions. As income rises, businesses gain confidence in the expected future level of demand and increase their investment in plant and equipment; this pushes up employment in the capital-goods industries and heightens the boom. The converse applies to a slump.

accelerators Large machines that are used for accelerating beams of charged particles (electrons, protons, etc.) to very high speeds primarily for research in *particle physics. The particles are accelerated by electric fields either in a straight line, as in the *linear accelerator, or in a circle, as in the *cyclotron, *synchrotron, and *synchrocyclotron. The beam is confined to its path by magnetic fields. The energies of the particles are measured in millions of electronvolts (MeV) or giga-electronvolts (1000 MeV = 1 GeV), some modern accelerators attaining several hundred GeV. Particle accelerators are used by directing a beam of particles at a stationary target or, for greater energy, by colliding two beams of particles together. Accelerators are also used to create artificial isotopes and in *radiotherapy. The first accelerator was a linear accelerator, produced in 1932 by *Cockcroft and *Walton.

accentor A small sparrow-like songbird belonging to an Old World family (*Prunellidae*; 12 species), usually restricted to northern and mountain regions. It has a red or brownish-grey plumage with grey underparts, often streaked or striped. Accentors feed on insects or—in winter—seeds and berries. The family includes the *duncock (hedge sparrow).

acceptance house A financial institution (usually a merchant bank) that deals in *bills of exchange. It buys them at a discount, the value of which depends on the standing of the drawer, and either holds them to maturity or endorses them and resells them at a smaller discount. An **acceptance credit** is a bill of exchange made payable to an exporter by his foreign customer and drawn on an acceptance house. The exporter can discount the bill to receive payment before the bill falls due.

accessory In law, a person who incites another to commit a crime but is not present when the crime is committed is an accessory before the fact. (An abettor is distinguished from an accessory before the fact by being present at the commission of a crime.) A person who assists another whom he knows has committed a crime is an accessory after the fact.

Accius, Lucius (170–c. 85 BC) Roman tragic dramatist, admired for his melodramatic plots and lively rhetorical style. About 700 lines survive from over 40 of his plays, mainly on Greek mythological themes. He also wrote treatises on poetry and grammar.

accomplice In law, a person concerned with one or more other persons in committing a crime, either as its actual perpetrator or as an abettor or *accessory.

Accoramboni, Vittoria (1557–85) Italian woman, whose life story was portrayed by John *Webster in *The White Devil* (1612) and by Ludwig Tieck in his novel *Vittoria Accoramboni* (1840). She married the Duke of Bracciano (d. 1585)

after the murder of her first husband by her brother in 1581. She was killed by Ludovico Orsini, a relative of Bracciano.

accordion A portable musical instrument invented in Berlin in 1822. A member of the reed-organ family, the accordion is a boxlike instrument in which bellows operated by the left arm force air through reeds mounted in end panels. In the modern **piano accordion** a small piano-like keyboard played by the right hand supplies the melody, while buttons operated by the left hand produce chords. The instrument is supported in front of the player's body by straps.

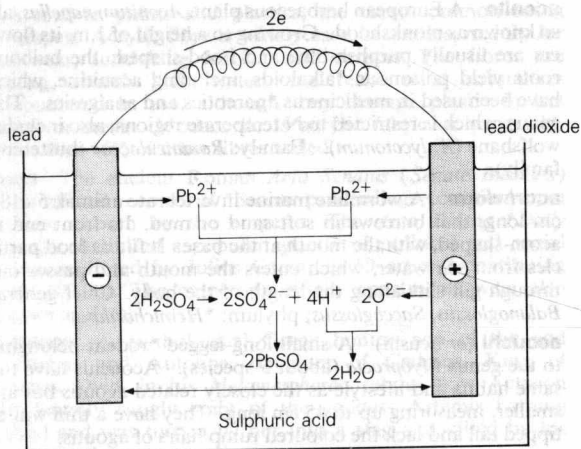
accountancy The profession of preparing, verifying, and interpreting the accounts of a business. The main branches are bookkeeping, auditing, financial accounting, and cost accounting. Bookkeeping is concerned with the preparation of records of all the financial transactions undertaken by a firm or a self-employed person, usually on a day-to-day basis. The books of account kept by a firm usually include a cash book to record all payments and receipts, a nominal ledger in which all transactions with named clients, suppliers, etc., are recorded, a purchase and a sales ledger, and sometimes purchase and sales day books. Auditing is the process of verifying that the bookkeeping and the preparation of accounts have been carried out accurately and truthfully. In most countries, including the UK and the USA, auditing is carried out by an independent firm of accountants, which is required to certify that a company's accounts are a true record of its transactions during the past year. Financial accounting consists of analysing a firm's transactions and summarizing them in the firm's annual accounts. These will normally consist of a profit and loss account and a balance sheet. The former lists the total sales, total purchases, opening and closing value of the stock (or work in progress), and the expenses, enabling the profit or loss in the period to be calculated. The balance sheet lists the firm's assets and liabilities. Cost accounting identifies the costs of production at all stages of a manufacturing process. Unlike financial accounting it can be used to measure economic performance and the relative efficiency of the constituent parts of a business.

