

Index

Italicized page numbers (42) indicate figures and tables. Bold page numbers (42–43) indicate an encyclopedia entry about the topic.

A Cartographic Expert System (ACES), 505
A-Z maps (United Kingdom), 1054
A&G Repsold (company), 455
AA (Automobile Association) (United Kingdom), 24, 119–20, 284
AA Directory of Town Plans of Britain, 119
AA Motorists' Atlas of Great Britain, 119
AA Road Atlas of the British Isles, 119, 120
AA Road Book of England and Wales, The, 119
AAG. *See* Association of American Geographers
Aangeenbrug, Robert T. (1935–2003), 3
Abbatt, William, 744
Abbe, Cleveland (1838–1916), 872
Abe, Kōbō (1924–1993), 784
Aberley, Doug, 1094
Abhandlungen (ARL), 41
Ablauf, 61
Abler, Ronald F. (b. 1939), 105, 994
 entry by, 677–79
ABMs (agent-based models), 497
Abrams, Talbert (1895–1990), 1298
Absalom, Absalom! (Faulkner), 783
Abteilung Landestopographie (Switzerland), 179
Abteilung für Landeskunde (Germany), 17
Abu-Sitta, Salman, 1008, 1009
ACA (American Cartographic Association), 49, 1406, 1760
Academic cartography, 1–13, 340–43. *See also* specific research subjects
 aerial photography in, 1114, 1118–19
 Bertin's role in, 6–7, 10, 342, 345
 cadastral surveying and, 1212, 1221
 color in maps and, 258–59
 Eckert's role in, 6, 10, 338, 339, 340
 electronic cartography development impacts, 128, 340, 342
 ESRI and, 401
 Europe overview, 6–13, 340–41, 342
 geographic information systems and, 4, 340, 341, 342, 488–91, 493, 494, 994–95
 geography and, 2, 524, 525
 Goode's role in, 1, 340, 568
 gravimetric surveys and, 455–56
 history of cartography in, 342, 608, 610, 612, 613

International Cartographic Association
 and, 10, 667, 670
on Internet, 1754
journals and, 49
Keates' role in, 342, 727
Maling's role in, 798
North America overview, 1–5, 5, 340
regional atlases and, 101
Robinson's role in, 2, 3, 7, 8, 340, 341, 342, 346, 1366
Russian Empire, 981–82
Russian Federation, 1378–79
Soviet Union, 7–8, 10, 340–41, 982–85, 1640
subject testing in, 1063–64, 1070–74
tactile maps and, 1480–81
thematic mapping and, 1, 341, 1505, 1507
web-based wayfinding and, 1740–41
women in cartography and, 1759–60
ACC (Association Canadienne de Cartographie), 1406–7
Accademia dei Lincei, 42
Accessibility
 for color vision impairment, 265, 293, 1057, 1058
 customization and, 293
 tactile maps, 1480–83, 1481, 1482, 1722–26, 1723, 1724
 wheelchair access maps, 1742–43, 1742
Accuracy, 13–16. *See also* Misrepresentation
 in maps; Uncertainty
advertising and, 20–22
aerial photography and, 30–31, 64
in analytical cartography, 59
boundary disputes and, 140
in boundary surveying, 154
campus maps, 1705
in cartometry, 204
choropleth symbolization and, 222
in climate maps, 228
copyright traps and, 284
cultural/social significance of cartography and, 1003
customization and, 293
data models and, 360, 364
drawing media and, 13, 204
in geocoding, 451, 451
in geodesy, 13, 240, 453
Global Positioning System and, 13, 14, 469
Harley on, 577
in in-vehicle navigation systems, 1719–20, 1720
military development and applications and, 1454, 1699
projections and, 34, 241, 243, 1188
satellite geodesy, 14, 456, 457, 459
satellite imaging, 1283
scale and, 13–14, 1386
social theory and, 1402
standards for, 13–14, 204, 1386, 1453–55, 1642, 1699
Wiki technology and, 1753
ACES (A Cartographic Expert System), 505
ACGs (address coding guides), 209–10, 449, 449, 450
Acheson, Gillian, entry by, 347–49
ACIC (Aeronautical Chart and Information Center) (USAF-ACIC) (United States), 26, 27, 890, 1765, 1766
Ackermann, Friedrich E. (Fritz) (b. 1929), 1109, 1111, 1130
ACM (Association for Computing Machinery) (United States), 1407
ACM SIGGRAPH, 387
Acoustic depth measurement, 843, 1024. *See also* Sonar
Across Canada . . . West Bound (Canadian Pacific Railway), 1621, 1623
ACSM. *See* American Congress on Surveying and Mapping
Active Control Networks, 469
Active incident management (AIM), 433
Activism. *See* Counter-mapping; Social activism
Adams, Cyrus C. (1849–1928), 1049
Adams, Harriet Chalmers (1875–1937), 1417
Adams, John S. (b. 1938), 96, 105
Adams, Oscar S. (1874–1962), 271, 867, 1193
Adams, Thomas (1871–1940), 752, 1159
Addams, Jane (1860–1935), 267, 268, 269
Addison, Joseph W., 1372
Address coding guides (ACGs), 209–10, 449, 449, 450
ADEOS (Advance Earth Observing Satellite), 1280, 1286

ADGRAV (Antarctic Digital Gravity Synthesis), 70
 Adkins, Lesley (b. 1955), 329
 Adkins, Roy, 329
 Adler, Ron, entry by, 163–68
 ADMAP (Antarctic Digital Magnetic Anomaly Project), 70
 ADMATCH (software), 450
Administrativ-Statistischer Atlas vom Preussischen Staate (1827/8), 96
 Administrative cartography, 16–18. *See also* Census mapping; Taxation
 aerial photography for, 1299
 boundary surveying and, 158
 cadastral mapping in, 16–17, 186, 186
 cadastral surveying for, 16, 188–89
 cartometry for, 203
 colonial/imperial cartography and, 252, 255, 256
 demographic mapping and, 312
 electronic cartography development impacts, 16, 270
 emergency planning, 389–93
 ESRI services, 398
 Experimental Cartography Unit and, 418
 facilities maps, 424–25
 forestry and, 17, 433–34
 geographic information systems and, 16, 493–94, 1488
 geographic names and, 521
 map libraries and, 768
 Lawrence Martin on, 864
 metadata and, 510–11
 national atlases and, 18, 96
 Nazi Germany, 17, 176–77
 public access to cartographic information and, 1227
 recreational maps and, 1253
 remote sensing for, 16, 1294–95
 road mapping and, 1345, 1348, 1348, 1351, 1356, 1356, 1361
 social theory and, 1401
 soils maps and, 1447
 urban mapping and, 1650
 John Kirtland Wright on, 1780
 Admiralty Raster Chart Series (United Kingdom), 839
 Adobe Illustrator (software), 262, 509, 1434–35, 1435, 1436, 1509
 Adobe Photoshop (software), 35
 ADSID (Air-Delivered Seismic Intrusion Detector), 891
 Advance Earth Observing Satellite (ADEOS), 1280, 1286
 Advanced Microwave Scanning Radiometer (AMSR), 1280
 Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), 1280, 1286
 Advanced Very High Resolution Radiometer (AVHRR), 71, 320, 991, 992, 1274, 1276, 1283, 1286, 1544
 “Adventure of the Priory School, The” (Doyle), 784

Advertising, 18–22, 20, 1092, 1093. *See also* Place promotion
 color and, 258
 in cycling maps, 1253
 map publishers, 1246–47
 place promotion and, 19, 1632, 1634
 railroad maps and, 19, 1240, 1243, 1621–22, 1623, 1626, 1729
 road mapping and, 19, 617, 618, 1345, 1348–49
 Aegeerter, Leo (1875–1953), 44, 292
 Aeppli, August (1859–1938), 1041
 Aerial perspective, 1267, 1268
 Aerial photogrammetry. *See* Photogrammetric mapping
 Aerial photography. *See also* Aerial photography military development and applications; Balloon observation; Cold War and aerial photography; Infrared photography; Photogrammetric mapping; World War I and aerial photography
 in academic cartography, 1114, 1118–19
 Antarctica, 64, 66, 66, 68
 Arctic, 74–76, 625–26
 art and, 83
 boundary disputes and, 140, 141
 for boundary surveying, 156, 169
 for cadastral surveying, 184, 1216, 1218, 1299
 cartometry and, 203
 for coastal mapping, 236, 237
 for colonial/imperial cartography, 252–53, 255, 322
 definitions of “map” and, 799, 1296–97
 drawing media for, 330
 earth-from-space perspective and, 566
 emergency planning and, 390
 for environmental protection, 393, 395, 1299
 forestry and, 436
 geographical discovery and, 1390
 for historical research, 598
 Hotine on, 620
 for hydrography, 625, 625–26, 626
 image processing software and, 501
 images as maps and, 804–5
 for land systems analysis, 750, 1119
 land use maps and, 752
 for landform maps, 1155
 in map libraries, 770
 for marine charting, 833–34, 854
 overview, 367
 pen-and-ink drafting and, 332
 perspective maps and, 1020
 photointerpretation, 750, 1113–20, 1115, 1122
 as precursor to remote sensing, 1296–99
 public access to cartographic information and, 1227
 relief depictions and, 1262, 1264, 1265, 1271, 1299
 satellite imaging and, 754
 scale and, 1386

terrain analysis and, 1496–97
 textbooks, 1114
 for thematic mapping, 754, 1505
 for topographic mapping, 182, 646, 647, 1536, 1541, 1553, 1563–64, 1580–81, 1581, 1613
Aerial Photography in Urban Planning and Research (Branch), 1114
 Aerial photography military development and applications
 Austrian military mapping, 925
 British military mapping, 897, 898, 899, 1118
 Chinese military mapping, 942
 Cold War. *See* Cold War and aerial photography
 French military mapping, 908, 972
 German military mapping, 916
 images as maps and, 805
 Israeli military mapping, 930
 Italian military mapping, 922–23, 922
 Japanese military mapping, 949
 military mapping of Australia, 975, 975
 military mapping of North Africa, 952, 953
 military mapping of the Middle East, 970
 World War I. *See* World War I and aerial photography
 World War II. *See* World War II and aerial photography
 Aerial Survey Database (ASDB) (Canada), 1553
 Aerial triangulation, 1110–11, 1110, 1129–30, 1140.
 Aerial triangulation by independent models (AIM), 324, 1109, 1111, 1111, 1130, 1131, 1140
 Aéro-Club de France, 22
 Aerodist, 466
 Aeronautical Chart and Information Center (ACIC) (USAF-ACIC) (United States), 26, 27, 890, 1765, 1766
 Aeronautical charts, 22–30. *See also* World Aeronautical Chart
 commercial products, 24–26, 25, 26, 861
 display hardware for, 28–29, 1699
 early, 22, 23
 as geographical mapping, 521
 International Civil Aviation Organization and, 274–75, 673–74, 675–76, 692
 International Map of the World and, 692
 jet age, 27–28
 map design and, 1063
 mass marketing and, 861
 military development and applications, 22–23, 23, 24, 26–27, 886, 888, 917, 920, 1189
 military mapping and, 902, 943, 969
 NATO and, 894
 projections for, 24, 871, 1189–90, 1764
 Rand McNally & Company, 24, 1245
 as route maps, 1368, 1369, 1370
 standards for, 274–75
 symbolization in, 26, 26, 27

- U.S. Coast and Geodetic Survey, 23–24, 25
 World War I and, 22–23, 23, 24, 1698–99
 World War II and, 22, 26–27, 886, 888, 917, 920, 969, 1189, 1699, 1775–76
 AFREF (African Geodetic Reference Frame), 474–75
- Africa. *See also* Colonial/imperial cartography in Africa; North Africa; Post-colonial cartography; Sub-Saharan Africa
 cadastral surveying, 1205–10, 1206, 1207, 1208, 1226–27
 cartographic societies, 1409–10
 geodetic surveying, 472–75, 473, 620, 1576
 geographic information systems, 1576
 geographic names, 513–14
 political boundaries, 136, 138, 138, 153–58, 155, 302, 303, 321, 956
 postcolonial cartography, 302
 regional atlases, 105
 road mapping, 1355–59, 1356, 1357, 1358, 1359
 UN Regional Cartographic Conferences, 1648
- African Association of Remote Sensing of the Environment (AARSE), 1426
- African Geodetic Reference Frame (AFREF), 474–75
- African Organization of Cartography and Remote Sensing (AOCRS), 1209, 1410
- Afrika: Politische Übersicht*, 1884–1885, 303
- Agent-based models (ABMs), 497
- Aggregate data, 498–99
- AGN (Astronomic Geodetic Network) (Soviet Union), 480, 481, 482, 1596
- Agnew, John A. (b. 1949), 415–16
- Agrarian reform. *See* Land reform
- Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), 655, 656
- Agricultural Adjustment Administration (United States), 30–31, 31, 1113, 1118
- Agricultural maps, 16, 30–31, 31, 211, 257, 1171, 1463–64, 1466. *See also* Biogeographical cartography; Land use maps; Soils maps; Thematic mapping
- AGS. *See* American Geographical Society
- Aguilar Robledo, Miguel, entry by, 1200–1205
- AHD (Australian Height Datum), 484
- Ahlborn, Wilfried, 288
- Ahn, John, 376–77, 377, 505
- Aiken, Howard H. (1900–1973), 1130
- AIM (active incident management), 433
- AIM (aerial triangulation by independent models), 324, 1109, 1111, 1111, 1130, 1131, 1140
- Air-age globalism, 31–34
 airline maps and, 37
 Cold War and, 34, 239, 241, 243, 543, 546
 Eurocentric bias and, 415
- geographical mapping and, 522
 perspective maps and, 33–34, 241–42, 1022, 1179, 1180
 political persuasive cartography and, 542–43, 546
 projections and, 33, 34, 243, 415, 580, 1179
 social theory and, 1401
 world atlases and, 115–16
- Air Almanac* (Weems), 1013
- Air Force Cambridge Research Laboratory (AFCRL), 455
- Air France, 38
- Air maps, 33
- Air mass theory, 873, 873
- Air traffic control (ATC), 1017
- Air travel. *See* Airline maps; Aviation
- Airborne Bathymetric System (ABS), 625
- Airbrush, 34–35, 328, 715, 1396
- Airline Deregulation Act (1978) (United States), 39
- Airline maps, 35–40, 40, 1732
 advertising and, 20–22, 20
 air-age globalism and, 37
 customization in, 293
 hub-and-spoke maps, 39, 40
 in-flight tracking charts, 39–40
 landscape information in, 36, 1623–24
 misrepresentation in, 861
 postcolonial cartography and, 1624, 1626
- Shelton, 37, 38, 38, 1396
- souvenir maps, 36, 37, 38–39, 39
 timetable maps, 35–36, 36
- Airman's view maps. *See* Perspective maps
- Airways of America* (Lobeck), 1729
- Airy, George Biddell (1801–1892), 593
- Aitoff, David (1854–1933), 1172
- Aitoff-Wagner projection, 1172
- AJAX (asynchronous Javascript and XML), 1740
- Akademie für Raumforschung und Landesplanung (ARL) (Germany), 40–42
- Akademiya nauk (Russia/Soviet Union), 1213, 1380, 1381, 1591, 1640
- Akerman, James R., 1245, 1732
 entries by, 46–49, 616–18, 1339–50, 1368–71, 1620–37, 1733–34
- Akzessionsliste: Staatsbibliothek Preußischer Kulturbesitz, Kartenabteilung*, 1452
- Alaska, 139, 144, 145, 1416
- Alaska Geographical Society, 1416
- Alaskan Glacier Studies* (Martin & Tarr), 864
- Albania, 1414, 1588–89
- Albanian Society of Geodesy, Cartography and Photogrammetry, 1414
- Albers projection, 1192
- Albert, Joseph (1825–1886), 1317
- Albert I (Prince of Monaco) (1848–1922), 444, 682, 818, 842, 1027. *See also* GEBCO
- Album of Map Projections, An* (Snyder), 1399, 1533
- Albuquerque, Luís de (1917–1992), 285–86
- Aldus FreeHand (software), 262, 509, 1435, 1436, 1509
- Alexander, Gerard L., 113
- Alexander Atlas, 108
- Alexander Schulatlas*, 724
- Alexandria Digital Library (ADL), 318, 319–20, 319, 520
- Alexandria Drafting Co., Plaintiff, v. Andrew H. Amsterdam d/b/a Franklin Maps*, 285
- Algemene Nederlandse Wielrijdersbond (ANWB), 1361, 1362
- Algerian War, 908, 955
- Alidade, 1156, 1156, 1556, 1558
- Állami Földmérési és Té Hivatal (Hungary), 1238
- Allan, Arthur L., entries by, 456–59, 1221–24
- Allan Cartography, 1436
- Allégorie de Genre* (Duchamp), 80
- Allen, James P., 311
- Allen, Rebecca, 659
- Allgemeine Vermessungs-Nachrichten* (journal), 478
- Allgemeiner Deutscher Automobil-Club (ADAC), 797, 1250
- Alliance for Progress, 664
- Allred, G. K. (Ken), entry by, 1220–21
- Allweather Motor Maps, 24
- Almagia, Roberto (1884–1962), 42–43
- Almásy, László (1895–1951), 952–53
- Almaz (satellite), 1286, 1301
- ALOHA (Areal Locations of Hazardous Atmospheres), 592
- Alpen im Eiszeitalter, Die* (Penck), 1055
- Alpenvereinskarte* (Brandstätter), 45
- Alpine cartography, 43–46, 44, 45. *See also* Relief depictions
 anaglyph maps in, 55
 customization in, 292, 292
 Kümmerly+Frey AG, 735, 736, 736
 perspective maps, 1020
 relief models in, 1263, 1264
 terrestrial photogrammetry for, 43–44, 45, 646, 1264
- Althusser, Louis (1918–1990), 308
- Always Coming Home* (Le Guin), 782
- AM/FM (Automated Mapping/Facilities Management) International, 387
- Amants, Les* (Malle) (film), 988
- Amazon Conservation Team, 643
- America's History*, 604
- American Academy of Arts and Sciences, 1415
- American Airlines, 39
- American Alpine Club, 1416
- American Association for the Advancement of Science, 1415
- American Association of Geodetic Surveying, 1406
- American Association of Petroleum Geologists, 1430