In the UK, members of the Institute of Chartered Accountants (founded 1880) specialize in financial accounting and auditing and have been trained with a professional partnership. Members of the Association of Certified Accountants (1904), who train in commerce, industry, or the public services, are also empowered to audit accounts. Members of the Institute of Cost and Management Accountants (1919) specialize in cost accounting and are not authorized auditors.

Accra 5°32'N 0°12'W The capital of Ghana, a port on the Gulf of Guinea. It is built on the site of three 17th-century trading fortresses founded by the English, Dutch, and Danish. It became the capital of the Gold Coast in 1877. Following the opening of a railway to the agricultural hinterland (1923) it developed rapidly into the commercial centre of Ghana. The University of Ghana was founded in 1948 at Legon, just outside Accra. Population (1984): 964 879.

Accrington 53°46'N 2°21'W An industrial town in NW England, in Lancashire. It specializes in textiles, textile and general engineering, and brick manufacturing. Population (1981): 35 891.

accumulator A cell or battery that can be recharged by passing a current through it in the direction opposite to that of the discharge current, thus reversing the chemical changes occurring during discharge at the electrodes. The most common example is the lead-acid accumulator used in motor vehicles. This consists, when charged, of a positive lead dioxide electrode and a negative spongy lead electrode, both immersed in sulphuric acid with a relative density of 1.20–1.28. During discharge lead sulphate forms on the electrodes and the acid density falls.



ACCUMULATOR A single cell of a lead (Pb) sulphuric acid (H_2SO_4) accumulator. The reactions shown are those taking place during discharge. During charging the lead sulphate (PbSO_4) is converted back to lead dioxide (PbO_2) and sulphuric acid, the density of which rises.

Nickel-iron (NiFe) accumulators with an electrolyte of 20% potassium hydroxide are also used. The rechargeable batteries used in cordless devices are usually nickel-cadmium cells in which a nickel hydroxide cathode and a cadmium anode are immersed in a potassium hydroxide electrolyte. These are light in weight and can be sealed. *See also* electric car.

Acer. *See* maple.

acetaldehyde (or ethanal; CH_3CHO) A colourless liquid *aldehyde with a pungent smell, formed by the oxidation of *ethanol. On further oxidation it becomes acetic acid.

acetic acid (or ethanoic acid; CH_3COOH) The *acid contained (3% to 6%) in vinegar. It can be made from alcohol but is commonly made from *acetaldehyde and used in plastics.

acetone (or propanone; CH_3COCH_3) A colourless inflammable liquid used as a solvent, for example in nail-polish remover and in the manufacture of rayon.

acetylcholine A chemical that transmits impulses between the ends of two adjacent nerves and is confined largely to the parasympathetic nervous system. Acetylcholine is released on stimulation of the nerve and diffuses across the gap of the *synapse to stimulate the adjacent nerve. It is rapidly converted to an inactive form by the enzyme cholinesterase, permitting the passage of a further impulse.

acetylene (or ethyne; C_2H_2) A colourless toxic inflammable gas. The two carbon atoms are joined by a triple bond and it forms the basis of a series of compounds called *alkynes. Acetylene is made by the action of water on calcium carbide and is widely used as a starting material for many organic compounds. Because of its high flame temperature (about 3300°C) it is used in oxy-acetylene welding.

Achaea A region of ancient Greece occupying the N coast of the Peloponnese and SE Thessaly. The 12 towns of the region formed the **Achaean League** in the 4th century BC. Dissolved in the late 4th century, it was revived by the ten surviving cities in 280 BC and included non-Achaean cities, such as Sicyon. The League finally disintegrated when Achaea was annexed by Rome in 146 BC. Its NW part approximates the modern department of Achaea.

Achaeans An ancient Greek people mentioned by Homer as being among the besiegers of *Troy. They were probably related to the *Dorian Greeks but also seem to have had associations with *Mycenaean culture.

Achaemenians An ancient Persian dynasty founded by

Achaemenes in the 7th century BC. Cyrus I (reigned c. 645–602 BC), Cambyses I (c. 602–559 BC), *Cyrus the Great (559–530 BC), who founded the Achaemenian (or Persian) Empire, and *Cambyses II (529–521 BC) belonged to the senior branch of the family. *Darius I (522–486 BC) headed the junior line, which included *Xerxes I (486–465 BC). The Achaemenian dynasty ended in 330 BC, when Alexander the Great defeated Darius III (336–330 BC).

Achard, Franz Karl (1753–1821) German chemist, who pioneered the extraction of the sugar from beetroot. His imperfect process produced considerable amounts of sugar on an estate granted to him in about 1800.

Achebe, Chinua (1930–) Nigerian novelist of the Ibo tribe. His first novel, *Things Fall Apart* (1958), deals with the arrival of missionaries and colonial government in the Ibo homeland. The conflict between traditional African society and western values is a central theme in all his work. His other works include the novels *A Man of the People* (1966) and *Ant-hills of the Savannah* (1987), and a collection of short stories. He won the Nobel Prize in 1989.

achene A small dry fruit having a single seed that is attached to the fruit wall at one point only. The fruit does not open at maturity (i.e. the fruit is indehiscent) and the seed is thus retained until germination. Lettuce fruits are examples.

Achernar A conspicuous blue star, apparent magnitude 0.5 and 114 light years distant, that is the brightest star in the constellation Eridanus.

Acheron A river in N Greece, in Greek mythology the chief river of the underworld. In Dante, it is the river across which the souls of the dead are ferried to hell by *Charon.

Acheson, Dean (Gooderham) (1893–1971) US lawyer and statesman. As secretary of state in *Truman's cabinet (1949–53), his foreign policy aimed at the containment of Soviet communism. This led him to play a leading role in developing the Truman Doctrine, the *Marshall Plan, and the *North Atlantic Treaty Organization. After 1953 he continued advising American presidents.

Acheulian A culture of the Lower *Palaeolithic. It is characterized by hand axes made by hammering flakes off a flint with a hammer of wood, antler, or bone, thus producing a more regular and effective tool than the *Abbevillian hand axe. Named after St Acheul near Amiens (N France) the Acheulian occurs in Eurasia and Africa where it apparently originated and survived longest (until about 58 000 years ago). Acheulian sites provide the earliest evidence of man's use of fire and are associated with *Homo erectus* remains (*see* Homo).

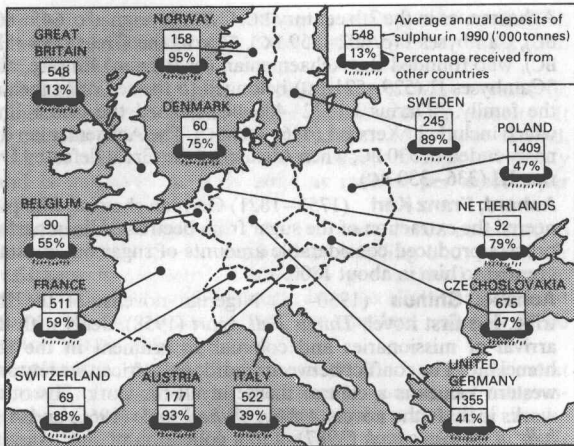
Achilles In Greek mythology, the greatest Greek warrior in the Trojan War. The son of Peleus, King of Thessaly, and Thetis, a sea nymph, he was dipped by his mother in the River Styx as a child, which made his whole body invulnerable except for the heel by which she had held him. After a quarrel with *Agamemnon he ceased fighting until the death of his friend *Patroclus at the hand of *Hector. Achilles then slew Hector and was himself later killed by Paris, who shot a poisoned arrow into his heel. The tendon connecting the heel-bone to the calf muscles is called the **Achilles tendon**.