- American Automobile Association (AAA), 46–49, 1345–46
 Automobile Blue Book series, 47, 1342, 1342, 1346
 early maps, 46–47, 46, 47, 1340
 electronic cartography development
 impacts, 358
 pathfinding and, 46, 1343
 TripTiks, 48, 49, 292–93, 1346, 1368–69, 1738
- American Cartographer, The* (journal), 2, 49, 490, 718, 719, 1405–6
- American Cartographic Association (ACA), 49, 1406, 1760
- American Clinical and Climatological Association, 1415
- American Congress on Surveying and Mapping (ACSM)
 Auto-Carto and, 386, 387
 cadastral surveying and, 1198
 founding of, 1405
 geographic information systems and, 494
 journals, 49, 1405–6
 relief depictions and, 1269
 Spatial Data Transfer Standard and, 1455
 women in cartography and, 1760
- American Council of Learned Societies, 993
- American Dialect Society (ADS), 520
- American FactFinder (software), 315
- American Geographical Society (AGS), 49–54, 1405. *See also* Millionth Map
 Antarctica maps, 51, 53, 64, 66
 Cullum Award, 42–43
 demographic mapping, 311
 Eastern European boundary changes and, 336
 electoral mapping and, 350
 epidemiological maps, 51, 52, 53
 founding of, 1415
 geographic information systems and, 494
 International Map of the World and, 1389
 labeling, 739, 740
 national atlases, 97, 993
 post–World War I settlement and, 50, 963, 1053, 1418
 race and, 1232, 1233, 1235
 seafloor mapping, 1025
 World War II and, 1667
- American Geography: Inventory & Prospect* (James & Jones), 525
- American Geophysical Union, 456
- American Heritage Pictorial Atlas of United States History, The*, 92–93
- American Library Association (ALA), 1407, 1423
- American Map Company, 1348
- American Name Society (ANS), 520
- American National Standards Institute (ANSI), 391
- American Philosophical Society, 1415
- American Society for Photogrammetry and Remote Sensing (ASPRS), 386–87, 494, 1118, 1120, 1269, 1405, 1425, 1454
- American Society of Cartographers (ASC), 1407
- American Society of Civil Engineers (ASCE), 1198, 1405
- American Society of Photogrammetry (ASP). *See* American Society for Photogrammetry and Remote Sensing
- Ames lettering guide, 739, 740
- Among the Cannibal Isles of the South Pacific* (film) (Johnson), 226, 987
- Amory, Copley (1866–1960), 1416
- AMPS (Automatic Model Production System), 1266
- AMSR (Advanced Microwave Scanning Radiometer), 1280
- Amt für Geoinformationswesen der Bundeswehr (AGeoBw) (Germany), 921
- Amt für Militärisches Geowesen (MilGeo) (Germany), 919–20
- Amtliches Liegenschaftskataster Informationssystem (ALKIS) (Germany), 188–89
- Amtliches Topographisch-Kartographisches Informationssystem (ATKIS) (Germany), 177, 178, 179, 189
- Amundsen, Roald (1872–1928), 74, 75–76, 1389, 1416, 1418
- Anaglyph maps, 54, 54–55
- Analysis of variance (ANOVA) framework, 1469
- Analytical and Computer Cartography* (Clarke), 56
- Analytical cartobibliography, 191, 192
- Analytical cartography, 55–61. *See also* Spatial analysis
 canonical structure, 57–58, 58
 cartographic visualization and, 59
 deep vs. surface structure, 57
 digital filters, 58
 in electronic atlases, 90
 electronic cartography and, 56, 358
 ESRI products, 401
 Fourier analysis and, 58, 59
 on generalization, 59
 geographic information systems and, 55, 358
 as leading North American paradigm, 5
 numerical shape analysis and, 59
 photogrammetric mapping and, 1125–32, 1127
 quantitative analysis and, 55–56, 59
 real vs. virtual maps, 56–57, 57
 Sampling theorem and, 58, 59, 60
 Sherman's influence on, 4
 statistics and, 1469
 temporal dynamics and, 1529
 Tobler's influence on, 5, 55, 56, 58–59, 868, 1534
 Warntz on, 56, 868, 1700
- “Analytical Cartography” (Tobler), 5, 1534
- Anblock aerial triangulation. *See* Aerial triangulation by independent models
- Ancient maps. *See* Premodern cartography
- Anderson, Benedict R. O’G. (b. 1936), 1000, 1401
- Anderson, Betty S., 1002
- Anderson, J. R. L. (1911–1981), 784
- Anderson, Jeremy, 348
- Anderson, K. E., 688
- Anderson, Paul, entry by, 1191–94
- Anderson land classification system, 1289
- Andree, Richard (1835–1912), 721, 1531. *See also* Andrees Allgemeiner Handatlas
- Andrée, Salomon August (1854–1897), 75
- Andrees Allgemeiner Handatlas* (Velhagen & Klasing), 721, 1531, 1673, 1674, 1690
- Andreessen, Marc (b. 1971), 1751
- Andrews, J. H., 579, 609, 799
- Andrews, Michael Corbett (1874–1934), 1373
- Andrews, William Loring (1837–1920), 245
- Anecdota cartographica* (Bagrow), 121
- Angelocrator, Daniel (1569–1635), 1175
- Angeville, Adolphe d’ (1796–1856), 221
- Anglo-American Cataloging Rules* (AACR), 191
- Anglo-Boer War (1899–1902), 19, 473, 894–95, 957–58, 957, 958, 1565, 1735
- Anglo-Brazilian Gravity Project (ABGP), 469, 470
- Anglo-russkiy slovar’ po kartografi, geodezii i aerofototopografi* (Galperin), 317
- Angola, 959. *See also* Africa
- “Animated Cartography/Thirty Years of Scratching the Surface” (Campbell), 61
- Animation, 61–63, 62
 in academic cartography, 342
 cartographic visualization and, 63, 1686, 1688
 in cinema maps, 61, 226, 227, 987–88
 in demographic mapping, 62, 311
 in electronic atlases, 90
 electronic cartography development and, 810
 in geopolitical cartography, 542–43
 in historical atlases, 93
 in historical cartography, 600
 in interactive mapping, 63
 narrative and, 987–88, 990
 and tactile maps, 1482
 temporal dynamics and, 61–62, 1531
 in thematic mapping, 114, 115, 1511, 1512, 1522
 in weather maps, 293, 1393, 1747
- Annals of the Association of American Geographers*, 2, 1525
- Annotation, 293
- ANOVA (analysis of variance) framework, 1469
- ANS (American Name Society), 520
- Anschütz-Kaempfe, Hermann (1872–1931), 1009
- Anso Printon process, 1396
- Anselin, Luc (b. 1953), 498, 1471

- Ansell, G. K., 1337
 ANSI (American National Standards Institute), 391
 Antarctic Digital Database (ADD), 70
 Antarctic Digital Gravity Synthesis (ADGRAV), 70
Antarctic Map Folio Series (American Geographical Society), 53
 Antarctic Treaty (1959), 65, 680
Antarctica (map) (Commonwealth of Australia), 64
Antarctica (map) (Department of Resources and Energy, Canberra), 67
 Antarctica maps and expeditions, 63–72, 1543–44
 aerial photography and, 64, 66, 66, 68
 by American Geographical Society, 51, 53, 64, 66
 Argentina, 65, 836, 1564
 atlases, 68, 69, 70
 Cold War and, 239
 digital mosaics, 71
 geographical discovery and, 1389
 geographical societies and, 1416, 1418
 Global Positioning System and, 69–70
 International Geophysical Year and, 65, 68, 679–80, 1543
 nineteenth century, 64, 65
 polar projections, 244
 premodern, 63–64
 satellite geodesy, 69–70
 satellite imaging and, 68, 71, 1277, 1283–85, 1544
 Scientific Committee on Antarctic Research, 68, 69, 70, 1543
 territorial claims and, 64–65, 67, 244, 1564
Antarctica: Glaciological and Geophysical Folio (Scott Polar Research Institute), 68
 Anthropology, 641, 1236–37
 Anthropomorphic maps, 1163, 1164
 Antippas, Andrew P., 72
 Antique maps. *See* Premodern cartography
 Anville, Jean-Baptiste Bourguignon d' (1697–1782), 772
 Appalachian Mountain Club, 1415
 Appleton, LeRoy, 598, 712, 714
 Applied toponymy, 516–19
 Apprenticeship, 342, 697, 697
 Approach charts, 24, 26, 26, 28
 Apsit, Aleksandr (1880–1944), 1766–67, 1767
 Aqua (satellites), 1280
 Arab-Israeli dispute, 930–31, 931, 969, 970, 1002, 1002, 1125, 1550
 Arab-Israeli War (1948), 930, 969, 970
 Arab-Israeli War (1973), 1550
 Arader, W. Graham, III (dealer), 250
 Arbeitsgemeinschaft für vergleichende Hochgebirgsforschung, 594, 595
Arbeitsmaterial der ARL, 41
 Arc Datum, 473
 ARC/INFO. *See* ArcInfo
 Arc Macro Language (AML), 1441
 Arc of the 30th Meridian (Africa), 472–73, 473
 ArcGIS (software), 361, 401, 402, 497, 500, 735, 1437, 1511
 ArcGIS Server (software), 402–3
 ArcGlobe (software), 662
Archaeological Illustration (Adkins & Adkins), 329
 Archaeology, 1113, 1121, 1121, 1677
 ArcIMS (Internet Map Server) (software), 402
 ArcInfo (software), 400, 401, 402
 for automated name placement, 505
 cartographic style and, 1472
 data models for, 361
 database design for, 1441
 for epidemiological maps, 406
 ESRI release of, 398–99, 401
 for hydrological mapping, 502
 institutional implications of GIS and, 492
 John Bartholomew & Son use of, 706
 for location-allocation problems, 499, 500
 photocopying and, 1307
 psychophysics and, 1084
 spatial analysis and, 496
 for thematic mapping, 1509
 Arcs, 190
 Arctic maps and expeditions, 73–78
 aeronautical charts, 73, 74
 bathymetric mapping, 74, 76, 78, 1027
 biogeographical, 128
 Cold War and, 239
 geographical discovery and, 1389
 geographical societies and, 1416, 1418
 hydrography and, 625–26
 indigenous peoples and, 641
 military mapping of Canada and, 951, 952
 polar projections, 243–44, 415
 satellite imaging and, 76, 77
 territorial claims and, 73–74, 75, 76
Arctic Meteorology and Climate Atlas, 76
Arctic Regions Showing Explorations Towards the North Pole, The (J. N. Matthews Co.), 75
 Arctowski, Henryk (1871–1958), 1050
 ArcView (software), 401, 402, 402, 502, 694, 1436
 Ardagh, John Charles (1840–1907), 1696
 Arden-Close (Close), Charles Frederick.
 See Close (Arden-Close), Charles Frederick
 Area-class maps, 14–15
 Area Quadtree model, 362
 Area studies, 307
 Argentina. *See also* Latin America
 Antarctica maps, 65, 836, 1564
 marine charting, 835–36
 political boundaries, 147, 148, 150, 1564
 road mapping, 1352–53
 topographic mapping, 1560, 1561, 1564
 Argosy Gallery (New York City), 246
 Aristotle (384–322 B.C.), 539
 Arkway, Richard B. (dealer), 246, 250
 Armenakis, Costas, entry by, 1552–54
 Armstrong, Marc P., 5
 Arnberger, Erik (1917–1987)
 cartographic dictionaries and, 317
 on cartography discipline, 7, 8, 10
 Eckert and, 339
 on history of cartography, 610
 influence of, 346
 Kretschmer and, 732
 satellite imaging and, 1286
 on semantics, 7
 on thematic mapping, 42, 345
 Arnold, Felix, 748, 748
 ARPANET (data-transfer system), 1750
 Arrowsmith, Aaron, 1006
 Art and cartography, 78–84, 79, 80, 81, 82.
 See also Pictorial depictions
 in academic cartography, 6
 photocopying and, 1307, 1307
 projections and, 1175, 1177
 recreational maps and, 1251, 1251, 1332, 1333
 viewshed mapping and, 1677
Art of Illustration, The (Blackburn), 1146
 Artanov, Aleksandr I. (1895–1930), 935
 Artaria & Co. (publisher), 439, 440
 Artillery warfare, 280–81, 905–6, 913, 934, 1184, 1188, 1699, 1771
 Artistic genetic rock depiction method, 292
Artscanada (journal), 83
As the Crow Flies (Hartman), 217
 Asch, Claudia, entries by, 146–53, 409, 411–13, 1350–55, 1408–9
 Asche, Hartmut, entries by, 40–42, 1754–55
 ASDB (Aerial Survey Database) (Canada), 1553
 ASDI (Australian Spatial Data Infrastructure), 1219, 1613
 ASDIC sonar, 626, 627, 1024
 Asia. *See also* Southeast Asia; specific countries
 boundary surveying, 168, 168–76, 170, 171, 172, 173, 174, 175–76, 1476
 UN Regional Cartographic Conferences, 1647–48
 Asinc Airshow, 39–40
 Aslakson, Carl I. (1896–1982), 355–56
 Asmoro, Pranoto (1923–2001), 1611
 Asociația Română de Cartografie (Romania), 1414
 ASP (American Society of Photogrammetry).
 See American Society for Photogrammetry and Remote Sensing
 Aspen Movie Map Project, 633, 659, 659, 1681
 ASPEX (software), 582
 ASPRS (American Society for Photogrammetry and Remote Sensing), 386–87, 494, 1118, 1120, 1269, 1405, 1425, 1454
 Asser, Eduard Isaac (1809–1894), 1317
 Association Canadienne de Cartographie, (ACC), 1406–7
 Association Canadienne de Géographes, (CAG), 1406, 1417

Association for Computing Machinery (ACM) (United States), 1407
 Association for Geographic Information (United Kingdom), 1305, 1412, 1425
 Association française pour l'avancement des sciences, 22
 Association of American Geographers (AAG), 1405
 academic cartography and, 2, 3
 founding of, 1416
 Gannett and, 444
 geographic information systems and, 493, 494
 Jefferson presidency, 700
 mapping software and, 1430
 women in cartography and, 1760
 Association of Canadian Map Libraries and Archives (ASCMLA), 1422
 Association of Geodetists of Montenegro, 1414
 Association of Ontario Land Surveyors (AOLS), 187, 188
 ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer), 1280, 1286
 Astrafoil, 330, 333
 Astralon, 330, 333, 1150
 Astrofixes, 68, 1613
Astrographic Catalogue, 1459
 Astronomic Geodetic Network (AGN) (Soviet Union), 480, 481, 482, 1596
 Astronomy. *See* Astrophysics and cartography
 Astrophysics and cartography, 84–89, 239
 star charts, 1459–62, 1460, 1461
 ATKIS (Amtliches Topographisch-Kartographisches Informationssystem) (Germany), 177, 178, 179, 189
Atlante dei tipi geografici (Marinelli), 923
Atlante della produzione e dei commerci, 697
Atlante delle colonie italiane, 697
Atlante geografi co metodico, 696
Atlante internazionale del Touring Club Italiano (Marinelli), 923, 1619, 1620
Atlante per le scuole medie svizzere, 1041
Atlante scolastico moderno, 696
 Atlantes Neerlandici (Koeman), 728
 Atlantis projection, 1174
Atlas, The (Vollmann), 787
Atlas Antarktiki, 68, 70, 1640
Atlas Aziatskoy Rossii, 101, 102, 104
Atlas Československé socialistické republiky, 732
Atlas coeli (Atlas of the Heavens) (Bečvář), 1460, 1461
Atlas composé de mappemondes, de portulans et de cartes hydrographiques et historiques depuis le VIe jusqu'au XVIIe siècle (Santarém), 91
Atlas de Carreteras de México, 1353
Atlas de la mutualité agricole en Afrique du Nord, 102, 105
Atlas de Moçambique, 301

Atlas der Deutschen Demokratischen Republik, 723, 724
Atlas der Schweiz=Atlas de la Suisse=Atlas della Svizzera (Imhof), 97, 640, 1465, 1465
Atlas du Québec et de ses régions, 103, 106
Atlas für Handelschulen (Peucker), 1102
Atlas für Politik, Wirtschaft, Arbeiterbewegung (Radó), 547, 1238
Atlas für Schweizerische Mittelschulen, 1041
Atlas général du Congo et du Ruanda-Urundi, 102, 105
Atlas Geográfico de la República Mexicana, 1353
Atlas géographique et historique du Congo belge et des territoires sous mandat du Ruanda-Urundi, 102, 105
Atlas istorii geograficheskikh otkrytiy i issledovanii, 1382
Atlas Leningradskoy oblasti i Karelskoy ASSR, 550
Atlas Linguarum Europae (ALE), 780–81
Atlas linguistique de la France (Gilliéron & Edmont), 779
Atlas mira. See Bol'shoy sovetskiy atlas mira
Atlas Moskovskoy oblasti, 102, 103, 550
Atlas Nacional de España, 90
Atlas Nationaux (IGU Commission on National Atlases), 97, 1382
Atlas Niedersachsen, 102, 103
Atlas of American History, 598
Atlas of Antarctica, 70
Atlas of Britain and Northern Ireland, 419, 504, 1440
Atlas of California, 103, 105
Atlas of Canada, 18, 96, 116–17, 314, 1501
Atlas of Central Europe, 103, 104
Atlas of Climatic Types in the United States 1900–1939, 102, 104
Atlas of Distribution of Diseases (American Geographical Society), 51, 52, 53, 404, 404, 405
Atlas of Early American History (Cappon), 92, 1095
Atlas of Egypt, 1501
Atlas of England and Wales (Saxton), 1001–2
Atlas of Fantasy, An (Post), 91, 782, 783, 796
Atlas of Great Lakes Indian History (Tanner), 92, 94
Atlas of Historical County Boundaries, 94, 96
 Atlas of Historical County Boundaries project (Newberry Library), 95
Atlas of Meteorology, 703
Atlas of North American English, 781
Atlas of Oregon, 103, 105, 315, 316
Atlas of Population Patterns in Metropolitan Los Angeles and Orange Counties, 1990, An, 311
Atlas of Switzerland, 90, 661
Atlas of the Arab World, 113, 114
Atlas of the Arab World and the Middle East, 102
Atlas of the European Conflict (Rand McNally), 1503
Atlas of the Heavens (Atlas coeli), 1460, 1461
Atlas of the Historical Geography of the United States (Paullin & Wright), 92, 350, 352, 354, 604, 1529
Atlas of the Interpretation of Multispectral Scanner Images (Sagdeev et al.), 1285
Atlas of the Irish Rural Landscape, 604
Atlas of the New West: Portrait of a Changing Region, 103, 105, 106
Atlas of the State of New Jersey (Westgard), 46
Atlas of the World's Commerce, 703
Atlas of Uganda, 124, 301, 302
Atlas of United States Mortality (U.S. Center for Disease Control), 1074, 1084
Atlas of Winnipeg, 103, 105
Atlas of Zoogeography, 703
Atlas öfver Finland (Atlas of Finland), 18, 96, 117, 117–19, 118, 131, 1465, 1501
Atlas okeanou, 848, 1382, 1383
Atlas Ost- und Südosteuropa, 103, 106
Atlas över Sverige (Lundqvist), 97, 407, 408
Atlas pastoral pour la Mauritanie et le Sénégal, 102, 105
Atlas Permanent (publisher) (Switzerland), 1238
Atlas promyshlennosti SSSR, 550
Atlas scolaire suisse pour l'enseignement secondaire, 1041
Atlas sive cosmographicæ meditationes de fabrica mundi et fabricati figura (Mercator), 91
Atlas Śląska Dolnego i Opolskiego, 103, 105
Atlas stratégique (Chaliand & Rageau), 544
Atlas till folk-och bostadsräkningen, 311
Atlas van Nederland, 97, 1362
Atlas van Tropisch Nederland, 1611
Atlas vedr. regionaludvikling, 417
Atlas zum Zeitgeschehen, 440
Atlas zur Erd- und Länderkunde (Haefke & Heyde), 722–23
Atlas zur Raumentwicklung (West Germany), 17
Atlas zur Weltgeschichte, 723
Atlas: Le monde diplomatique, L', 544
 Atlases, 89–116. *See also specific atlases*
 bivariate maps in, 130–31
 climate maps in, 228
 collecting, 248, 251
 cultural, 642, 643
 electoral mapping and, 350
 electronic. *See* Electronic atlases
 Eselte Kartor AB, 409
 European Union, 417
 facsimile, 90–92, 608
 Freytag-Berndt und Artaria KG, 440
 geographical mapping and, 523
 geopolitical cartography and, 544
 Hammond Map Company, 575–76, 576
 historical, 92–94, 94, 350, 352, 354, 604–5