Achill Island 54 00N 10 00W A mountainous island in the Republic of Ireland, off the W coast of Co Mayo. The chief occupations are farming and fishing. Area: 148 sq km (57 sq mi). Population (1981): 3107.

achromatic lens A combination of lenses used to eliminate chromatic *aberration in an optical system. The simplest type has two lenses of different powers made from different kinds of glass. The chromatic aberration of one lens is cancelled by the chromatic aberration of the other lens.

acid house. *See* pop music.

acid rain Rain that contains sulphuric and nitric acids as a result of the absorption of sulphur dioxide and nitrogen oxides, mostly from industrial and vehicle emissions, in the atmosphere. It is contended that the effects of acid rain can in-



ACID RAIN Sulphur deposits in Europe.

clude destruction of fish, crops, and trees, as well as damage to buildings. In 1985 19 countries agreed to make substantial reductions in the emission of sulphur dioxide by 1993.

acids and bases Acids are chemical compounds containing hydrogen that can be replaced by a metal atom to produce a *salt. They have a sour taste and turn litmus red. When dissolved in water they dissociate into ions. Hydrochloric acid (HCl), for instance, gives chloride ions and hydrogen ions: $\text{HCl} + \text{H}_2\text{O} \rightarrow \text{Cl}^- + \text{H}^+ + \text{H}_2\text{O}$. The hydrogen ion is associated with a water molecule, a combination referred to as a hydroxonium ion (H_3O^+).

Strong acids dissociate completely in water; hydrochloric acid, sulphuric acid, and nitric acid are common examples. Such compounds are extremely corrosive, sulphuric and nitric acids being particularly so because they are also powerful oxidizing agents. **Weak acids** do not dissociate completely. Many are organic compounds, usually carboxylic acids, containing the carboxylate group $-\text{CO.OH}$, and occur naturally: e.g. acetic acid in vinegar, citric acid in citrus fruits, and lactic acid in milk.

Bases are compounds that react with acids to form salts and water. Bases that dissolve in water, known as **alkalis**, produce hydroxide ions (OH^-). Many are metal hydroxides, such as sodium hydroxide (NaOH) and potassium hydroxide (KOH). Ammonia is also a base, reacting with water molecules to form ammonium ions and hydroxide ions: $\text{NH}_3 + \text{H}_2\text{O} \rightarrow \text{NH}_4^+ + \text{OH}^-$. The neutralization of an acid by a base in solution is a reaction in which hydrogen and hydroxide ions combine to give water. In chemistry the simple concept of acids and bases has been extended to include the concept of an acid as any compound that can donate a proton and a base as a proton acceptor. This (the Brønsted-Lowry theory) can be applied to reactions in nonaqueous solvents. A further extension of the terms (Lewis theory) defines an acid as an acceptor of an unshared electron pair and a base as a pair donor. See also pH.

acmeism A movement in Russian poetry in the 1910s and 1920s that asserted the value of precision against what was seen as the abstract vagueness of the symbolist movement. Because it was apolitical it met with official hostility, and several of its members, including *Akhmatova and *Mandelstam, were persecuted.

acne A skin condition, common in adolescence, affecting the face, chest, and back. Acne is caused by overactivity and inflammation of the sebaceous glands: oily sebum accumulates in the hair follicles, producing pustules and blackheads. Severe cases can be treated with antibiotics.