- historical-boundaries, 94–96
John Bartholomew & Son, 703, 704, 705, 706
in map libraries, 768, 770
marine charting and, 818, 818
mass marketing and, 861
national. *See* National atlases
persuasive, 1094
projections for, 108, 115, 871, 1183
regional, 18, 101–6, 102–3, 104, 106
satellite imaging and, 1285–86, 1288
school. *See* School atlases
statistical, 96, 112, 212, 1463, 1463, 1657
subscription, 91, 110–12, 111
thematic, 112–15, 114
urban, 1651
Verlag Ed. Hözel, 1675–76, 1675, 1676
war, 1503
world. *See* World atlases
Zhongguo kexueyuan, 1784
- Atmospheric cartography. *See* Meteorology
ATOM (Automatic Topographic Mapper), 1442
ATRAN (automatic terrain recognition and navigation), 289–90
ATS (Applications Technology Satellite), 873–74
Audiovisual maps. *See* Sound
Aurousseau, Marcel (1891–1983), 1085, 1086
Ausgabe für die Volkswirtschaft (AV) (East Germany), 199, 199, 200, 1589, 1589
Ausgabe Staat (AS) (East Germany), 199, 199, 200, 1589
Auster, Paul (b. 1947), 783
Austral Wheel, 1363
Australia
cadastral mapping, 185
cadastral surveying, 1217–19
cartographic societies, 1414–15
geodetic surveying, 483, 483, 483–85, 484, 485
geographic names, 513
intellectual property, 656, 657
marine charting, 854–55
military mapping, 974–77, 975
road mapping, 1363–65, 1364
topographic mapping, 1612–15, 1613, 1614, 1615
Australia New Zealand Land Information Council (ANZLIC), 1219, 1613, 1647
Australian and New Zealand Map Society (ANZMapS), 1414–15
Australian Antarctic Division, 70
Australian Map Circle (AMC), 1422–23
Australian National Spheroid, 483, 484
Australian Spatial Data Infrastructure (ASDI), 1219, 1613
Austria, 103–4, 1582, 1582. *See also* Europe
Australian Geodetic Datum, 483, 484–85
Australian Height Datum (AHD), 484
Austro-Hungarian empire. *See also* Austria
alpine cartography, 43
military mapping, 924, 924–27, 926, 963, 1771, 1771
post–World War I settlement and, 337
school atlases, 107
topographic mapping, 43, 925, 926, 963, 1549, 1587, 1771, 1771
Auto-Carto (International Symposium on Computer-Assisted Cartography), 56, 59, 318, 386–87, 504, 505, 1212, 1406
Auto Trails maps (Rand McNally), 618, 1344, 1346, 1737
Autodesk (software), 1435
Autography, 738
Autoline system, 1663
AUTOMAP (software), 1441
Automated name placement, 358, 375–78, 376, 377, 384, 505
Automatic Model Production System (AMPS), 1266
Automatic radio compass (ADF), 1014
Automatic Stereo-mapper, 1296
Automatic Vehicle Location (AVL), 1717, 1718
Automation. *See also* Electronic cartography
development impacts
Bertin, 123
choropleth symbolization and, 221, 223–24, 223
coordinate systems and, 282
definitions of, 358
Experimental Cartography Unit and, 419
exploratory data analysis and, 419
generalization and, 371–72, 373
geographic information systems and, 507
geographic names and, 518
relief depictions and, 1484
Tobler on, 1534
topographic mapping and, 1544, 1544, 1545
U.S. Geological Survey, 1663, 1664
Automobile Association (AA) (United Kingdom), 24, 119–20, 284
Automobile Blue Book series, 47, 1342, 1342, 1346
Automobile Club of America, 1340
Automobile Club of Southern California (ACSC), 47
Automotive navigation systems. *See* In-vehicle navigation systems
Automóvil Club Argentino (ACA), 1352–53, 1564
Autonomous underwater vehicles (AUV), 627
Autoplot system, 1663
Availability of cartography. *See* Democratization of cartography
Avery, Elroy McKendree, 744
AVHRR (Advanced Very High Resolution Radiometer), 71, 320, 991, 992, 1544
Aviation. *See also* Aerial photography; Aeronaautical charts; Airline maps
International Civil Aviation Organization, 26, 27, 274–75, 672–77, 692, 1015–16, 1018, 1648, 1765
navigation for, 1010–11, 1013, 1013
projections and, 1179
Aviation Cartography (Ristow), 1732
Ayer, Edward Everett (1841–1927), 245
Azimuthal projections, 34, 243, 543, 546, 997, 1179. *See also* Polar projections
Azusa Mod II, 356
B. F. Goodrich (company) (United States), 1344
Baarda, W. (1917–2005), 460
Babcock, Frederick Morrison (1898–1983), 1254
Baber, Mary Arizona (Zonia) (b. 1862), 1416
Babson, Roger Ward (1875–1967), 561, 562
Bacchus, Michel, entry by, 645–49
Bachi, Roberto (1909–1995), 213, 1466, 1467
Backus, George (b. 1930), 535
Badan Koordinasi Survei dan Pemetaan Nasional (BAKOSURTANAL) (Indonesia), 1611–12
Baedeker, Karl (1801–1859). *See* Baedeker Publishing
Baedeker Publishing
cartographic style, 1690, 1691
guidebooks, 1620, 1627, 1627
hiking/trail maps, 1712, 1713
Nazi Germany and, 1691–92
Bagley, James Warren (1881–1947), 1104, 1549
Bagrow, Leo (Lev Semenovich Bagrov) (1881–1957), 121, 121, 608, 609, 636
Bahrain, 1600
Baigent, Elizabeth, 613
Bailey, Oakley H. (1843–1947), 1020
Bailyn, Bernard (b. 1922), 598
Baker, Alan R. H. (b. 1938), 600
BAKOSURTANAL (Badan Koordinasi Survei dan Pemetaan Nasional) (Indonesia), 1611–12
Balbi, Adriano (1782–1848), 221
Balchin, W. G. V. (1916–2007), 1069–70, 1491
Balkans. *See also* Eastern Europe; specific countries
Dayton peace accords, 141, 142, 143, 143, 162, 892, 1669
ethnographic mapping, 295, 411, 777
geographic names, 512
nation-state formation/maintenance, 1003
topographic mapping, 1587
Balloon observation, 566
Antarctica, 64
Arctic, 75
for meteorology, 873
military mapping and, 884, 884, 1273, 1668
photogrammetric mapping and, 1127, 1133
U.S. intelligence community mapping, 1668
Bancroft, Hubert Howe (1832–1918), 245

- Bandanna maps, 233, 234, 235, 310
 Banks, David, 1520
 Banse, Ewald (1883–1953), 317
 Banyai, Istvan (b. 1949), 813
 Bar-Gal, Yoram, 1002
 Barabba, Vincent P. (b. 1934), 1467
 Baranskiy, Nikolay N. (1881–1963), 101, 103, 135, 340–41, 1465, 1641
 Barbara Petchenik Children's World Map Competition (ICA), 218–19, 672, 1095, 1375
 Barbor, Ken, entry by, 682–85
 Barbujani, Guido (b. 1955), 446
 Barclay, Robert, 1323
 Barlow, Samuel L. M. (1826–1889), 245
 Baron, Nick, entry by, 1766–70
 Barracough, Geoffrey, 93
 Barrass, Clive, 1363
 Barrett, Andrea (b. 1954), 785
 Barriers. *See* Boundary delineation
Barrington Atlas of the Greek and Roman World (Talbert), 605
 Barthelmess, Richard (1895–1964), 246
 Barthes, Roland (1915–1980), 308, 612
 Bartholomew, George (1784–1871), 701
 Bartholomew, Harland, 752
 Bartholomew, John (I) (1805–1861), 701
 Bartholomew, John (II) (1831–1893), 701
 Bartholomew, John (Ian) (1890–1962), 703
 Bartholomew, John Christopher (1923–2008), 703, 705
 Bartholomew, John George (1860–1920), 701. *See also* John Bartholomew & Son
 Bartholomew, Peter Hugh (1924–1987), 703
 Bartholomew, Robert Gordon (b. 1927), 703
Bartholomew's Reduced Ordnance Survey of Scotland, 701
Bartholomew's Revised Half-Inch to Mile Map for Tourists, 1362
 Bartlett, M. S. (1910–2002), 1470
 Bartlett, Richard A., 609
 Barton, Donald C. (1889–1939), 530
 Barzini, Luigi Giorgio (1908–1984), 1069
 Base-in, base-out method (photogrammetry), 1110–11, 1110, 1129–30
Basic Cartography for Students and Technicians, 1412
 Baskes, Roger, 247
 Basoglu, Umit, 362
 Bassett, Thomas J., entry by, 1355–59
 Batchelor, Francis J. (1877–1943), 1372
 Batellier, Jean-François (b. 1947), 1164
Bateman New Zealand Historical Atlas-Kō Papatuanuku e Takoto Nei, 604
Bathymetric Map of the Antarctic (American Geographical Society), 51, 66
 Bathymetric mapping. *See also* GEBCO; Hydrography; Marine charting; Seafloor mapping
 Antarctica, 51, 66
 Arctic, 74, 76, 78, 79, 1027
 Canada, 830
 Digital Bathymetric Data Base, 1028
 Experimental Cartography Unit, 419, 420, 421
 Global Positioning System for, 632
International Bathymetric Charts, 76, 78, 848, 1027
 satellite imaging for, 819, 1026, 1027
 sea-surface altimetry and, 630
 TIBS, 625–26
Bathymetrical Survey of the Scottish Fresh-Water Lochs (Murray), 701
 Batson, Raymond M., 794
 Battersby, Sarah E., 1181
 entry by, 418–19
 Battlefield maps, 1627, 1628, 1636
Baudolino (Eco), 785
 Bauer, Kurt W., 1198
 Baum, L. Frank (1856–1919), 783, 986, 987
 Bayerische Kommission für die Internationale Erdmessung (BEK), 470
 Baynton-Williams, Ashley (dealer), 1535
 entry by, 248–51
 Baynton-Williams, Lawrence (1900–1973) (dealer), 248, 249, 249
 Baynton-Williams, Roger (1936–2011) (dealer), 247, 249, 250
 Baynton-Williams Gallery (London), 248, 249, 250
BBC Domesday Project (United Kingdom), 90
 BCS (British Cartographic Society), 200, 727, 772, 798, 800, 1421
 BD Carto (topographic map series), 374, 648, 648
 BD TOPO (topographic map series), 374
 Beach, William W., 94
 Beaman, W. M., 1546
 Bean, Russell K., 1111–12, 1142, 1144, 1663
 Beans, George H. (1894–1978), 246
 Beaufort, Francis (1774–1857), 837
 Beaumonts-Beaupré, Charles-François (1766–1854), 623, 842
 Beaux-Arts movement, 1158, 1159
 Beaver, Carol, 1759
 Beazley, G. A. (1870–1961), 1113, 1121
 Beck, Anne Louise, 873
 Beck, Henry Charles (Harry) (1902–1974), 788–92, 790. *See also* London Underground Map
 Beckel, Lothar (b. 1934), 548
 Becker, Fridolin (1854–1922), 44, 736, 1260, 1262, 1267
 Becker, J. J., 1028
 Becker, Richard A. (b. 1949), 421
 Bečvář, Antonín (1901–1965), 1460, 1461
 BEDMAP (Antarctic Bedrock Mapping Project), 70
 Bednarz, Sarah Witham, entry by, 347–49
 BEF (British Expeditionary Force), 1770
 Behrmann, Walter (1882–1955), 340, 341, 1100
 Beijing zuobiaoxi (Beijing geodetic coordinate system), 1604
 Beinecke, Frederick W. (1887–1971), 245
 Beinecke Library (Yale University), 72
 Belarus, 411
 Belew, Ruth, 783
Belfast Confetti (Carson), 785
 Belgium. *See also* Europe
 colonial/imperial cartography, 105, 474, 959, 4109
 topographic mapping, 1579, 1584, 1586, 1586
 Bell, James Ford (1879–1961), 245
 Bellot, Léon-Henri-André (1873–1942), 646
 Bellwood, Peter, 72
 Belousov, Vladimir V. (1907–1990), 679
 Ben Day tints, 334, 1148, 1149, 1309–10, 1314, 1327
 Bender, A. R. E., 1337
 Bender folding system, 1337
 Benet, Juan (1927–1993), 783
 Bennett, Edward H. (1874–1954), 1157, 1630, 1630
 Bennett, Floyd (1890–1928), 76
 Bennett, Mark, 814
 Bennett, Matthew, 1490
 Benson, Betty, 1440, 1477
 Benson series, 1777, 1778
 Bentham, Jeremy (1748–1832), 1170
 Bentham, Samuel (1757–1831), 1170
 Berann, Heinrich C. (1915–1999), 533, 997, 1020, 1022, 1025, 1500
 Berg, L. S. (1876–1950), 1418
 Bergen School theory of meteorology, 873, 1743–44, 1745
 Bergen van der Grijp, D. H. G. van (1905–1983), 1611
 Berget, Alphonse (1860–1934), 212
Berghaus' Physikalischer Atlas, 1182
 Bergson, Henri (1859–1941), 764
 Bergstrand, Erik (1905–1987), 454, 460, 1196
 Berkner, Lloyd V. (1905–1967), 679
 Berlin Conference (1884–1885), 301, 303, 539
 Berlyant, A. M., entry by, 1382–83
Bermuda Runners' Map, 1253
 Berne Convention for the Protection of Literary and Artistic Works, 655, 656, 657
 Berners-Lee, Tim (b. 1955), 661, 1751
 Bernier, Joseph-Elzéar (1852–1934), 74
 Berry, Brian J. L. (b. 1934), 362, 364, 525, 583, 584, 1440, 1529
 Bertarelli, Luigi Vittorio (1859–1926), 1615, 1616, 1619
 Bertiglia, Aurelio (b. 1891), 1163
 Bertin, Jacques (1918–2010), 121–23
 academic cartography and, 6–7, 10, 342, 345
 on bivariate maps, 131
 Chinese military mapping and, 945
 Freitag and, 10
 historical cartography, 599, 599
 perception/cognition and, 346
 on semiology, 6–7, 122–23, 123
 on spatial thinking, 1060
 on statistical mapping, 1466
 on thematic mapping, 1509

- Bertrad, Hermann von (1857–1940), 909, 914
- Bertschmann, Simon (1893–1989), 180
- Besag, Julian (1945–2010), 1470
- Bessel, F. W. (1784–1846), 455, 486
- Bessel ellipsoid, 836, 927, 1606
- Bessel spheroid, 479, 935
- Bessero, Gilles, entry by, 840, 842–43
- Besswerger, Charles, 1050
- Bevington-Attardi, D., entries by, 101–6, 1462–68
- Beythien, Hermann, 212
- BGN (U.S. Board on Geographic Names), 133–35, 319, 443, 1085
- Bianco, Andrea (fl. 1436–1460), 785
- Bias. *See* Eurocentric bias; Persuasive cartography
- Bibliographia Cartographica*, 719, 1412
- Bibliographic Guide to Maps and Atlases*, 1452
- Bibliographie Cartographique de la France*, 1452
- Bibliographie cartographique internationale*, 1452
- Bibliographies. *See* Cartobibliography
- Bibliotheca Cartographica*, 719, 1412
- Bibliothèque nationale (BN) (France), 191, 772, 773
- Bibliothèque royale (France), 771
- Bickmore, David P.
- academic cartography and, 342
 - analytical cartography, 56
 - digitization and, 357, 1036
 - on display hardware, 370
 - Euro-Carto conference, 387
 - Experimental Cartography Unit and, 418, 419
 - geographic information systems and, 1440
 - on map production, 504
 - national atlases, 97
 - on printing, 509
 - thematic mapping and, 1508
- Bidimensional regression, 56
- Biehl, Katherine, 1468
- Bier, Jess, entry by, 804–5
- Big Bang theory, 87–88
- Big Bird (Hexagon) (satellite), 1669
- Bigelow, Frank H. (1851–1924), 872
- Biger, Gideon (b. 1945), 967
- Bigler, Stuart G., 875
- BIH Terrestrial System (BTS), 466–67
- Bildhauer der Berge* (Imhof), 640
- Bina, Eric, 1751
- Biogeographical cartography, 124–29
- aerial photography for, 1119, 1121
 - American Geographical Society, 53
 - Bretschneider, 124, 125
 - climate maps and, 228
 - Forrest, 124, 126
 - French method, 128, 129
 - Handel-Mazzetti, 124, 127
 - photomosaics for, 1543, 1543
 - satellite imaging for, 1278–79, 1279
- Biological hazards. *See* Epidemiological maps
- Bird's-eye views. *See* Perspective maps
- Birdsall, Stephen S. (b. 1940), 94
- Birdseye, C. H. (1878–1941), 805
- Birney, Earle (1904–1995), 783, 784, 785
- Bishop, Elizabeth (1911–1979), 785, 787
- Bishop, Ian D., 1681
- Bishop, John, 786
- Bivariate maps, 122, 129–33, 130, 131, 132.
- See also* Multivariate maps
- Bjerhammar, Arne (b. 1917), 460, 980
- Bjerknes, Jacob (1897–1975), 873
- Bjerknes, Vilhelm (1862–1951), 873
- BKG (Bundesamt für Kartographie und Geodäsie) (Germany), 176–78, 179
- Blachut, T. J., 424
- Black, Jeremy (b. 1955), 92, 304, 599, 1089
- Black Book (Paris Peace Conference), 701, 1050, 1051, 1052, 1053, 1234
- Blackburn, Henry (1830–1897), 1146
- Blais, J. A. R., 1553
- Blakemore, M. J., 91, 205, 509, 579, 612
- Bland, Gilbert, Jr., 72
- Bland, K. W., 667
- Blank, William J., 1050
- Blaupunkt (company), 1718
- Blaut, James M. (1927–2000), 217, 1076, 1080, 1530
- Block diagrams, 1, 788, 1050
- Block Diagrams and Other Graphic Methods Used in Geology and Geography* (Lobeck), 788
- Block-pile approach, 1516, 1516
- Block plots, 953–54
- Blodget, Lorin (1823–1901), 1415
- Blueprinting, 330, 1305–6, 1305
- Blum, George W., 1252
- Blumer, Walter (1888–1987), 45
- Board, Christopher, 9, 945
- entries by, 232, 597, 798–800, 1734–39
- Boas, Franz (1858–1942), 1234
- Bobek, Hans (1903–1990), 54
- Bodleian Library (Oxford University), 661, 1450
- Bodo, Fritz, 103–4
- Boelcke, Siegfried (1876–1930), 911
- Boesch, William E., 332–33
- Bogan, Louise (1897–1970), 787
- Boggs, Samuel Whittemore (1889–1954), 146, 977, 993, 1088, 1177, 1179, 1193, 1402
- Boggs eumorphic projection, 1177, 1179, 1193, 1503
- Böhle, Klaus (1925–2003), 1163
- Böhler, Heinrich, 1573
- Bol, Peter Kees (b. 1948), 96
- Bol'shakov, V. D., 983
- Bol'shoy sovetskiy atlas mira* (BSAM), 135–36, 137, 550, 1193, 1382, 1501, 1502, 1640–41
- Bolivia, 1560. *See also* Latin America
- Bollettino di Geodesia e Scienze Affini* (journal), 478
- Bollmann, Hermann (1911–1971), 1020, 1630, 1631, 1652
- Bomford, Guy (1899–1996), 477, 1182
- Bonacker, Wilhelm (1888–1969), 317
- Bonch-Bruyevich, Mikhail Dmitriyevich (1870–1956), 982
- Bond, Barbara A., 1759
- entry by, 1709–11
- Bonne projection, 1182, 1184, 1188, 1192
- Bonpland, Aimé (1773–1858), 1392
- Book of Old Maps*, A (Fite & Freeman), 246
- Booth, Charles (1840–1916), 288, 314, 315–16
- Borchert, John R. (1918–2001), 397
- Borcic, Branko, 317
- Borders. *See* Boundary delineation; Boundary surveying; Political boundaries
- Borges, Jorge Luis (1899–1986), 555, 787
- Boria, Edoardo, 541
- Borodko, A. V., 1213
- Boroli, Achille, 698
- Boroli, Adolfo (d. 1996), 698, 699
- Boroli, Marco, 698
- Boroli, Marco Adolfo (d. 1961), 696, 698
- Borri, Roberto (b. 1954), 250
- Börtzell, Johan Erik Algernon (1840–1918), 408
- Borzov, Aleksandr A. (1874–1933), 135, 985
- Bos, E. S., 317
- Bosnia-Herzegovina, 141, 142, 143, 162
- Bossler, John D., entry by, 465–68
- Boston Public Library, 72, 766
- Botanical maps. *See* Biogeographical cartography
- Botswana, 157. *See also* Africa
- Bouguer, Pierre (1698–1758), 454
- Bouguereau, Maurice (d. ca. 1595), 297
- Boulanger, Philippe, entry by, 904–9
- Boundaries of Home: Mapping for Local Empowerment* (Aberley), 1094
- Boundary commissions. *See* Boundary disputes; Boundary surveying
- Boundary delineation, 210, 360–61, 378–82, 379, 380, 447, 779. *See also* Cadastral mapping; Political boundaries
- Boundary disputes, 136–43, 140, 142, 146, 151, 892, 1645, 1645
- Boundary surveying, 143–76. *See also* Political boundaries
- Africa, 153–58, 155, 321, 956
 - Asia, 168, 168–76, 170, 171, 172, 173, 174, 175–76, 1476
 - Close, 154–55, 232
 - Europe, 158–62, 159, 160, 161
 - Holdich, 158, 618, 619
 - Latin America, 146–53, 148, 149, 618, 619, 664, 1564
 - Middle East, 163–68, 164, 165, 166, 167
 - North America, 143–46, 143–46, 145, 146
 - post-World War I settlement and, 158–61, 160, 161, 163, 165, 619, 701, 1235
- Bowden, Martyn J., entry by, 1779–80

- Bowie, William (1872–1940), 454–55
- Bowman, Doug A. (b. 1971), 1680
- Bowman, Isaiah (1878–1950)
- Millionth Map and, 50, 690, 700
 - post–World War I settlement and, 50, 1049–50, 1053, 1169, 1234
 - race and, 1234, 1235–36
 - secrecy and, 1169
- Boyle, A. Raymond, 59, 357, 489
- Boyle, Lucinda, entry by, 1336–38
- Braback, John W., 1050
- Bradford, William (1590–1657), 598, 599
- Brahmagupta (598–668), 694
- Braille, 1480, 1481, 1482, 1724, 1725
- BrailleNote GPS, 1724, 1725
- Brainerd, Paul (b. 1947), 1434
- Branch, Melville Campbell (1913–2008), 1114
- Brandstätter, Gerhard, entry by, 43–46
- Brandstätter, Leonhard (1906–2012), 44, 45, 45
- Brandt, Willy (1913–1992), 1100
- Brannon, Gary R., 334
- Brassel, Kurt E., 4, 1271
- Braudel, Fernand (1902–1985), 599, 600
- Braun, Georg (1541–1622), 112
- Braun, Lindsay Frederick, entry by, 251–55
- Braun-Blanquet, J. (1884–1980), 125
- Brawer, Moshe (b. 1919), 1675
- Brazil, 150, 388, 1353–54, 1355, 1408. *See also* Latin America
- Bretschneider, E. (1833–1901), 124, 125
- Brett, Reginald Baliol, 2d Viscount Esher (1852–1930), 1666
- Brewer, Cynthia A. (b. 1960)
- entry by, 504–10
 - on choropleth symbolization, 223, 1514
 - on color, 265, 1057, 1065, 1074, 1084, 1514
 - geographic information systems and, 504
 - illustration software and, 1437
- Brewer, J. M., 1255, 1259, 1260
- Brewer, William Henry (1828–1910), 443
- Briesemeister, William A. (1895–1967), 50, 51, 977, 1050
- Briesemeister elliptical equal-area projection, 51, 1174
- Briggs, L. I., 1427
- Brigham, Carl C. (1890–1943), 1233–34
- Bringhurst, Robert (b. 1946), 783
- Britain. *See* United Kingdom
- Britain and the British Seas* (Mackinder), 413
- Britannia* (Ogilby), 785, 1733
- British Antarctic Survey (BAS), 66, 70, 1274
- British Cartographic Society (BCS), 200, 727, 772, 798, 800, 1421
- British colonial/imperial cartography. *See also* Directorate of Overseas Surveys
- boundary surveying, 153, 154–55, 155, 156, 163, 169, 618
 - cadastral surveying, 1207–8, 1218
 - cartographic societies and, 1409
 - Colonial Survey Committee, 232, 255, 321, 895, 958, 1546, 1565
- ethnographic mapping and, 411
- geodetic surveying, 322
- limitations of, 253
- map reproduction, 322–23, 1146
- Middle East, 163, 902, 928–30, 966–67, 968, 1598, 1599
- military mapping, 897, 902, 928–30, 952, 953, 955, 956, 966–67, 968, 1598
- nation-state formation/maintenance and, 1001
- Ordnance Survey and, 958
- postcolonial cartography and, 323–24
- Southeast Asia, 971
- topographic mapping, 321, 323, 1565, 1565–68, 1567, 1568, 1598, 1599
- British Columbia Online Cadastre, 186
- British Empire Map of the World, The* (Parkein), 1181
- British Expeditionary Force (BEF), 1770
- British Geological Survey, 418, 464
- British Library, 771
- British military mapping, 894–904, 895, 902. *See also* British military mapping in World War II
- Cold War, 900
 - Falklands War, 902–3, 1496, 1498
 - Goings maps, 899, 900, 953, 954, 969, 1491, 1493, 1493, 1696, 1799
 - Gulf War (1991), 903
 - Middle East, 896, 902, 904, 928–30, 966–67, 968–69, 968, 969, 1598, 1599
 - North Africa, 899, 952, 953–54, 953, 954, 955, 955
 - Southeast Asia, 898–900, 971–72
 - sub-Saharan Africa, 894–95, 898, 902, 956–59, 957, 958, 961
 - World War I, 896, 896, 966–67, 968, 1770–71, 1770
- British military mapping in World War II
- aerial photography, 1118
 - Africa, 898, 953–54, 953, 954, 955, 959, 960, 961
 - Benson series, 899, 1123, 1777, 1778
 - Europe, 898, 899, 900, 901, 903
 - Goings maps, 899, 900, 953, 954, 969, 1491, 1493, 1493, 1696, 1799
 - Loper-Hotine Agreement (1942), 886–87, 899, 964–65, 971, 1778
 - map reproduction, 897–98
 - Middle East, 968–69, 969
 - photogrammetric mapping, 1107–8
 - Southeast Asia, 898–900, 971
 - surveying, 898, 898, 899, 904
- British Museum, 190, 771, 773
- British National Committee for Geography, 232
- British Oceanographic Data Centre, 445
- Broadbent, George R. (1863–1947), 1363, 1364
- Broc, Numa (b. 1934), 297
- Brockhaus ABC Kartenkunde* (Ogriszek et al.), 317
- Brody, Hugh (b. 1943), 642
- Brommer, Stéphane de (1905–1972), 667
- Bronk, Detlev W. (1897–1975), 993
- Brookes, Peter, 1163, 1164
- Brooks, Alfred H. (1871–1924), 1416
- Brown, Allan, 1739
- Brown, Clint, 403
- Brown, Daniel G., entry by, 495–504
- Brown, Duane C. (1929–1994), 1130
- Brown, Dwight A., 1505, 1521
- Brown, John Carter, 245
- Brown, Lloyd A. (1907–1966), 191, 246, 609–10
- Brownlie, Ian, 138
- Brückner, Eduard (1862–1927), 689, 1055
- Brunhes, Jean (1869–1930), 1050
- Brunhoff, Jean de (1899–1937), 217
- Brüning, Kurt (1897–1961), 41
- Brundson, Chris, 1471
- Brunton Pocket Transit compass, 207
- Brussels International Map Collectors' Circle, 1412
- Bryant, Henry G. (1859–1932), 1416
- Bryant, Nevin A., entry by, 991–93
- Bryce, James (Lord) (1838–1922), 1050
- Brzezinski, Zbigniew (b. 1928), 415
- Bubble sextant, 1013, 1013
- Buchroithner, Manfred F., 55, 619, 1282, 1283
- entries by, 54–55, 619–20, 1282–88, 1437–38
- Buckley, Aileen, entry by, 340–43
- Buell, Abel, 514
- BUFKIT (software), 876
- Bugayevskiy, Lev M., 795
- Buisseret, David (b. 1934), 604
- Buja, Andreas, 421
- Bulanzhe, Yu. D. (1911–1997), 983
- Bullard, Edward Crisp (1907–1980), 531, 1392
- Bulletin du Comité français de cartographie* (journal), 49, 719
- Bumstead, Albert H. (1875–1940), 258, 259, 996, 997
- Bundesamt für Bauwesen und Raumordnung (BBR) (Germany), 41
- Bundesamt für Eich- und Vermessungswesen (Austria), 926, 927
- Bundesamt für Kartographie und Geodäsie (Germany) (BKG), 176–78, 179
- Bundesamt für Landestopographie (swisstopo) (Switzerland), 178–82, 179, 180
- Hallwag Kümmerly+Frey AG and, 573, 737
- Himalaya cartography, 596
 - interactive mapping, 661
 - labeling and, 748
 - relief depictions, 179, 181, 1267
 - road mapping, 1361
- Bundesamt für Statistik (Switzerland), 661
- Bundesanstalt für Landeskunde und Raumordnung (Germany), 17
- Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) (Germany), 41
- Bunge, William (b. 1928), 268, 269, 379, 1088–89, 1088, 1094, 1529

- Bureau de recherches géologiques et minières (France), 842
- Bureau International de L'Heure (BIH), 466, 478
- Burgenland* (1921–1938): *Ein Deutsches Grenz land im Südosten*, 102, 103–4
- Burgess, Ernest Watson (1886–1966), 1254
- Burkina Faso, 156, 1572. *See also* Africa
- Burleigh, Lucien R. (1853–1923), 1020
- Burma, 134, 169, 171–72, 172, 971
- Burnett, D. Graham, 615
- Burnett, G. E., 1721
- Burnham, Bruce O., 497
- Burnham, Daniel H. (1846–1912), 1157, 1158, 1630, 1630
- Burrill, Meredith F. (1902–1997), 133–34, 516, 1646
- Burrough, P. A., 688, 994
- Burroughs, Edgar Rice (1875–1950), 796
- Burtch, Robert C., entry by, 1194–1200
- Burton, Alfred H., 888
- Bush, George H. W. (b. 1924), 568, 569
- Bush, Vannevar (1890–1974), 679
- Business geographics. *See* Commercial applications
- BusinessMAP (software), 401
- Buttenfield, Barbara P., 4, 5
entry by, 1642–44
- Buzai, Gustavo D., entry by, 387–89
- ByChrome Ltd. (company), 1324
- Byerly, Perry (1897–1978), 533
- Byrd, Richard Evelyn (1888–1957), 64, 76, 244
- C (programming language), 376
- Cabral, Amilcar (1921–1973), 308
- Cabrini Connection (Chicago), 269
- CAD software. *See* Computer-aided design (CAD) software
- Cadastral index maps, 183, 1486
- Cadastral Map in the Service of the State, The* (Kain & Baigent), 613
- Cadastral mapping, 183–86, 185
in administrative cartography, 16–17, 186, 186
boundary surveying and, 158, 161
digital cadastral databases, 185–86, 185, 1219, 1219
land use maps and, 751
production methods, 184
social theory and, 1400
Spain, 649, 652–54
surveying for. *See* Cadastral surveying
for taxation, 16–17, 183, 1484–88, 1485, 1487
Thrower on, 1525
- Cadastral plans, 183
- Cadastral surveying, 183–84, 186–89, 1194–1219. *See also* Cadastral mapping
for administrative cartography, 16, 188–89
aerial photography for, 184, 1216, 1218, 1299
Africa, 1205–10, 1206, 1207, 1208, 1226–27
- Australia/New Zealand, 188, 1217–19
- Europe, 1210–12, 1211
- Global Positioning System and, 187–88, 1197, 1220, 1224, 1226–27
- land description methods for, 1194–96, 1194, 1195, 1196
- Latin America, 1200–1205, 1202, 1203, 1204
- North America, 1194–1200, 1220, 1485–86
- photogrammetric mapping for, 184, 185, 188, 1486
- for postcolonial cartography, 324
- professional practices, 1198, 1199, 1204, 1209, 1220–21
- Public Land Survey System, 279, 280, 1195, 1485
- Russia/Soviet Union, 1212–17, 1215, 1216, 1217, 1218, 1378
- subdivision development and, 1198, 1200
- for taxation, 1201, 1485–86
- topographic mapping and, 1583
- Cadastre 2014, 185
- CAG (Canadian Association of Geographers) (L'Association Canadienne de Géographes), 1406, 1417
- Cahill, Bernard J. S. (1866–1944), 1177
- Caird, James (1816–1892), 248
- Calculus, 55
- Calder, Nigel, 238
- Caldwell, Patricia Suzanne, 1489, 1525
- Calendario atlante De Agostini*, 696, 698
- CALFORM (software), 221, 582, 1441, 1441
- Calkins, Hugh W., 507, 700
- Call, David A., entry by, 872–77
- Calvino, Italo (1923–1985), 787
- CAM (Cartographic Automatic Mapping) (software), 1431, 1664
- CAMA (computer-assisted mass appraisal), 1488
- Cambodia, 173–74, 174
- CAMEO (Computer-Aided Management of Emergency Operations) (software), 389–90, 592
- Cameron, John H., entry by, 1048–49
- Cameroon, 155, 155, 156, 156, 1572. *See also* Africa
- Camouflage, 1113, 1118
- Campbell, Bruce D., 1681–82
- Campbell, Craig S., 61
- Campbell, Eila M. J. (1915–1994), 610, 636
- Campbell, James B., entry by, 1298–1303
- Campbell, Joel, entry by, 1298–1303
- Campbell, John (b. 1932), 204–5
- Campbell, Tony, 1419
entries by, 636–38, 1535
- Campus maps, 1704–6, 1705, 1706, 1726
- Canada. *See also* Canada Geographic Information System; First Nations; North America
- academic cartography, 4, 343
- Arctic maps, 73, 77
- Arctic territorial claims, 73–74, 76
- cadastral surveying, 1194–1200, 1220
- Cartographica* (journal), 200, 201–2
- Digital Nautical Charts, 465
- geographic names, 134
- geographical societies, 1417
- intellectual property, 656
- marine charting, 829–30
- meteorology, 875–76
- military mapping of, 951–52
- national atlases, 18, 90, 90, 96, 100, 116, 314, 1501
- national map collection, 771
- Northwest Passage, 144, 146
- photogrammetric mapping, 1108–9
- road mapping, 1339–50
- topographic mapping, 1552–54, 1554, 1555
- U.S. boundary surveying, 139, 144, 145, 146, 146
- Canada Centre for Geomatics, 1555
- Canada Gazetteer Atlas*, 519
- Canada Geographic Information System (CGIS), 189–90, 190
accuracy and, 14
ArcInfo and, 399
data models in, 360, 1439
image processing software and, 501
map production, 504
origins of, 1439–40
spatial analysis and, 490, 495
- Canada Land Inventory (CLI), 189, 749
- Canadian Association of Geographers (CAG), 1406, 1417
- Canadian Automobile Association (CAA), 1346
- Canadian Basic Net, 467
- Canadian Cartographer* (journal), 1406
- Canadian Cartographic Association (CCA) (L'Association Canadienne de Cartographie) (ACC), 1406–7
- Canadian Geodetic Vertical Datum, 467, 1553
- Canadian Geographer* (journal), 1417
- Canadian Geographic* (journal), 1417
- Canadian Geographical Society, 1417
- Canadian Geospatial Data Infrastructure, 100
- Canadian Hydrographic Service (CHS), 445, 829, 830
- Canadian Institute of Geomatics (CIG), 1406, 1198
- Canadian Institute of Surveying (CIS), 1405, 1406
- Canadian International Development Agency (CIDA), 1555
- Canadian Permanent Committee on Geographical Names, 134
- Canadian Spatial Reference System (CSRS), 467
- Canadian Wheelmen's Association (CWA), 1339
- Canny boundary delineation operator, 381
- Canonical structure, 57–58, 58
- Canters, Frank, 1172
entries by, 1172–74, 1182–84
- Canters projection, 1175