Aconcagua, Mount (Spanish name: Cerro Aconcagua) 32 40S 70 02W A mountain in W Argentina, in the Andes, regarded as being the highest point in the W hemisphere. It is of volcanic origin. Height: 6960 m (22 835 ft).

aconite A European herbaceous plant, *Aconitum napellus*, also known as monkshood. Growing to a height of 1 m, its flowers are usually purplish-blue and hood-shaped; the bulbous roots yield poisonous *alkaloids, including aconitine, which have been used in medicine as *narcotics and analgesics. The genus, which is restricted to N temperate regions, also includes wolfsbane (*A. lycotonum*). Family: *Ranunculaceae* (buttercup family).

acornworm A wormlike marine invertebrate animal, 5–180 cm long, that burrows in soft sand or mud. Its front end is acorn-shaped, with the mouth at the base. It filters food particles from sea water, which enters the mouth and passes out through gill slits along the length of the body. Chief genera: *Balanoglossus*, *Saccoglossus*; phylum: *Hemichordata.

acouchi (or acushi) A small long-legged *rodent belonging to the genus *Myoprocta* (about 5 species). Acouchis have the same habits and lifestyle as the closely related agoutis but are smaller, measuring up to 45 cm long. They have a thin white-tipped tail and lack the coloured rump hairs of agoutis.

acoustics The branch of physics concerned with the production, propagation, reception, properties, and uses of sound. It has several subdivisions. The most important, architectural acoustics, is concerned with the design of public auditoriums so that sounds can be heard in all parts of them with the maximum clarity and the minimum distortion. *Ultrasonics is the study of very high frequency sound. The structure and function of sound sources, such as loudspeakers, and sound receptors, such as microphones, also form part of acoustics. Other fields include speech communication and the design of machines that can understand spoken instructions.

acquired character. See Lamarckism.

acquittal In law, the clearing of an accused person of the charge against him, usually by court verdict. In England there must be a verdict of "not guilty"; in Scotland the verdict may be either "not guilty" or "not proven." Acquittal prevents a person from being prosecuted for the same offence again. Anyone charged as an *accessory to a crime is automatically acquitted if the principal is acquitted.

Acre (Arabic name: 'Akko) 32 58N 35 06E A town in N Israel, on the Mediterranean coast. Acre was held by the Crusaders for many years and was in Turkish hands for several centuries. Allocated to the Arabs under the UN plan for *Palestine, it fell to the Jews in May, 1948, and became part of Israel. It contains walls and a mosque from the 18th century, and caravanserais. It is a fishing port and a centre for light industry. Population (1983): 37 000.

acrolith A statue made, especially in ancient Greece, of marble for the flesh and gilded wood for the clothing. This method was a cheaper substitute for chryselephantine (gold and ivory) statuary.

acromegaly A rare disease in which a noncancerous tumour of the pituitary gland secretes abnormally large amounts of *growth hormone. This causes enlargement of the face, hands, feet, and heart. The tumour can be destroyed by X-rays or surgically removed.

acropolis (Greek: high town) In ancient Greek towns, the isolated rocky plateau on which stood the religious and administrative nucleus of the town and which served as a citadel in time of war. The most famous is the Acropolis of Athens, which is still adorned by remains of buildings erected by *Cimon, *Themistocles, and *Pericles after the sack of Athens by the Persians (480 BC). These buildings include the *Propylaea, *Parthenon, and the reconstructed Erechtheum (completed 1987) and temple of Athena Nike.

acrylic painting A method of painting using acrylic paint. An opaque bright smooth easily applied mixture, it has been used by many pop artists, notably David *Hockney.

acrylics Synthetic materials produced by *polymerization of acrylonitrile (vinyl cyanide; $\text{CH}_2\text{:CHCN}$). Acrylic resins

are used in paints and plastics, the most common being *Perspex. Acrylic fibre is widely used in textiles, mainly for knitwear, furnishing fabrics, and carpets. The fibres are strong, absorb little water, and resist most substances encountered in use, although they become plastic in hot water or steam. Modacrylic is acrylic fabric or yarn with more than 15% of other fibres added.

Acta The ancient Roman *Acta Senatus* (*Senate Business*) were official records of *Senate proceedings compiled by a senator chosen by the emperor. The *Acta Diurna* (*Daily News*) constituted a popular gazette of political and social news, instituted by Julius Caesar in 59 BC and continuing until 300 AD. The emperor's official enactments were also known as *Acta*.

Actaeon A mythological Greek hunter, son of the god Aristaeus and Autonoe, daughter of Cadmus, King of Thebes. Ovid, in his *Metamorphoses*, relates how Actaeon accidentally caught sight of the goddess Artemis bathing naked and was turned by her into a stag and killed by his own hounds.