- Cantor, Georg (1845–1918), 867
 Capdevila Subirana, Joan, entry by, 158–62
 Cape Datum, 473
Cape Peninsula (TSO), 1576, 1578
 Capitalism, 307, 539
 Capman, Mick, 431
 Cappon, Lester Jesse (1900–1981), 92
 Capsule (microcapsule) paper, 1481–82,
 1723–24, 1725
 Caquard, Sébastien, entries by, 226–27,
 986–91
 CAR (conditional autoregressive) structure,
 1470
 Carbonnat, Louis de (1879–1959), 226
 Cardoso, Fernando Henrique, 308
 Carey, S. Warren (1911–2002), 531
 CARIS (Computer Aided Resource Information System) (software), 496, 499, 830
 Carl Mannerfelt Gold Medal (ICA), 409
 Carlier, Pierre, 733
 Carlson, Chester Floyd (1906–1968), 1307,
 1324
 Carlucci, April, entry by, 1531–32
 Carney, David, entry by, 951–52
 Carpine-Lancré, Jacqueline, entry by, 444–45
 Carpini, John de Plano, 1678
 Carr, Daniel B., 422
 entries by, 419, 421–23
 Carroll, Lewis (1832–1898), 555, 1383
 Carson, Ciaran (b. 1948), 785
 Carson, Rachel (1907–1964), 389
 CART-8 (digitizing and editing system), 357
Carta-Base della Futura Europa Politica,
 158, 160
Carta Corográfica de Portugal, 1579
Carta d'Italia (IGM), 921–22, 922, 1362,
 1616, 1616, 1617
Carta do Brasil, 690, 764
Carta Hungarica Collection, 248
Carta marina (Magnus), 785
Carta topografica d'Italia, 922, 923
Cartactual (journal), 1235, 1239
Carte, La (Kish), 610
Carte de la frontière Gréco-Turque, 161
Carte de l'Indo-chine, 169
Carte du Ciel, 1459
Carte du france, 1583, 1583
Carte figurative (Minard), 194
Carte figurative de l'instruction populaire de la France (Dupin), 221
Carte générale bathymétrique des océans. See
 GEBCO
Carte géométrique de la France, 1579
Carte internationale du tapis végétal, 127
Carte Michelin, 1362
Carte routière/Strassengefälkkarte, 736
Carte topographique de Belgique, 1579
 Carter, James R., entries by, 225–26, 292–94,
 1488–90, 1744–50
 Carter, Paul (b. 1951), 612
Cartes anciennes de l'Église de France (Dainville), 297
 Cartesian coordinate systems, 278–80, 279,
 280, 361, 362, 431, 1187
Cartiform (journal), 1239
 Carto-Québec, 1407
 Cartobibliography, 190–93, 192, 193
 Dainville, 297
 history of cartography and, 608
 map availability and, 1452
 map collecting and, 245, 251
 map theft and, 72
 national map collections and, 773
 Tooley, 1535
 Western European cartographic societies
 and, 1412
 Cartoconsult Austria, 594, 595
 Cartografia (Kartográfiai Vállalat) (Hungary)
 (publisher), 1238
Cartografia e cartógrafos portugueses dos séculos XV e XVI (Cortesão), 285
Cartografia portuguesa antiga (Cortesão),
 285
 Cartograms, 193–97, 195, 196. *See also*
 London Underground Map
 analytical cartography and, 56
 for census mapping, 210, 1518
 for demographic mapping, 56, 194, 195,
 313–14, 314
 for electoral mapping, 195, 352, 355,
 1503, 1516, 1518, 1520
 for ethnographic mapping, 777
 for statistical mapping, 1193, 1467
 temporal dynamics and, 1529
 Tobler on, 195, 1516, 1534
 WorldMapper Project, 1516, 1519
Cartographer (journal) (Canada), 49, 200,
 201
 Cartographic aggression, 138–39
 Cartographic anxiety, 1402
 Cartographic Automatic Mapping (CAM)
 (software), 1431, 1664
 Cartographic conventions, 273–78,
 274, 275, 276, 1585. *See also*
 Symbolization
Cartographic Design (Wood & Keller), 1073
Cartographic Design and Production
 (Keates), 728
 Cartographic dictionaries, 202, 317–18
 Cartographic duplicity. *See also* Secrecy
 East Germany, 197–200, 199, 1652
 Soviet Union, 1641
Cartographic Encounters (Lewis), 612
Cartographic Journal, The, 49, 200–201,
 718, 719, 728
Cartographic Materials: A Manual of Interpretation for AACR2, 773
Cartographic Perspectives (journal), 49, 83,
 1407
Cartographic Relief Presentation (Kartographische Geländedarstellung) (Imhof),
 345, 610, 640, 1262
 Cartographic School (Panama), 665
 Cartographic societies, 1405–15. *See also*
 specific societies
 Africa, 1409–10
 Australia/New Zealand, 1414–15
 cadastral surveying, 1198, 1209
 Eastern Europe, 1413–14
 geographic information systems, 494,
 1407
 Latin America, 1408–9
 North America, 1405–8
 Western Europe, 1410–13, 1411
Cartographic Strategies of Postmodernity
 (Mitchell), 785
 Cartographic style, 1471–73. *See also* Color;
 Labeling; Map design; Relief depictions;
 Standards for cartographic information;
 Symbolization; *specific cartographers and styles*
 classical style, 274, 1331, 1332
 in hazard/risk mapping, 1472
 in journalistic cartography, 33, 34,
 580, 580, 582, 708, 713, 715, 717,
 1471–72
 Keates, 727, 727
 National Geographic Society, 257–58,
 258, 861, 996, 997, 1472, 1503
 Swiss style, 1261–62. *See also* Imhof's
 cartographic style
 in topographic mapping, 1472, 1547–48,
 1550, 1551, 1572, 1573
 Wagner & Debes, 1691, 1692
 wax engraving and, 739–40, 744, 745,
 1245, 1331, 1436, 1472, 1702
 Cartographic visualization, 1683–89. *See*
 also Geovisualization
 analytical cartography and, 59
 animation and, 63, 1686, 1688
 boundary disputes and, 1669
 hypermapping and, 1686, 1687
 Internet and, 1686–87
 multimedia maps and, 1686, 1687, 1688
 process of, 1683–84, 1684
 textbooks and, 346
 timeline, 1684
 virtual reality and, 1681–82, 1687–88
Cartographica (journal), 200, 201–2, 718,
 719, 1406–7
Cartographical Innovations (Wallis & Robison), 610
 “Cartographies” (Sonenberg), 784
 “Cartographies of Silence” (Diehl), 807
Cartographies of Travel and Navigation
 (Akerman), 1732
Cartographies Schizoanalytiques (Guattari),
 807–8
 “Cartography” (Bogdan), 787
Cartography (journal) (Australia), 49, 1414
 Cartography, definitions of, 10
Cartography and Geographic Information Science (journal), 49, 56, 718, 1406
 Cartography and Geographic Information Society, 49, 387
Cartography and Geographic Information Systems (journal), 49, 56, 718, 1406
Cartography in France (Konvitz), 613
 Cartography labs, 343
Cartography: Thematic Map Design (Dent),
 259
 “Cartohypnosis” (Boggs), 1088

- Cartometry, 202–6, 203, 204, 205, 798
Cartoon maps, 61, 1092, 1093
 political, 1092, 1093, 1162–65, 1164
Cartophiles (United States), 1419–20
CartoTravel (Germany) (publisher), 1250
Cartur Mapas (Colombia) (publisher), 1353
Cartwright, William (b. 1948), 670, 1682
 entries by, 633–34, 659–62
Carver, Larry, entry by, 318–20
Carwood, Mary, 1050
Casablanca (film), 226, 227
Case Concerning Sovereignty over Certain Frontier Land (1959), 140
Caspall, Fred C., 221–22
Cassidy, Martin M., 247
Cassini de Thury, César-François (1714–1784), 904, 1184
Cassini-Soldner projection, 911, 929, 930, 1184, 1188
Casten, Jo Ann, 246–47
Casten, Richard, 246–47
Castner, Henry W. (b. 1932), 3, 4, 10, 1072
 entry by, 121
Castree, Noel (b. 1968), 811, 812
Castro, Fidel (b. 1926), 664
Catalogue of Maps and Charts of Antarctica (SCAR), 68
Categorical coverage. *See* Area-class maps
Cathode ray tubes (CRTs), 61, 361, 370, 406, 809, 1150, 1717
Cauchy, Augustin-Louis (1789–1857), 867
Cavalli-Sforza, L. L. (b. 1922), 1237
Cave maps, 206, 206–7
CCmaps (conditioned choropleth maps), 422
CCTV (closed-circuit television), 1170
CD-Atlas of France, 90
CD-ROMs/DVDs
 Arctic maps, 76
 atlases on, 90, 100, 114, 119
 cartographic dictionaries on, 318
 climate maps on, 229
 demographic mapping on, 315, 316
 Digital Chart of the World on, 1431
 facsimile atlases on, 91
 geographic information systems and, 508
 interactive mapping on, 660–61, 661
 in map libraries, 768, 770
 satellite imaging on, 548
CDC (Centers for Disease Control and Prevention) (United States), 494, 587, 590, 592
Celestial maps. *See* Astrophysics and cartography; Lunar and planetary mapping; Star charts
Celestial navigation, 1011, 1012, 1013, 1013, 1023
Cell phones. *See* Personal digital assistants
Cellophane, 330, 333, 334, 1150
Cellular automata (CA), 497
Celluloid sheets, 330, 333, 1150
Cellulose acetate, 330
CEMAT (Council of Europe Conference of Ministers Responsible for Regional Planning) (Conférence du Conseil de l'Europe des Ministres responsables pour l'aménagement du territoire), 417
CEN/TC (Comité Européen de normalisation), 1455
Censorship. *See* Secrecy
Census data. *See also* Census mapping; GBF/DIME format; TIGER aggregation of, 208
 dasymetric symbolization and, 298
 demographic mapping and, 311, 312
 geographic information systems and, 504
 Hollerith system for processing, 209, 209
 mapping software and, 1430
 new geographies and, 210
 public access to cartographic information and, 1229
 race in, 1232, 1233, 1237
 soils maps and, 1444
 thematic atlases and, 112
Census mapping, 207–12. *See also* Census data
 administrative cartography and, 17
 cartograms for, 210, 1518
 choropleth symbolization for, 208, 220–21, 222
 color in, 261, 262, 264
 dot maps in, 210, 211
 enumeration, 207–8, 208, 443
 indigenous peoples and, 641
 statistical mapping and, 1462, 1464, 1466
Census Mapping Survey (IGU), 211
Census of Agriculture (United States), 1657
Centennia Historical Atlas, 93
Center for Earth Resources Observation and Science (EROS), 318, 321
Centers for Disease Control and Prevention (CDC) (United States), 494, 587, 590, 592
Centograms, 314, 315
Central America. *See* Latin America
Central Europe. *See* Eastern Europe
Central Intelligence Agency (CIA). *See also* Corona
 color, 261, 261
 digital worldwide mapping projects, 320
 institutional role of, 1670
 map libraries and, 770
 military mapping and, 888
 photogrammetric mapping and, 1123
 regional atlases, 105
 U-2 program and, 1123, 1667–68, 1667, 1668
 urban mapping, 1652, 1653, 1670
World Data Bank, 320, 357, 809, 1430
 World War II and, 1667
Central Map Reproduction Plant (United States), 884
Central tendency, measures of. *See* Centrography
Centre national de la recherche scientifique (CNRS) (France), 122, 125, 908
Centre national d'études spatiales (CNES) (France), 631, 648, 1278–79. *See also* SPOT
Centre national d'exploitation des océans (France), 842
Centro Argentino de Cartografía, 836, 1408
Centro Interamericano de Fotointerpretación (CIAF), 150, 687
Centrography, 212–15, 213, 214
Century Atlas of the World, The (Smith), 744, 745
Century Dictionary and Cyclopedias, 19
CERCO (Comité Européen des Responsables de la Cartographie Officielle), 178, 266–67, 417, 478, 1455, 1585–86
CERES (Clouds and Earth Radiant Energy System), 1276, 1277
Cerography. *See* Wax engraving
Československá akademie věd, 731–32
Český svaz geodetů a kartografů (ČSGK) (Czech Republic), 1414
CfA Redshift Survey, 85, 88
CGIS. *See* Canada Geographic Information System
CGRIES-GIS (software), 1442
Chadwick, Helen (b. 1953), 1307, 1307
Chain surveys, 183, 187, 1033, 1549
Chaîne du Mont-Blanc, La (Imfeld & Kurz), 736
Chaliand, Gérard (b. 1934), 544
Challenging Minisatellite Payload (CHAMP), 427, 469
Chamberlin, Wellman (1908–1976), 999, 1193
Chamberlin trimetric projection, 1193
Chamizal Settlement (1963), 150, 150
CHAMP (Challenging Minisatellite Payload), 427, 469
Champlain Society (Canada), 1417
Change maps, 1529
Chapin, Alfred Clark (1848–1936), 245
Chapin, Robert M., 243, 715, 716, 717, 1091–92, 1091
Chapman, Sydney (1888–1970), 679
Chapo, Stephen, 72
Charcot, Jean-Baptiste (1867–1936), 64, 1418
Charles Close Society (United Kingdom), 1412
Charles E. Goad Company, 428, 429
Charlton, Martin, 1471
Chartarum Amicæ (CA) (Finland), 1412, 1420
Chartarum Amici (journal), 1420
Chartlets, 830
Chase, Ernest Dudley (1878–1966), 79–80, 79
Chatwin, Bruce (1940–1989), 787
Chavanne, Josef (1846–1902), 1675
Chavez, Pat S., 1438
Chebotarev, A. S. (1881–1969), 983
Checkovich, Alex, entries by, 433–37, 751–54, 1423–26
Chen, Jun, entry by, 1602–6

- Chen Jian, 1780
 Chen Shupeng (1920–2008), 215–16
 Chen Yongling, 1780, 1783
 Chen Yu, 1784
 Cheng, Yang, 1453
 Cherdantsev, G. N. (1885–1958), 984
 Cheremnykh, Mikhail (1890–1962), 1767, 1768
 Chernikeev, Vasilii Ivanovich (d. 1949), 1010
 Chernobyl, 396
 Chernoff, Herman (b. 1923), 1521
 Chervet, Daniel, 667
 Chesapeake Bay Observing System (CBOS), 394
 Chess maps, 1529
 Chesterton, G. K. (1874–1936), 785
 Chiang Kai-shek (1887–1975), 942
 Chicago Map Society (CMS), 1420
 Chicago School of Sociology, 288, 1254
 Child, Jois, 4
Child's Conception of Space, The (Piaget & Inhelder), 217
 Children and cartography, 216–20, 218, 219, 220. *See also* Pedagogic role of cartography
 Children's World Map Competition, 218–19, 672, 1095, 1375
 map-use skills, 217, 1076, 1077, 1077
 sense of place, 811, 811
 Chile, 147, 148, 1560. *See also* Latin America
 China
 academic cartography, 342
 biogeographical cartography, 124, 125
 boundary surveying, 169, 170, 171–72, 171, 172, 1564
 electronic cartography development, 358
 historical-boundaries atlases, 96
 land ownership, 16
 land use maps, 1651
 military mapping, 942–48, 944, 945, 946, 947, 973
 national atlases, 100, 215
 political boundaries, 139
 regional atlases, 106
 topographic mapping, 594, 942, 943, 1602–6, 1603, 1604, 1605
 China Historical GIS (*Zhongguo lishi dili xinxixitong*), 96
 Chishitsu chōsa sōgō senta (Geological Survey of Japan), 731
 Chisholm, George Goudie (1850–1930), 701
 Cho, George, entry by, 654–59
 Cholera map (Snow), 393, 403, 497, 587, 1070
 Chombart de Lauwe, Paul Henry (1912–1998), 122
 Chorley, Richard J. (1927–2002), 1428
 Chorley, Roger (b. 1930), 1304
 entry by, 1304–5
 Chorley Report (Report of the Committee of Enquiry into the Handling of Geographic Information) (1987) (United Kingdom), 1304–5, 1455
 Chorology, 378–79
 Choropleth symbolization, 113, 220–25, 1511–14
 animation in, 62, 63
 automated, 221, 223–24, 223
 bivariate, 130, 130, 132
 for census mapping, 208, 220–21, 222
 color for, 221, 223, 262, 264–65, 1514, 1514
 communication paradigm and, 221–22
 for crime mapping, 221, 288, 288
 vs. dasymetric symbolization, 221, 223, 298, 299
 data classification and, 374, 384
 for demographic mapping, 311, 312, 313, 314
 for electoral mapping, 350, 352, 1489, 1520
 electronic cartography development and, 384
 exploratory data analysis and, 422
 geographic information systems and, 223–24, 1511
 grayscale in, 222–23, 1512, 1513, 1513, 1514
 on Internet, 224, 224
 interpolation and, 695, 695
 map reproduction and, 221, 509, 1511–13
 map typologies and, 802
 in persuasive cartography, 1090–91
 post–World War I settlement and, 777
 printing for, 509, 1511–13
 race and, 1237
 SYMAP and, 221, 1508, 1509
 in thematic atlases, 112, 113, 114
 unclassed, 221, 374, 384, 1511–12, 1513
 Chrismann, Nicholas R. (b. 1950)
 analytical cartography and, 5, 56, 59–60
 on Canada Geographic Information System, 190
 on data models, 364
 Harvard Laboratory for Computer Graphics and Spatial Analysis and, 583, 1440
 ODYSSEY and, 1441
 POLYVRT and, 361, 584
 on public access to cartographic information, 1229
 on topology, 869
 Christaller, Walter (1893–1969), 213
 Christensen, Jon, 377–78
 Christensen, Lars (1884–1965), 64
 Christian, Clifford S., 1114, 1119
 Christian Aid (United Kingdom), 1100
 Christie's, 248
 Christo (b. 1935), 83
 Chroma key, 225, 225–26, 226, 1489
 Chrominance keying. *See* Chroma key
 Chromolithography, 258, 1151, 1316, 1322
Chronicle/Chronique (journal), 1407
 Chrzanowski, Adam, 424
 Church, Elihu Dwight (1835–1908), 245
 Churchill, Winston (1874–1965), 338, 565, 997, 1030
 Chusov, V. L., 984
CIA World Factbook, 661
 Cicada (Tsikada) (satellite navigation system), 1018
 CIL (combined image line) maps, 595, 1282
 Cinema, 226–27
 animation and, 61, 226, 227, 987–88
 art and, 83
 halftones in, 1151
 journalistic cartography and, 714
 narrative in, 986–88, 988
 place promotion and, 988
 world revolution theory in, 1767
 CIR (color infrared photography), 367, 1114, 1116, 1118, 1119, 1122, 1299
 Cissalpin (font), 748, 748
 Cities Revealed (datasets), 1144
Citizen's Atlas of the World, 703
 City Beautiful movement (United States), 1157–58, 1158, 1159
 City maps. *See* Urban mapping
City of Glass (Auster), 783
City of New York, The (Harrison), 708, 712
City of Peterborough, Ontario, and Environs, 261
 City planning. *See* Administrative cartography; Urban/regional planning
City Surveying (Whitmore), 424
 Civil engineering, 1198, 1221
 Civil rights movement (United States), 268
 Civil War (United States), 18, 1273, 1305, 1305
Civilization and Capitalism (Braudel), 599
Civitates orbis terrarum (Braun & Hogenberg), 112
 Clark, Herbert “Shortie,” 1156
 Clark University, 2
 Clarke, D. L., 1718
 Clarke, Keith C. (b. 1955), 5, 56
 entries by, 202–6, 568–72, 1294–96, 1534–35, 1666–72
 Clarke ellipsoid, 473
 Clarke Spheroid, 465
 Classification animations, 62
 Cleave, Mary Louise (b. 1947), 631
 Clements, William L. (1861–1934), 245
 Cleveland, William S. (b. 1943), 421
Cliché-verre. *See* Scribing
 Cliff, A. D. (b. 1943), 406, 498, 1469, 1470
Climate Atlas of the United States (National Climatic Data Center), 229
 Climate change. *See also* Environmental protection
 Arctic and, 76–77
 climate maps and, 227
 coastal mapping and, 238
 emergency planning and, 392
 geographical mapping and, 523
 hazard/risk mapping and, 587
 political boundaries and, 146
 satellite imaging for measurement of, 1277, 1278
 U.S. intelligence community mapping and, 1670

- Climate maps, 227–32, 230, 231. *See also* Meteorology
Cline maps, 1237
Clinometers, 207, 1156, 1157
Clinton, Bill (William Jefferson) (b. 1946), 510, 557, 592, 661, 1229
Close (Arden-Close), Charles Frederick (1865–1952), 232
boundary surveying, 154–55
on grid systems, 1696
on Hinks, 597
history of cartography and, 609
military mapping, 896
topographic mapping, 1539, 1579
World War I and, 1032–33
Close-Up Britain Road Atlas, 120
Closed-circuit television (CCTV), 1170
Cloth maps, 232–35
cycling maps, 1707
as decoration, 234, 310
escape/evasion maps, 233, 234, 703, 1709–11, 1710
folding strategies and, 1336
for tourism, 233–34, 233, 234, 235
Cloud, John, entry by, 289–91
Clouds and Earth Radiant Energy System (CERES), 1276, 1277
Clough, A. B., 898, 953, 1107
Clow, Harry Beach (1870–1933), 1247
Clube de Engenharia (Brasil), 690, 764
CNES (Centre national d'études spatiales) (France), 631, 648, 1278–79. *See also* SPOT
CNRS (Centre national de la recherche scientifique) (France), 122, 125, 908
Coastal mapping, 235–39, 237, 238. *See also* Hydrography
Law of the Sea and, 760–61
photocopying for, 1307
projections for, 1191
satellite imaging for, 236, 1286
tidal measurement, 236, 821, 1525–28, 1526, 1528
Coastal Zone Color Scanner (CZCS), 630, 1025, 1277, 1286
Cobb, David A. (b. 1945), 1450
COBE (Cosmic Background Explorer), 88, 89
Codename Dora (Radó), 1239
Coe, William Robertson (1869–1955), 245
Coello, Francisco, 652
Coffin, James H. (1806–1873), 1415
Cognition/perception. *See* Perception/cognition
Cognitive cartography. *See* Thematic mapping
COGO (coordinate geometry), 1197
COGO (software), 1441
COGS (College of Geographic Sciences) (Canada), 343
COGS (Computer Oriented Geological Society), 1430
Cohen, Saul Bernard, 415
Colby, Charles C. (1884–1965), 700
Colby, Thomas (1784–1852), 1549
Cold War, 239–45. *See also* Cold War and aerial photography; Cold War persuasive cartography
air-age globalism and, 34, 239, 241, 243, 543, 546
bathymetric mapping and, 445
British military mapping and, 900
cartographic duplicity and, 198
CIA institutional role and, 1670
cruise missiles and, 291
Cuban Missile Crisis, 241, 890, 1124, 1299, 1668, 1668
Eastern European boundary changes and, 338
emergency planning and, 392
Eurocentric bias and, 415
figure of the earth and, 240, 427, 455
French military mapping and, 907–8
geodesy and, 14, 239, 240–41, 463
geographic names and, 134
Global Positioning System and, 241, 244, 553, 554
gravimetric surveys and, 455, 456
history of cartography and, 610
International Cartographic Association and, 667, 669–70, 671
International Geophysical Year and, 679
journalistic cartography and, 715, 716, 717, 1179
map revision and, 1294
military mapping of Europe, 888–90, 900, 919, 921, 939–40, 941, 942, 965–66, 966, 967
misrepresentation in maps, 1090
navigation and, 1018
photogrammetric mapping and, 239, 1109, 1123–24, 1124
plate tectonics and, 1025
political boundaries and, 1401
postcolonial cartography and, 307
regional atlases and, 104
remote sensing and, 239, 368
satellite imaging and, 239, 805, 890–91, 1291, 1299–1300. *See also* Corona
secrecy and, 239, 241, 244–45, 667, 669, 1696, 1698
social theory and, 1401
Soviet military mapping and, 938, 939–40, 941, 942, 965–66, 967
terrain analysis and, 1495
topographic mapping and, 1547, 1550, 1599–1600
U.S. intelligence community mapping and, 1667–68, 1667
U.S. military mapping and, 888–92, 891, 966
Cold War and aerial photography, 239, 889, 1299
photointerpretation, 1114, 1118
U-2 program, 889–90, 1123, 1124, 1273, 1667–68, 1667, 1668, 1698
Cold War persuasive cartography
air-age globalism and, 546
color in, 1091
displacement in, 1090
geopolitical cartography, 543–44
journalistic, 715, 716, 717
pictorial depictions in, 79, 1092, 1093
projections and, 239, 241, 242, 243–44, 243, 870, 1179, 1181
vs. propaganda, 1088
social theory and, 1401
Coleman, Alice M., 1069–70
Coleman, David J., 859, 1221
Colin, Armand, 1452
Collaborative Distributed Virtual Environment (CDVE), 1682
Collage, 80, 1146–47, 1148
Collecting. *See* Map collecting
College of Geographic Sciences (COGS) (Canada), 343
Collier, Charles Wood (1909–1987), 1104, 1549
Collier, Peter, 275
entries by, 618–19, 894–904, 927–28, 948–55, 962–74, 1032–40, 1102–25, 1136–46, 1155–57, 1545–52, 1565–72, 1587–91, 1597–1602, 1606–8, 1696–99, 1770–79
Collins, Elmer B. (b. 1879), 463, 1681
Collins Bartholomew, 706
Collocation, 426, 460–61
Collotype, 91, 1150, 1317, 1710
Coleman, John, 1743
Cöln sheet, 22
Colombia, 665, 687, 1353, 1541–42, 1561. *See also* Latin America
Colonial Development Act (1929) (United Kingdom), 322
Colonial Development and Welfare Act (1940) (United Kingdom), 322
Colonial Development and Welfare Act (CDW) (1945) (United Kingdom), 322
Colonial Development Fund (CDF) (United Kingdom), 322
Colonial/imperial cartography, 251–55, 254, 303. *See also* British colonial/imperial cartography; Colonial/imperial cartography and political boundaries; Colonial/imperial cartography in Africa; French colonial/imperial cartography; Postcolonial cartography
accuracy standards and, 1454
Belgium, 105, 474, 959, 4109
British military mapping and, 897, 902, 928–30, 952, 953, 955, 956, 966–67, 968, 1598
cadastral surveying, 1205, 1207–8, 1218
climate maps, 227
coastal mapping and, 235
ethnographic mapping and, 411, 413
Eurocentric bias and, 413, 415
French military mapping and, 908, 955, 968, 972, 972
geodetic surveying for, 150, 322, 323, 472–74, 1573–74
geopolitical cartography and, 539

Colonial/imperial cartography (*continued*)
 German, 909, 956, 959, 1409, 1572–76,
 1573, 1574, 1575
 in historical atlases, 93
 history of cartography and, 608, 613
 indigenous peoples and, 641
 Italy, 1616, 1617, 1619
 limitations of, 252–54, 253, 254
 marine charting and, 842
 nation-state formation/maintenance and,
 1000, 1001
 National Geographic Society and, 996
 Netherlands, 254, 1608–11, 1610
 place promotion and, 1633, 1635
 Portugal, 474
 postcolonial cartography and, 146, 252,
 255, 300, 301, 303, 307, 323–24,
 1003
 in regional atlases, 105
 social theory and, 1400, 1401
 Southeast Asia, 970–71
 surveying for, 252, 321–22
 thematic mapping in, 254–55, 256, 257
 in world atlases, 115
 World War I and, 254, 255, 1566,
 1574–75

Colonial/imperial cartography and political boundaries, 156
 Africa, 153–56, 155, 157, 321
 boundary disputes, 138, 146
 British boundary surveying, 153, 154–55,
 155, 156, 163, 169, 232, 618
 Eastern European boundary changes,
 335–36
 French boundary surveying, 153, 163,
 164, 169
 postcolonial cartography and, 146, 157,
 168–69, 171, 301
 social theory on, 1401
 Sykes-Picot Agreement, 163, 164

Colonial/imperial cartography in Africa
 Algerian War and, 908, 955
 British topographic mapping, 321, 1565,
 1565–68, 1567, 1568
 cartographic societies and, 1409
 ethnographic mapping and, 411
 French topographic mapping, 1568–72,
 1569, 1570, 1571
 geodetic surveying for, 322, 323, 474
 German topographic mapping, 1572–76,
 1573, 1574, 1575
 historical atlases and, 93
 limitations of, 253–54, 253
 military mapping, 952–55, 956–59
 political boundaries and, 153–56, 155,
 157, 321
 postcolonial cartography and, 302, 303
 regional atlases and, 105
 road mapping, 1355–56, 1357–58
 thematic mapping in, 256, 257

Colonial Survey Committee (CSC) (United Kingdom), 232, 255, 321, 895, 958,
 1546, 1565

Color, 255, 257–66, 1322–26. *See also* Color reproduction; Color separation

advertising and, 258
 in aeronautical charts, 22, 1775
 in airline maps, 37, 1396, 1397
 in anaglyph maps, 54
 in bathymetric mapping, 1025
 in bivariate maps, 131, 131, 132
 in cartographic visualization, 59
 in census mapping, 261, 262, 264
 for choropleth symbolization, 221, 223,
 262, 264–65, 1514, 1514
 classical style, 1331, 1332
 in climate maps, 228
 for coastal mapping, 238
 in colonial/imperial cartography, 255,
 322, 323
 color charts, 1146, 1147
 color infrared photography, 367, 1114,
 1116, 1118, 1119, 1122, 1299
 color vision impairment, 265, 293, 1057,
 1058
 copperplate engraving, 1322, 1333
 in cycling maps, 1252, 1707, 1736
 dasymetric symbolization and, 298
 in demographic mapping, 259, 312
 in diazotype process, 1306
 early twentieth century, 257–58, 257
 in electoral mapping, 350, 351, 352, 353,
 355
 in epidemiological maps, 51, 53
 in Esselte Kartor AB maps, 409, 410
 in ethnographic mapping, 777
 exclusionary politics and, 1001
 in Freytag-Berndt und Artaria KG maps,
 440, 441
 in geologic mapping, 257
 in Hammond Map Company maps, 576
 Richard E. Harrison's use of, 579
 in hazard/risk mapping, 588–89, 1472
 in holographic maps, 619
 in hydrography, 625, 625, 629
 in Italian topographic mapping, 921, 922,
 922
 in John Bartholomew & Son maps, 701
 in journalistic cartography, 260, 715
 in marine charting, 238, 821, 822, 823,
 824, 826–27, 833, 834, 839, 841,
 853
 mouse-over techniques and, 1687
 in multivariate maps, 1522
 in National Geographic Society maps,
 257–58, 258, 260, 997
 ODYSSEY for, 584
 in orienteering maps, 1043, 1044
 pen-and-ink drafting and, 334
 perception/cognition and, 1065, 1066
 in persuasive cartography, 1091
 Karl Peucker on, 107, 1101, 1102, 1262
 plotters and, 260, 261, 261
 for relief depictions, 22, 1262, 1267,
 1268–69, 1270, 1271
 in road mapping, 120, 258, 260, 261,
 618, 1361, 1736, 1737, 1738
 in school atlases, 107
 in statistical mapping, 1466
 subject testing and, 1074

symbolization and, 263, 264, 265,
 1540–41
 textbooks on, 259–60
 in thematic mapping, 113, 114, 264–65
 in topographic mapping, 1540, 1541,
 1542, 1547, 1587, 1589
 visual perception and, 1056–57
 in wall maps, 1692
 in weather maps, 225, 225, 226, 873,
 876–77, 1489, 1746, 1747

Color infrared photography (CIR), 367,
 1114, 1116, 1118, 1119, 1122, 1299

Color reproduction, 1314, 1322–26
 Ben Day tints, 334, 1148, 1149, 1314,
 1327
 cartographic conventions and, 273–74,
 274, 275
 chromolithography, 258, 1151, 1316,
 1322
 for coastal mapping, 238
 color matching, 1324
 early twentieth century, 257–58, 257
 electronic cartography development
 impacts, 260–63, 1324–25, 1333
 geographic information systems and, 263,
 506–7, 509
 lithography and, 258, 1151, 1316, 1318,
 1322
 offset printing and, 258, 1323–24, 1331,
 1332
 orthophotography and, 1310, 1310
 photocopying and, 1324
 photoengraving, 802, 803
 photolithography and, 1320, 1320, 1333
 prepress techniques for, 1326, 1327,
 1328, 1329
 relief models and, 1333, 1334
 timeline, 1322
 topographic mapping and, 275, 1540–41,
 1547, 1548, 1589
 xerography and, 1324

Color separation, 258, 1310, 1314
 charts for, 1146, 1147
 halftone screens for, 334, 509, 1146,
 1151, 1314, 1318, 1320, 1320, 1324
 offset printing and, 1323
 proofing for, 1147, 1152, 1328, 1396

Color separation overlay. *See* Chroma key

Color vision impairment, 265, 293, 1057,
 1058

ColorBrewer (software), 223, 265, 1065,
 1066, 1514

Coloured States Atlas of India, 102, 105

Columbia University, 1, 2

Columbus, Christopher (1451–1506), 1389

Colvocoresses, Alden P. (1918–2007),
 272–73, 1283, 1285, 1394, 1399,
 1453. *See also* Space Oblique Merca-tor Projection

Colwell, Robert N. (1918–2005), 1114,
 1119, 1120

Comarc (software), 492

Combined image line (CIL) maps, 595, 1282

COMECON (Council for Mutual Economic Assistance), 17

- Comisión Geográfica Militar (Mexico), 1561, 1563
Comissão de Cartographia (Portugal), 474
Comissão Nacional de Cartographia (CONCAR) (Brazil), 1408
Comité Européen de normalisation (CEN/TC), 1455
Comité Européen des Responsables de la Cartographie Officielle (CERCO), 178, 266–67, 417, 478, 1455, 1585–86
Comité français de cartographie, 317, 772
Comité spécial du Katanga (CSK), 474, 1409
Commercial applications. *See also* Advertising
aeronautical charts, 24–26, 25, 26, 861
geocoding, 450
geographic information systems, 492, 493, 1301
geospatial data marketing, 369, 855–60, 857, 1037, 1039
Global Positioning System, 556, 856
interactive mapping services, 816
mass marketing of maps, 860–62
photogrammetric mapping, 368
satellite imaging, 369, 1301, 1302, 1303
thematic data, 369
topographic mapping, 1564
Commission nationale de l'information géographique (France), 648
Commission de géographie (France), 335–36
Commission internationale de l'éclairage (CIE), 258
Commission on a World Population Map, 311–12
Commission on Communication in Cartography, 10
Commission on Geographical Information and Processing (IGU), 387
Commission on Maps and Graphics for Blind and Partially Sighted People, 1481
Commission on National Atlases, 97, 1382
Commission on Sub-Oceanic Nomenclature, 444
Commission on Tactual and Low Vision Mapping, 1481
Committee for Space Research (COSPAR), 461
Committee on Cartography (AAG), 2
Common Ground Parish Maps project, 216, 275, 276, 277, 812, 813, 1307, 1307
Common Ground project (British Columbia), 269
Commonwealth Scientific and Industrial Research Organization (CSIRO), 749, 1497
Communication paradigm. *See also* Cartographic visualization; Information theory; Perception/cognition; Semiology
Bertin on, 10
Board on, 9
choropleth symbolization and, 221–22
data models and, 365
definitions of “map” and, 799–800
Freitag on, 10, 11
Harley on, 578–79
Internet and, 1750
Keates on, 727
Koláčný on, 8–9, 10, 12
narrative and, 989–90
persuasive cartography and, 1088
Ratajski on, 9, 9
Robinson on, 2, 8, 9, 1071, 1366
Salishchev on, 7–8, 10
social theory and, 1402
subject testing and, 1071–72, 1074
visual perception and, 1056
Communitas (Goodman & Goodman), 1161
Community 2020 (U.S. Department of Housing and Urban Development), 315
Community mapping, 267–69, 812. *See also* Counter-mapping; Social activism
Comoving coordinates, 85
Compact Airborne Spectrographic Imager (CASI), 645
Compact discs. *See* CD-ROMs/DVDs
Comparative Atlas of America's Great Cities: Twenty Metropolitan Regions, A, 103, 105
“Comparison of Pseudocylindrical Map Projections, A” (Snyder), 1399
Compass (satellite navigation system), 284, 551, 843
Compass for Map Collectors (Nebenzahl), 246
Compass roses, 1697
Compasses, 207, 1009–10
Compilation maps, 957–58, 957
Complete Road Atlas, Massachusetts and Rhode Island (Scarborough Company), 1733
CompStat, 288
Compton Gamma Ray Observatory, 88
Computer-aided design (CAD) software, 331
for cadastral surveying, 184, 1197
cartographic visualization and, 1684
geographic information systems and, 507, 1438
illustration software and, 1435–36
Intergraph, 666
for landscape architecture, 758
national mapping agencies, 181
Computer-assisted cartography. *See* Electronic cartography
Computer-assisted mass appraisal (CAMA), 1488
Computer Oriented Geological Society (COGS), 1430
Computers, digital, 209, 269–70. *See also* Electronic cartography
Computers & Geosciences (journal), 1430
Conant, James Bryant (1893–1978), 1244
Conant, Jennet, 492
CONCAR (Comissão Nacional de Cartografia) (Brazil), 1408
Concretism (art movement), 80
Conder, Claude Reignier (1848–1910), 928, 967
Condition of Postmodernity, The (Harvey), 613
Conditional autoregressive (CAR) structure, 1470
Conditioned choropleth maps (CCmaps), 422
Conférence du Conseil de l'Europe des Ministres responsables pour l'aménagement du territoire (CEMAT), 417
Conference of East European Cartographic and Geodetic Services (1952), 275
Conference on Environment and Development (Earth Summit), 321
Conference on Spatial Information Theory (COSIT), 365, 995
Conferences on computer-aided mapping, 386–89. *See also specific conferences*
Conferencia Iberoamericana de Sistemas de Información Geográfica (CONFIBSIG), 387, 388
Conformal projections, 270–73, 271, 272.
See also Mercator projection
for airline maps, 39
American Geographical Society, 51
astrophysics and, 85, 86
Conformal Space projection, 1453
Lambert conformal conic projection, 24, 871, 906, 1184–85, 1186, 1190, 1192
for military mapping, 912, 945, 1188
optimal, 869, 1184
polyhedral projections and, 1177
Riemann mapping theorem and, 867
Tissot's indicatrix and, 1533
Conformal Space projection, 1453
Conformality. *See* Conformal projections
Conic projections
Bonne projection, 1182, 1184, 1188, 1192
boundary disputes and, 139
Lambert conformal conic projection, 24, 871, 906, 1184–85, 1186, 1190, 1192
Conklin, Harold C., 53
Conley, Tom (b. 1943), 987
Conly, Robert Leslie (1918–1973), 663
Conrad, Joseph (1857–1924), 782
Conseil national de l'information géographique (France), 648
Consol (navigation system), 1015
Constraint propagation, 376, 377
Constructivism (art movement), 80
Consumerism, 1064
Continental drift. *See* Plate tectonics
Continental-Landstrassen-Atlas für Mittel-Europa, 1733
Continuously operating reference stations (CORS), 467, 1197
Contour layer tints, 701, 702
Contour lines. *See also* Relief depictions
in alpine cartography, 43–44, 45
in Arctic maps, 76
in astrophysics, 85, 86–87, 88
in boundary surveying, 160