ACTH (adrenocorticotrophic hormone) A peptide hormone, secreted by the anterior lobe of the pituitary gland, that stimulates the cortex of the adrenal glands to produce three types of *corticosteroid hormones. Secretion of ACTH is stimulated by physical stress and is regulated by secretions of the *hypothalamus of the brain.

actinides A group of related chemical elements in the periodic table ranging from actinium (atomic number 89) to lawrencium (atomic number 103). They are all radioactive and include a number of *transuranic elements. Chemically, they resemble the *lanthanides, having unfilled inner electron shells.

actinium (Ac) A highly radioactive metal that occurs naturally in uranium minerals. It is the first of the actinide series of elements and is chemically similar to the lanthanide elements. It was discovered in 1899 by A. L. Debierne (1874–1949). At no 89; at wt (227); mp 1050°C; half-life of ²²⁷Ac 21.6 yrs.

actinium series One of three naturally occurring series of radioactive decays. The actinium series is headed by uranium-235 (known as actino-uranium), which undergoes a series of alpha and beta decays ending with the stable isotope lead-207. *See also* thorium series; uranium series.

actinomycetes Bacteria belonging to the order *Actinomycetales*. They have rigid cell walls and often form branching filamentous mouldlike colonies. Some may cause diseases in plants and animals, particularly *Mycobacterium tuberculosis*, which causes tuberculosis, and *M. leprae*, which causes leprosy; others are relatively harmless parasites inhabiting the gastrointestinal tract. Many are found in soil, where they decompose organic matter. Certain species produce valuable *antibiotics.

action painting A modern style, also called abstract expressionism, in which paint is sprayed, splashed, or dribbled over a large canvas to form an unpremeditated and usually abstract design. Jackson *Pollock invented it in 1947 to give free rein to his own emotions. It was later also used by Willem *de Kooning to produce figurative pictures. Together with colour-field painting (*see* Rothko, Mark), action painting was the dominant style in the USA in the 1950s and made New York, for the first time, the most advanced centre of modern art.

action potential The change in electric potential on the surface of a nerve cell that occurs when the cell is stimulated. It results from sodium and potassium ions moving across the cell membrane. The electrochemical impulse travels along the nerve fibre, and in this way information is transmitted through the *nervous system. *See also* neurone; synapse.

Actium, Battle of (31 BC) The decisive land and sea battle that ended the civil war in ancient Rome. Octavian, later

*Augustus (the first Roman emperor), defeated the forces of *Mark Antony and *Cleopatra.

activated charcoal Charcoal that has been processed to increase its power of absorption by heating it to drive off absorbed gas. It then has a high capacity for further absorption of gas. Its uses include removing impurities from gases and liquids and as filters in gas masks.

active galaxy A galaxy that emits an unusually large amount of energy from a very compact central source. *Quasars, *Seyfert galaxies, and *radio galaxies are examples. The energy is thought to arise as a result of gas spiralling into a supermassive *black hole at the centre of the galaxy.

act of God In law, an occurrence due to a sudden violent natural cause, such as a storm, which could not reasonably have been guarded against and loss from which could not have been avoided or predicted.

Act of Parliament. *See* parliament.

Acton, John Emerich Edward Dalberg-Acton, 1st Baron (1834–1902) British historian, born in Naples. As a Whig MP (1859–66) he formed a close friendship with Gladstone. Acton mobilized liberal Roman Catholic opinion against the doctrine of papal infallibility promulgated in 1870. Appointed professor of modern history at Cambridge (1895) he planned the *Cambridge Modern History*.

Actors' Studio An actors' workshop founded in New York in 1947 by Elia *Kazan and others. Under its director Lee Strasberg (1901–82), it became famous for "method" acting, which was developed from the theories of *Stanislavsky. Film actors influenced by it include Marlon *Brando, Rod Steiger (1925–), and James *Dean.