- Contour lines (*continued*)

in colonial/imperial cartography, 323

Dainville on, 297

elimination of, 996

in Himalaya cartography, 594, 595

interpolation for, 694, 694

isobaths, 444, 629

in marine charting, 822

orthographical relief (inclined contour) method, 1269, 1271, 1483–84, 1484, 1485

in orthophotography, 1143

SYMAP, 1477–78, 1479

in topographic mapping, 1558
- Control densification, 1198
- Control surveys. *See* Photogrammetric mapping
- Convention on Biological Diversity, 643
- Convention on Indigenous and Tribal Peoples (ILO), 642, 643
- Convention on International Civil Aviation, 26
- Conventions. *See* Cartographic conventions
- Conzen, M. R. G. (1907–2000), 603
- Conzen, Michael P. (b. 1944), 604, 606

entry by, 1649–55
- Cook, Frederick Albert (1865–1940), 74, 1389
- Cook, James (1728–1779), 64, 828, 844
- Cook, Karen Severud, 1505

entries by, 738–44, 802–4, 1030–32, 1146–53, 1305–22, 1394–96, 1701–4
- Cooke, Donald F., 369, 506
- Coolridge, Archibald Cary (1866–1928), 1416
- Coordinate geometry (COGO), 1197
- Coordinate systems, 278–84. *See also*

Gauss-Krüger coordinate system;

Geodetic datums; Reference ellipsoids;

Universal Transverse Mercator (UTM) coordinate system

for astrophysics, 85, 88

for boundary surveying, 141, 160, 161, 162, 166

for cadastral surveying, 1195–96, 1195, 1196

Cartesian, 278–80, 279, 280, 361, 362, 431, 1187

for cave maps, 207

for forensic mapping, 431

geocoding and, 448–49

Global Positioning System and, 282–83, 284

for International Map of the World, 1188–89

for marine charting, 141, 236, 819

military development and applications, 280–81, 282, 283, 284, 1187

for military mapping, 1186–89, 1696–97, 1771

National Grid (United Kingdom), 279, 280, 281, 283, 311, 1034, 1036, 1108

vs. projections, 1187

Public Land Survey System, 279, 280, 1195, 1485

for Soviet military mapping, 935, 937, 940

State Plane Coordinate (SPC) system, 279–80, 280, 281

for topographic mapping, 1604, 1606

Universal Polar Stereographic (UPS) system, 273, 281, 464, 1188, 1189, 1191

World Polyconic Grid, 1188

Xi'an zuobiaoxi, 1604
- Coordinate Systems and Map Projections* (Maling), 798
- Coordinates* (journal), 1423
- Cope, E. B., 1305
- Copperplate engraving, 744, 1308, 1316

color and, 1322, 1333

for geologic mapping, 527

Justus Perthes, 721

Ordnance Survey, 1033–34, 1314

in Swiss topographic mapping, 180

for topographic mapping, 1551
- Coppock, J. T. (1921–2000), 688, 1438, 1440
- Copyright, 654, 655, 1228. *See also* Intellectual property
- Copyright Act (Japan), 657
- Copyright Act (United States), 656, 657
- Copyright traps, 284–85, 656
- Corbellini, Pietro, 1616, 1619
- Corbett, James P., 56, 60, 209
- Corel Painter (software), 35
- CorelDRAW (software), 1435
- CORINE (Coordination of Information on the Environment), 417
- Cornell, Joseph (1903–1972), 80, 81
- Cornwell, Bruce, 61
- Corona (satellite), 368, 566, 890, 891, 1124, 1283, 1300, 1300, 1669

camera technology, 1669

for map revision, 1294–95, 1295, 1296, 1297

public access to cartographic information and, 1228, 1229

secrecy and, 1696, 1698
- CORS (continuously operating reference stations), 467, 1197
- Corson-Rikert, Jonathan, 584
- Cortesão, Armando (1891–1977), 91, 285–86
- COS-B satellite, 88
- Cosgrove, Denis E. (1948–2008), 522, 714, 1402
- COSIT (Conference on Spatial Information Theory), 365, 995
- Cosmas Indicopleustes (fl. A.D. 540), 785
- Cosmic Background Explorer (COBE), 88, 89
- Cosmographiae introductio* (Waldseemüller), 1175
- Cosmopolitan World Atlas*, 115–16, 1247, 1248, 1249
- Cosmos Club, 444
- COSPAR (Committee for Space Research), 461
- Costa Rica, 147, 1563, 1564. *See also* Latin America
- Côté, Jean Leon, 1220
- Couclelis, Helen, 364
- Coulomb, Jean (1904–1999), 679
- Coulson, Michael R. C., 201
- Coulthard-Clark, C. D. (b. 1951), 976
- Council for Mutual Economic Assistance (COMECON), 17
- Council of Europe Conference of Ministers Responsible for Regional Planning (CEMAT), 417
- Council of Geographic Names Authorities in the United States, 134
- Counter-Cartographies Collective, 1403–4
- Counter-mapping, 276, 277, 286–88. *See also*

Critical cartography; Postcolonial cartography; Social activism

cartographic conventions and, 275

indigenous peoples and, 286–87, 287, 643–44

map design and, 286–87, 287

nation-state formation/maintenance and, 1006–7, 1007, 1008, 1009

Parish Maps project, 216, 275, 276, 277, 812, 813, 1307, 1307

persuasive cartography and, 1094

race and, 1237
- Counties of Illinois*, 94
- Counties of the King's Award*, *The*, 619
- Course of Empire*, *The* (De Voto), 1244
- Coventry Access and Mobility Mapping Project (CAMMP), 1742–43, 1742
- Cowan, James (b. 1942), 785
- Cowan, Robert E. (1862–1942), 245
- Cowen, David J., entry by, 510–11
- Craib, Raymond B., entry by, 300–309
- Craigie, Kenneth (1890–1932), 1363
- Crampton, Jeremy W., 411, 1094, 1400, 1515

entries by, 294, 1232–37
- Crane, Nicholas, 91
- Craster, J. E. E. (1873–1942), 1193
- Craster parabolic projection, 1193, 1503
- Crawford, Osbert Guy Stanhope (1886–1957), 1113
- Crawford, Paul V., 3
- Creative Commons (CC), 657
- Cree, D., 161
- Cressie, Noel A. C. (b. 1950), 1471
- Creutzburg, Nikolaus (1893–1987), 341, 345, 1501
- Crime mapping, 288–89

choropleth symbolization for, 221, 288, 288

point data for, 288, 288

statistical mapping and, 289, 289
- Criminology. *See also* Crime mapping

centrography and, 214

forensic mapping, 430–33, 431, 432
- Critical cartography, 79, 544, 579, 990, 1366, 1403. *See also* Counter-mapping; Social activism
- Croatia, 1003, 1004, 1414
- Crocco, Gaetano Arturo (1877–1968), 1011
- Croce, Benedetto (1866–1952), 42
- Crocker, Templeton (1884–1948), 245
- Cromley, Robert G., 377

- Crone, G. R. (1899–1982), 200, 609–10, 609, 1373
- Cronon, William (b. 1954), 598
- Cross-maps, 210–11, 421–22
- Crossroads of the Pacific, The* (Hammond Map Company), 575
- CRTs (cathode ray tubes), 61, 361, 370, 406, 809, 1150, 1717
- Cruickshank, John L., entry by, 931–42
- Cruise lines, 1622–23, 1624, 1625, 1729
- Cruise missiles, 289–92, 290, 291
- Crutzen, Paul J. (b. 1933), 1275
- CSC (Colonial Survey Committee) (United Kingdom), 232, 255, 321, 895, 958, 1546, 1565
- CSIRO (Commonwealth Scientific and Industrial Research Organization), 749, 1114, 1497
- CSK (Comité spécial du Katanga), 474, 1409
- CSRS (Canadian Spatial Reference System), 467
- Cuba, 663–64, 884, 884. *See also* Cuban Missile Crisis; Latin America
- Cuban Missile Crisis (1962), 241, 890, 1124, 1299, 1668, 1668
- Cubism, 80, 1148
- Cuerpo de Ingenieros Geógrafos (Spain), 649
- Cuerpo de Topógrafos (Spain), 649
- Cuff, David J. (b. 1933), 1514
- Culcasi, Karen, entries by, 286–87, 409, 411–13, 1000–1009
- Cultural atlases, 642, 643
- Cultural geography, 521
- Cultural/social significance of cartography
- accuracy and, 1003
 - geographic names, 134, 293–94, 301–2, 304, 511–16, 512, 513, 514, 515, 521
 - geopolitical cartography, 544–45
 - globes, 558–63, 560, 561, 562, 563
 - Harley on, 578–79
 - history of cartography and, 612–13, 615
 - land use maps, 752–53
 - nation-state formation/maintenance and, 1001
 - postcolonial cartography, 303–5
 - projections, 1177, 1179–82
 - public transportation maps, 1732
 - sense of place and, 812–14
 - social theory and, 1402
 - urban mapping, 1652
- Cumming, William Patterson (1900–1989), 247
- Cunard Line Handbook, The*, 1622–23, 1624, 1625
- Current Geographical Publications* (AGS), 1452
- Customization, 292, 292–94, 419, 618, 867. *See also* Interactive mapping
- Cutter, Charles A. (1837–1903), 190–91
- Cvijić, Jovan (1865–1927), 294–96, 295, 411, 1050, 1235, 1236
- Cybercartography: Theory and Practice* (Taylor), 1094
- Cyclers' Guide and Road Book of California* (Blum), 1252
- Cycling maps, 1252–53, 1706–8
- folding strategies, 1336
 - road mapping and, 1339–40, 1341, 1359, 1361, 1361, 1363, 1364, 1733
 - symbolization in, 1709, 1736
- Cyclists' Handbook and Guide to the Roads of New South Wales*, 1363
- CYCLONE (software), 1441
- Cyprus, 324, 514, 897
- Cyprus: A Landform Study* (Thrower), 1525
- CZCS (Coastal Zone Color Scanner), 630, 1025, 1277, 1286
- Czechoslovakia, 337, 338, 731–32, 1414, 1588, 1589–90. *See also* Eastern Europe
- Czoernig, Karl von (1804–1889), 776
- Dacey, Michael F., 364
- Dada, 1148
- Dahlberg, Richard E. (1928–1996), 3, 4, 1487
- Dahlgren database, 809
- Dahmann, Donald C., entries by, 443–44, 1656–59
- Dai Nippon teikoku rikuchi sokuryōbu (Japanese Imperial Land Survey) (JILS), 948–49, 1606, 1607, 1608
- Dainville, François de (1909–1971), 297–98, 610
- Dale, Peter F., 184
- Dalí, Salvador, 80, 1251
- Dalla Vedova, Giuseppe (1834–1919), 42
- Dalrymple, Alexander (1737–1808), 837
- Dance maps, 1529
- Dangermond, Jack, 397–98, 760, 1441, 1508
- Dangermond, Laura, 398
- Daniels, Frank T. (b. 1865), 326
- Danko, David M., entry by, 320–21
- Dansereau, Pierre Mackay (b. 1911), 127
- Danzer, Gerald A. (b. 1938), 604
- entries by, 574–77, 1714–16, 1727–33
- Darby, H. C. (1909–1992), 603
- Darton, Nelson Horatio (1865–1948), 257
- Darwin, Charles (1809–1882), 1392
- Dasymetric symbolization, 113, 298–300, 1514–15
- aggregate data and, 499
 - vs. choropleth symbolization, 221, 223, 298, 299
 - in demographic mapping, 298, 313
 - development of, 298, 1503
 - interpolation and, 695
 - in thematic atlases, 112
- Data capture, 366–70. *See also* Aerial photography; Digitization; Plotters; Remote sensing; Scribing; Surveying
- accuracy and, 14
- Canada Geographic Information System, 189
- cartometry and, 203
 - for dialect maps, 779–80
 - for ethnographic mapping, 777
- Experimental Cartography Unit role, 418–19
- geographic names, 518
- for hazard/risk mapping, 592
 - military development and applications, 1697
 - scanning, 18–19, 189–90, 270, 357, 367, 382, 489, 661, 1266
 - Tobler on, 57, 357
- Data classification, 374, 384, 1290–91
- Data conversion, 366–70, 489. *See also* Photogrammetry
- Data dictionaries, 1642
- Data dumping, 508
- Data exploration software, 1522
- Data mining, 422, 497–98, 516
- Data models, 358–59, 359–66, 382–84, 383. *See also* GBF/DIME format; Grid; raster data models; TIGER
- analytical cartography on, 59–60
 - communication paradigm and, 365
 - conversion software, 189, 369
 - display hardware and, 370
 - generalization and, 372, 373, 374
 - for geographic information systems, 360, 361, 362, 363–65, 369, 1439, 1440
 - image processing software and, 364, 501, 1437
 - mapping software and, 1427
 - object-oriented, 365, 377, 497, 1441–42
 - quadtree, 361–62, 362, 1387, 1440
 - raster-vs.-vector debate, 364, 372, 382
 - remote sensing and, 361
 - scale and, 1387–88, 1387, 1388
 - tesselation, 361–62, 362, 363, 364
 - theory of, 363–65
 - vector, 360–61, 360, 362–64, 369, 372, 382, 496
- Data representation. *See* Data models
- Data structures. *See* Data models
- Database management systems (DBMSs), 365
- Dataland, 659
- Datums. *See* Geodetic datums
- Dauwalder, Rudi, 1269
- DAV (Deutsche Alpenverein), 45, 594, 1549
- Davenport, Charles Benedict (1866–1944), 1233–34
- David Rumsey Historical Map Collection, 91
- Davidson, Al, 1439
- Davidson, George (1825–1911), 1415
- Davidson, John Colin Campbell (1889–1970), 1032, 1034
- Davidson, John Humphrey (1876–1954), 1372
- Davies, Merton, 793
- Davis, Darrell Haug (b. 1879), 700
- Davis, John C., 205
- Davis, Stuart, 1050
- Davis, William Morris (1850–1934)
- block diagrams, 788
 - geographical societies and, 1416
 - influence of, 1, 42, 700, 1242
 - perspective maps by, 1023
 - physiographic diagrams, 1153, 1505, 1505

- Dawson, Robert (1776–1860), 1267
 Day, Benjamin Henry (1838–1916), 1148.
See also Ben Day tints
 Dayton peace accords (Bosnia-Herzegovina) (1995), 141, 142, 143, 143, 162, 892, 1669
 DBDB (Digital Bathymetric Data Base), 1028
 DBMSs (database management systems), 365
 DCAP (Digital Cartographic Applications Program), 1664
 DCASS (Digital Cartographic Software System), 1664
 DCDBs (digital cadastral databases), 185–86, 185, 1219
 DCW (Digital Chart of the World), 320, 321, 401, 508, 660, 903, 1431, 1455
 De Agostini, Giovanni (1863–1941), 696
 De Cola, Lee, 205
 De Dion Bouton (publisher) (France), 879
 De Dios Editores (Argentina) (publisher), 1353
 De Geer, Sten (1886–1933), 311, 312
 De Renne, Wymberley Jones (1853–1916), 245
 De Seversky, Alexander P., 34, 542–43, 546
De stadsplattegronden van Jacob van Deventer (Koeman), 728
 De Voto, Bernard Augustine (1897–1955), 1244
 Dead reckoning (DR), 1009–11, 1010, 1011, 1012, 1023
Death and Life of Great American Cities, The (Jacobs), 1161
Death in a High Latitude (Anderson), 784
Death Valley Chuck-Walla magazine, 19
 Debes, Ernst (1840–1923), 1690
Debes Handatlas, 1692, 1692
 DeBow, J. D. B. (1820–1867), 1657
 Decca (navigation system), 819, 827, 843, 1014, 1015, 1016, 1024, 1698, 1699, 1775
 Declerq, Hugo, 1172
 Decolonization. *See* Postcolonial cartography
 “Deconstructing the Map” (Harley), 579, 1089
 Decorative maps, 79, 234, 309, 309–10, 310, 559, 560, 1094. *See also* Pictorial depictions
 Deep Sea Drilling Project, 1025
 Deep vs. surface structure, 57, 59
 Defence Geographic Imagery and Intelligence Agency (United Kingdom), 464
 Defense Logistics Agency (United States), 464
 Defense Mapping Agency (DMA) (United States). *See also* National Geospatial-Intelligence Agency; National Imagery and Mapping Agency
 Corona and, 1295
 creation of, 891
 Digital Chart of the World, 320, 401, 508, 660, 903, 1431, 1455
 Digital Production System, 891–92
 geodetic surveying and, 466, 468, 469, 470
 Gulf War (1991) and, 570, 571, 970
 institutional role of, 1670–71
 Inter-American Geodetic Survey and, 662
 Intergraph and, 666
 lunar and planetary mapping, 793, 794
 mapping software and, 1429
 marine charting, 831
 orthophotography, 1144
 terrain analysis, 1495
 on topographic mapping, 1539
 Defense Meteorological Satellite Program (DMSP) (United States), 537, 1280
 Definiens (company), 1294
 Deforestation, 1279, 1279
 DeGolyer, Everette (1886–1956), 245
 Delano-Smith, Catherine, 638
 Delavay, Jean Marie (1834–1895), 124
 Deleuze, Gilles (1925–1995), 1400
 Delgado López, Enrique, entry by, 1200–1205
 DeLoache, Judy S. (b. 1943), 1077
 DeLorne Map Company (publisher) (United States), 1349, 1733
 Delta Airlines, 39, 40
 DeLyser, Dydia, 1634
 Demeritt, David, 436
 Demhardt, Imre Josef, entries by, 720–25, 1095–97, 1165–66
 Democratization of cartography. *See also* Counter-mapping; Public access to cartographic information
 cartographic conventions and, 275, 278
 cartographic visualization and, 1685
 color and, 262
 customization and, 294
 electoral mapping and, 352
 electronic cartography development impacts, 270, 359, 1335
 geographic information systems and, 397, 401, 635, 642
 Global Positioning System and, 556
 Internet and, 1511, 1511, 1753
 journalistic cartography and, 716
 map design and, 1321, 1511, 1511
 mapping software and, 1429
 nation-state formation/maintenance and, 1001
 personalization and, 292
 satellite imaging and, 1301
 thematic mapping and, 1511
 urban mapping and, 1652
 Demographic mapping, 311–17
 animation in, 62, 311
 cartograms for, 56, 194, 195, 313–14, 314
 on CD-ROM, 315, 316
 centograms, 314, 315
 centrography in, 212
 color in, 259, 312
 dasymetric symbolization in, 298, 313
 ethnographic mapping and, 777
 genetic mapping, 445–48, 448
 interpolation in, 59
 Mark S. W. Jefferson on, 700
 in national atlases, 96, 98, 99, 311
 John Kirtland Wright on, 312, 1780
 DEMs. *See* Digital elevation models
 Dene Mapping Project, 642
 Denes, Agnes, 1177
 Deni, Viktor (1893–1946), 1767, 1768
Denkschrift zur Frage der Neuerstellung der offiziellen Landeskarten der Schweiz (Imhof), 180
 Denmark, 161, 460, 961–62
 Denny, Charles Edward (d. 1965), 1372
 Denoyer, L. P. (1875–1964), 1193
 Denoyer-Geppert (publisher) (United States), 1503, 1694
 Denoyer semielliptical pseudocylindrical projection, 1194
 Densham, Paul J., 500
 Dent, Borden D., 259, 345
 Denzin, P. V., 983
 Department of Technical Cooperation (DTC) (United Kingdom), 323
 Depth measurement. *See* Sounding
 Dermanis, Athanasios, entry by, 459–62
 Derrida, Jacques (1930–2004), 308, 579
 Descartes, René (1596–1659), 278
Description de l’Égypte (Napoleon Bonaparte), 1001
Design for Defense (Chapin), 715, 717
Design of Residential Areas (Adams), 752
Design with Nature (McHarg), 267, 760
 Desktop publishing software, 1434
 Destination maps, 39
 Det norske Geografiske Selskap (Norway), 1418
 Detje, H. C., 714–15
 Detroit Geographical Expedition, 268, 269
 Deutch, John M. (b. 1938), 892
 Deutsche Alpenverein (DAV), 45, 594, 1549
 Deutsche Forschungsgemeinschaft (DFG) (Germany), 177
Deutsche Generalkarte, 797, 1362
 Deutsche Gesellschaft für Kartographie (DGK), 726, 1100, 1412, 1423
 Deutsche Gesellschaft für Photogrammetrie, 317
Deutsche Grundkarte, 1584
Deutsche Heereskarte, 690
 Deutsche Seewarte, 621
Deutsche Straßenprofilkarte für Radfahrer (Mittelbach), 1706–7, 1707
 Deutschen Verein zur Erforschung Palästinas, 1598
Deutscher Planungsatlas, 41
 Deutscher Schutzbund, 541
Deutscher Sprachatlas (Mitzka & Martin), 778
 Deutsches Geodätisches Forschungsinstitut (DGFI), 177, 470
 Deventer, Jacob van (ca. 1500–1575), 728
 Deville, Édouard (1849–1924), 367, 1104, 1697
 Devillers, Rodolphe, 1643
 Dewdney, John C. (b. 1928), 105
 DFAD (Digital Features Analysis Data), 1495