Acts of the Apostles The fifth book of the New Testament, written by Luke about 63 AD as a sequel to his Gospel. Starting with the ascension of Christ, it deals with the spread of the Christian Church from a single congregation at Jerusalem, where Peter is prominent, to Paul's first missionary journey and his eventual imprisonment at Rome.

actuary A mathematician employed by an *insurance company to calculate the premiums payable on policies. The calculations are based on statistically determined risks and eventualities (e.g. sickness, life expectancy). In the UK qualifications are awarded by the Institute of Actuaries through examination.

actus reus. *See* criminal law.

acupuncture A traditional Chinese system of healing in which thin metal needles are inserted into selected points in the body. The needles are stimulated by manual rotation or electrically. Acupuncture is used in the Far East to relieve pain and in China as an anaesthetic. The traditional explanation of its effectiveness, dating back to 2500 BC, relates to balancing the opposing life forces *yin and yang. Research in the West suggests that the needles activate deep sensory nerves, which causes the release of endorphins (natural pain killers; *see* encephalins).

acyclovir A drug that inhibits viral DNA synthesis in cells infected with herpes. It is used for treating herpes infections in patients with compromised immune systems (e.g. those on chemotherapy or with AIDS).

Adad A Babylonian and Assyrian weather god. He was worshipped as both creator and destroyer of life: his summer rains ensured a good harvest but his storms and floods brought death. His father was Anu, god of the heavens.

Adalbert (c. 1000–72) German churchman, Archbishop of Bremen. From a noble Saxon family, he became a trusted and powerful adviser to Emperor Henry III. He was active in the evangelization of Scandinavia, the Orkneys, Iceland, and Greenland until his exile from Henry IV's court in 1066.

Adam, Adolphe-Charles (1803–56) French composer. He composed over 60 operas but is primarily remembered for his romantic ballet *Giselle* (1841), the earliest full-length ballet in the traditional repertoire.

Adam, Robert (1728–92) British architect and interior

designer, born in Kirkcaldy, Fifeshire, the son of the Palladian architect **William Adam** (1689–1748). He evolved a unique style that blended the *rococo and *neoclassicism, although he occasionally used *gothic forms. After visiting Italy (1755–58), Robert, often in collaboration with his brother **James Adam** (1732–94), built many country houses, notably Kenwood House (1768), the interior of Syon House (1769), and Osterley Park (1780). His building of town houses in London, such as Apsley House (1775), led him into severe financial difficulties. In his last years in Edinburgh he produced much of his finest work, for instance Charlotte Square (1791).

Adam and Eve In the Old Testament, the first human beings. According to Genesis (2.7–3.24), Jehovah (or Yahweh) created Adam from dust in his own image and put him in the Garden of Eden. His wife Eve was created from one of his ribs. Tempted by the serpent (the devil) to eat the forbidden fruit of the Tree of Knowledge of Good and Evil, Eve succumbed to the temptation and induced Adam to eat the fruit also. They became aware of their guilt and were expelled from Eden. Their sons included *Cain and Abel.

Adam de la Halle (c. 1240–1290) French poet and musician. He travelled with his patron Robert II of Artois and became famous at the court of Charles of Anjou in Naples, where he died. His *Jeu de la feuillée* and *Jeu de Robin et Marion*, the first comic opera, combined popular songs with a sequence of realistic narrative scenes.

adamellite A variety of *granite consisting of roughly equal proportions of potassium feldspar and sodic plagioclase feldspar, with one or more ferromagnesian minerals.

Adamnan, St (c. 625–704 AD) Abbot of *Iona, born in Co Donegal, Ireland. He is chiefly remembered for championing the Roman system of dating Easter, which differed from the system used by the Celtic Churches, and for his biography of his predecessor, St *Columba. Feast day: 23 Sept.

Adamov, Arthur (1908–70) French dramatist of the *Theatre of the Absurd. Born in Russia, Adamov went to Paris in 1924 and edited a surrealist journal, *Discontinuité*. The experimental forms of his plays owe much to the images and logic of dreams: *La Parodie* (1947) features a handless clock and in *Le Ping Pong* (1955) men are dominated by the futile relentless action of a pinball machine. His later, more political, work included anti-Gaullist sketches. He committed suicide in Paris.

Adams, Charles Francis (1807–86) US diplomat; ambassador to Britain (1861–68). He was influential in keeping Britain neutral during the US Civil War and attempted to prevent British-built ships from joining the Confederate fleet, protesting against the dispatch of the *Alabama* (1862). He represented the USA in the subsequent *Alabama* claims for compensation against Britain (1871).

Adams, Henry (1838–1918) US historian. After working as a radical political journalist, he became disillusioned with active politics and turned to fiction and history, writing a long history of early democracy in America (1889–91). His most influential works were *Mont Saint Michel and Chartres* (1913), a study of the unity of art and religion in the middle ages, and his autobiography, *The Education of Henry Adams* (1918).

Adams, John (1735–1826) US statesman; first vice president (1789–97) and second president of the USA (1797–1801). Adams was prominent in the development of North American revolutionary thought. During the American Revolution he successfully mobilized European support for the North American cause, which he represented in the peace negotiations. His term as president was troubled by disputes with his vice president, Thomas *Jefferson, over US policy towards Revolutionary France. Adams was defeated by Jefferson in the election of 1800. His son **John Quincy Adams** (1767–1848) was sixth president of the USA (1825–

29). As a young man Adams practised law, wrote political articles and pamphlets, and began his successful career as a diplomat. From 1803 to 1808 he was a member of the Senate and from 1809 to 1817 he was US minister to several European countries, including Russia and Great Britain. As secretary of state (1817–25) he was largely responsible for the *Monroe Doctrine (1823). As president he was opposed by Andrew *Jackson, who defeated Adams in the presidential election in 1828. From 1831 Adams served in the House of Representatives, where he campaigned against slavery.

Adams, John Couch (1819–92) English astronomer, who became professor at Cambridge University (1858). He predicted (1845) to within 2° the position of the then undiscovered planet *Neptune, which was confirmed in 1846. Adams later worked on lunar parallax, the earth's magnetism, and the Leonid meteors.

Adams, Richard (1920–) British novelist. He worked in the civil service from 1948 to 1974. His *Watership Down* (1972), an epic treatment of the adventures of a community of rabbits, became an international bestseller. His later novels include *Shardik* (1974), *The Plague Dogs* (1977), *The Girl in a Swing* (1980), and *Traveller* (1989).

Adams, Samuel (1722–1803) US politician. A propagandist of revolution against Britain, he led the *Stamp Act agitation of 1765. His protests against British troops in Boston led to the Boston Massacre (1770) and he helped to plan the *Boston Tea Party (1773). He signed the Declaration of Independence (1776), served in the *Continental Congress until 1781, and was then governor of Massachusetts (1794–97).

Adamson, Robert. See Hill, David Octavius.

Adana 37 00N 35 19E A city in S Turkey, the fourth largest in the country. Its prosperity comes from the surrounding fertile valleys, where much cotton is grown, and its position on the Anatolian-Arabian trade routes. It has a university (1973). Population (1985): 776 000.

adaptation In biology, a change in a physical characteristic of an animal or plant that makes it better suited to survive in a particular environment. For example, cacti have adapted to desert environments by evolving swollen water-storing stems. See also adaptive radiation.

adaptive radiation The process by which a uniform population of animals or plants evolves into a number of different forms over a period of time. The original population increases in size and spreads to occupy different habitats. It forms several subpopulations, each adapted to the particular conditions of its habitat. In time—and if the subpopulations differ sufficiently—a number of new species will be formed from the original stock. The Australian marsupials evolved in this way into burrowers, fliers, carnivores, herbivores, and many other different forms.

addax A rare African antelope, *Addax nasomaculatus*, about 1 m high at the shoulder, that lives in small herds in the Sahara Desert. It has a greyish hide with a white patch on the face, long spirally twisted horns, and broad hooves suitable for running over loose sand. □ mammal.

adder A European *viper, *Vipera berus*, about 80 cm long, common in heathland areas. It is usually greyish with a broad black zigzag line along its back and black spots on its sides. Although venomous, its bite is rarely fatal. It is one of the three species of snakes found in Britain. The name adder is also given to a highly venomous Australian snake (death adder) of the cobra family and to some harmless North American snakes. □ reptile. See also puff adder.

addiction. See drug dependence.

Addington, Henry, 1st Viscount Sidmouth (1757–1844) British statesman; prime minister (1801–04), replacing Pitt the Younger. Addington was attacked for his management of the Napoleonic Wars and resigned. As home secretary (1812–21) he introduced stern measures against radical and