- DFG (Deutsche Forschungsgemeinschaft (Germany), 177
DGC (Dirección General de Cartografía) (Nicaragua), 663
DGFI (Deutsches Geodätisches Forschungsinstitut), 177, 470
DGIWG (Digital Geographic Information Working Group) (NATO), 894, 1455
DGK (Deutsche Gesellschaft für Kartographie), 726, 1100, 1412, 1423
DGN (Doppler Geodetic Network) (Soviet Union), 482, 1596
DGPS (Differential GPS), 632
Diagram, the (London Underground Map) (Beck), 788–92, 789, 790, 814, 1069, 1239, 1403, 1516, 1651, 1731
Dialect maps, 778–81, 779, 780, 781
Diapositive instruments for photogrammetric mapping, 1140–41
Diary maps, 576
Diazo prints, 183
Diazotype process, 1306
DiBiase, David, 61, 1685
entry by, 1434–37
Dickinson, Donald C., 245
Dickinson, G. C., 1466
Dictionaries, cartographic, 202, 317–18
DIDS (Domestic Information Display System) (United States), 262, 1467
Diehl, Joanne Feit (b. 1947), 807
Diehn, Gwen, 814
Diercke, Carl (1842–1913), 1755
Diercke Schulatlas über alle Teile der Erde, 1755
Differential GPS (DGPS), 628, 632
DIGEST (Digital Geographic Information Exchange Standard), 894, 1455
Diggle, Peter, 1470
DigiGlobe (company), 1286
Digital Aeronautical Flight Information File (DMA), 320
Digital Agenda, 655
Digital atlases. *See* Electronic atlases
Digital Bathymetric Data Base (DBDB), 1028
Digital cadastral databases (DCDBs), 185–86, 185, 1219
Digital Cartographic Applications Program (DCAP), 1664
Digital Cartographic Software System (DCASS), 1664
Digital Cartography Program, 508
Digital Chart of the World (DCW), 320, 321, 401, 508, 660, 903, 1431, 1455
Digital computers, 269–70. *See also* Electronic cartography
Digital data. *See* Digital databases; Geospatial data
Digital databases. *See also* Geographic information systems; Geospatial data; TIGER
Antarctica, 70
cadastral mapping and, 185–86, 185, 1219, 1219
cartobibliography and, 192, 193
Chinese military mapping and, 947–48
electronic cartography development and, 357, 809, 810
geographic information systems and, 1441–42
for in-vehicle navigation systems, 1720, 1721
intellectual property and, 656–57, 658
Israeli military mapping and, 930
Istituto Geografico De Agostini, 699
John Bartholomew & Son, 706
map reproduction and, 1311, 1329
mapping software and, 1430, 1431
national mapping agencies and, 178
pattern recognition and, 1293
Russian Federation, 1377–78
scale and, 1386, 1387
for soils maps, 751, 1448, 1449
terrain analysis and, 1495
for topographic mapping, 1545, 1552, 1555, 1559, 1604
U.S. Geological Survey, 1664–65
for web-based wayfinding, 816
World Data Bank, 320, 357, 809, 1430
World Digital Database, 699
Digital Earth, 1457
Digital elevation models (DEMs)
Antarctica, 70
cruise missiles and, 291
feature extraction and, 1293
fly-through animation and, 61
interpolation and, 694
mapping software and, 1427, 1430, 1432
NASA and, 992–93
for orthophotography, 1143–44
for photogrammetric mapping, 1136
relief depictions and, 1262, 1271
topographic mapping and, 1604
U.S. Geological Survey, 358, 1664
viewshed mapping and, 1676, 1677, 1678
Digital Features Analysis Data (DFAD), 1495
Digital filters, 58, 59
Digital Geographic Information Exchange Standard (DIGEST), 894, 1455
Digital Geographic Information Working Group (DGIWG) (NATO), 1455
Digital geospatial libraries (DGLs), 318
Digital globes. *See* Virtual globes
Digital libraries, 318–20, 319, 645
Digital line graphs (DLGs), 1664
Digital Millennium Copyright Act of 1998 (DMCA) (United States), 655
Digital mosaics, 71
Digital Nautical Charts (DNC), 464–65
Digital Orthophoto Quarter Quadrangles (DOQQs), 14, 1387
Digital Photogrammetric Workstation (DPW), 1144
Digital Production System (DPS), 891–92
Digital rights management (DRM), 655, 656, 657
Digital terrain models (DTMs), 291, 694, 930, 1144, 1438
Digital Topographic Support System (DTSS), 1495
Digital Wenker Atlas Project, 781
Digital worldwide mapping projects, 320–21
DigitalGlobe (company), 567
Digitization, 357, 357, 367, 369. *See also* Data capture
bathymetric mapping, 445
British topographic mapping, 1035–36, 1037, 1038
Canada Geographic Information System, 18–19, 189–90
cartometry and, 203–4
data models and, 382
electronic cartography development and, 809–10
Experimental Cartography Unit role, 418–19, 1036–37
intellectual property and, 656
premodern cartography, 90
spatial analysis and, 489
topographic maps, 1544–45, 1555, 1559
U.S. Geological Survey, 1664
Dijkstra, Edsger Wybe (1930–2002), 499–500
Dilke, Charles Wentworth (1843–1911), 413
DIME (Dual Independent Map Encoding), 209–10, 368, 816. *See also* GBF/
DIME format
Dingus, Thomas A. (b. 1958), 1718
Dippy, Robert J. (b. 1912), 1014
Diqiu xinxì kexué (geoinformation science), 215–16
Dirección del Servicio Geográfico Militar (Paraguay), 1560
Dirección General de Cartografía (DGC) (Nicaragua), 663
Directional arrows, 112
Directional gyro, 1010
Directorate of Colonial Surveys (United Kingdom). *See* Directorate of Overseas Surveys
Directorate of Overseas Surveys (DOS) (United Kingdom), 255, 321–25
cadastral surveying, 1208–9, 1222
cartographic style, 1547, 1548
founding of, 1409, 1566
Himalaya cartography and, 594
Hotine and, 321, 322, 323, 620–21
military mapping and, 902
orthophotography by, 1141, 1542
photogrammetric mapping, 1106, 1550
photomosaics by, 1542–43, 1543
Disabilities, people with. *See* Accessibility
Disaster management, 587–88, 588, 1144, 1744–45, 1745, 1747, 1748, 1749. *See also* Emergency planning
Discrete global grids, 1387–88, 1388
Disease maps. *See* Epidemiological maps
DISIC (Dual Improved Stellar Index Camera), 1295, 1669
Disney, Walt (1901–1966), 542–43
Dispersion ellipses, 213, 214
Displacement, 1090
Display hardware, 270, 370–71
for aeronautical charts, 28–29, 1699
for airline maps, 39–40

Display hardware (*continued*)
 animation and, 61
 cartographic visualization and, 1686
 cathode ray tubes, 61, 361, 370, 406,
 809, 1150, 1717
 color and, 262
 definitions of “map” and, 800
 electronic cartography development and,
 808
 for electronic marine charting, 822–23,
 826–27, 842
 for in-vehicle navigation systems, 1717,
 1717, 1718, 1719, 1721, 1721
 Intergraph, 666
 Internet and, 1753
 labeling and, 371, 747
 map libraries and, 770
 web-based wayfinding and, 1739
Dispossessed, *The* (Le Guin), 782
 Distance decay, 213
 Distance measurement. *See* Electromagnetic
 distance measurement; Measurement
 Distribution maps. *See* Thematic mapping
 Districting problem, 500
 Disturnell, John (1801–1887), 49
 Dixon, David J., entry by, 626–29
 Dixon, Katherine L., 1655
 Dixon, Oliver M., 747
 Dixon, Roland Burrage (1875–1934), 1416
Dixue de tansuo (Chen), 215
Dixue xinxī tupu (geoinformation tupu), 216
 Djawatan Topografi (JATOP) (Indonesia),
 1611
 DLGs (digital line graphs), 1664
 DMA. *See* Defense Mapping Agency
 DMSP (Defense Meteorological Satellite
 Program) (United States), 537, 1280
 DNC (Digital Nautical Charts), 464–65
 Dobson, Jerome E., 557, 1170
 entries by, 492–95, 1169–71
 Dobson, Michael W., 3, 1247
 Docudrama, 986–87
*DOD Glossary of Mapping Charting and
 Geodetic Terms, A* (U.S. Defense Intel-
 ligence Agency), 202
 Dodge, Richard Elwood (1868–1952), 347
 Dodt, Jürgen (b. 1939), 726
 Doležal, Eduard (1862–1955), 1424
 Dollarhide, William, 94, 96
 Domesday Book, 603, 659
 Domesday videodisc, 633, 659, 660
 Domestic Information Display System
 (DIDS) (United States), 262, 1467
 Dominian, Leon (1880–1935), 1235
 Dominican Republic, 1560. *See also* Latin
 America
 Dominion Land Survey (DLS) (Canada),
 1196, 1485
 Donley, Michael W., 105
 Donne, John (1572–1631), 782
 Donnelly, Jay, entry by, 993–94
 Donovan, William J. (1883–1959), 1030
 Doppler Geodetic Network (DGN) (Soviet
 Union), 482, 1596

Doppler positioning, 426, 456. *See also*
 Transit System
 Cold War and, 240
 Doppler Geodetic Network (Soviet
 Union), 482, 1596
 DORIS system, 461
 European Datum and, 476
 European Doppler Observation Cam-
 paign and, 477
 geodetic computations and, 461
 Global Positioning System and, 464, 466,
 1197
 for marine charting, 819
 for meteorology, 875, 875, 1279–80,
 1747
 for navigation, 1016–17, 1024, 1699
 North American Datum and, 466
 satellite geodesy comparison chart, 457
 U.S. Navy satellite network, 457–58, 458
 DOQs (Digital Orthophoto Quarter Quad-
 rangles), 14, 1387
 Dörflinger, Johannes (b. 1941), 317, 610
 Dorington, John Edward (1832–1911), 1032
 DORIS system, 461
 Dorling, Daniel (b. 1968), 61, 313, 314,
 1467, 1516, 1518
 entry by, 193–97
 Dorling Kindersley (DK) (publisher), 1628,
 1629, 1634
 Dorsey, Herbert Grove (1876–1961), 623
 Dot maps, 113
 in census mapping, 210, 211
 demographic, 311, 312
 Eckert on, 338
 soils maps, 1446, 1446
 in thematic atlases, 112
 for thematic mapping, 1514–15, 1515
 in urban/regional planning, 1158–59,
 1161
 Dot matrix printers, 1325, 1429, 1429, 1513
*Dotrina della marea nell'antichità classica e
 nel medio evo, La* (Almagià), 42
 Double hemispheric world maps, 1175
 Dougenik, James A., 585
 Douglas, David H. (b. 1939), 59, 372
 Douglas, Roy (b. 1924), 1162, 1163
 Douglas-Peucker technique (line simplifica-
 tion), 372, 385
 Dover Publications, 91
 Downs, Roger M., 217, 1080, 1403
 entries by, 579–82, 1065–70, 1074–80
 Dowson, Ernest MacLeod (1876–1950),
 183, 929
 Doyle, Arthur Conan (1859–1930), 784
 Doyle, Frederick J., 686, 1283
 Doyle, Peter (b. 1960), 1490
 Dozier, Jeff, entry by, 1273–82
 DR (dead reckoning), 1009–11, 1010, 1011,
 1012, 1023
Dr. Strangelove (film) (Kubrick), 227
 Drafting. *See also* Drawing instruments
 data models and, 360
 drawing media, 329–31, 1551
 geologic mapping, 527
 pen-and-ink, 331–34, 332, 333, 744, 804,
 1148, 1150, 1308
 for topographic mapping, 1550–51
 Drago, Marco, 698, 699
 Dransch, Doris, 62
 Drawing instruments, 326, 326–29, 327,
 328. *See also* Airbrush
 for cadastral surveying, 183
 photomechanical processes and, 326,
 1146, 1147, 1310
 topographic mapping and, 1551
 Drawing media, 329–31, 1551
 plastic, 183, 330, 331, 333, 334, 1150,
 1311, 1332, 1394
 scribing and, 330, 1151–52, 1394
 Drawing surfaces. *See* Drawing media
*Dreams of the Rarebit Fiend: The Flying
 House* (film) (McCay), 226
 Dreyer, Georg Leonard (1793–1879), 407–8
 Driel, Rico van, 634
 Driencourt, Ludovic (d. 1940), 272, 867,
 1183
 Driftmeters, 1011
 DRM (digital rights management), 655, 656,
 657
 Drobshev, F. V. (1894–1986), 1595
Droit moral, 657
 Drones, 1125
 Drop shadows, 1471–72
 Druhot, George Stanley (1895–1984), 1556
 Drummond, Jane, entry by, 1226–27
 Dry-Nuages software, 181
 Dry transfer lettering, 334, 1150, 1150,
 1333. *See also* Mechanical lettering
 techniques
 Drygalski, Erich von (1865–1949), 64, 1418
 DTC (Department of Technical Cooperation)
 (United Kingdom), 323
 DTSS (Digital Topographic Support System),
 1495
 Du Toit, Alexander (1878–1948), 531, 1025
 Dual Improved Stellar Index Camera
 (DISIC), 1295, 1669
 Dual Independent Map Encoding (DIME),
 209–10, 368, 816. *See also* GBF/
 DIME format
 Duchamp, Marcel (1887–1968), 80, 80
 Duchesneau, Thomas D., 1198
 Dueker, Kenneth J., entry by, 448–52
 Dufour, Guillaume-Henri (1787–1875), 43,
 178–79, 640, 1267, 1579
 Duh, Jiunn-Der (Geoffrey), entry by,
 495–504
 Duncan, James S. (b. 1945), 613
 Dupin, Charles (1784–1873), 221, 1512
 Duplicity. *See* Cartographic duplicity
 Dürer, Albrecht (1471–1528), 1175, 1177
 Duster, Troy, 1237
 Dutton, Geoffrey (b. 1944), 362, 583, 619,
 1388, 1388
 DVDs. *See* CD-ROMs/DVDs
 Dykes, J., 1686
 Dymaxion projection, 20, 21, 582, 1175,
 1176, 1177, 1394

- Dymon, Ute Janik, entries by, 389–93, 585–93
- Dynamic mapping, 315. *See also* Animation; Customization; Interactive mapping
- Dzurek, Daniel J., 138
entry by, 136–43
- E-government, 1488
- Eames, Charles (1907–1978), 227
- Eames, Ray (1912–1988), 227
- Eames, Wilberforce (1855–1937), 245
- Earle, Carville (b. 1942), 94–95
- Early Thematic Mapping in the History of Cartography* (Robinson), 1366, 1501
- Early Years of the Ordnance Survey, The (Close)*, 232, 609
- EARSeL (European Association of Remote Sensing Laboratories), 1425
- Earth, shape and size of. *See* Figure of the earth
- Earth, The* (Jeffreys), 531
- Earth art, 83
- Earth Day, 389
- Earth-from-space perspective, 522, 565–68, 566, 567, 990
- Earth Gravity Models (EGMs), 427, 463
- Earth observation. *See* Remote sensing; Satellite imaging
- Earth Observation Satellite Company (EOSAT), 756–57
- Earth Observing System (EOS) (NASA) (satellite), 566, 992, 1280
- Earth Radiation Budget Experiment (ERBE), 1275–76
- Earth Resources Data Analysis System (ERDAS), 1441, 1442
- Earth Resources Technology Satellite (ERTS). *See* Landsat
- Earth Satellite Corporation (EarthSat), 1301
- Earth Summit (Conference on Environment and Development), 321
- Earth's radiation budget, 1275–76, 1277
- Eartha (DeLorme globe), 561
- EarthExplorer, 318
- Earthquakes. *See* Seismological mapping
- “Earthrise” photograph, 522, 566, 567
- Earthsea series (Le Guin), 782
- EarthWatch (corporation), 369
- East Germany. *See also* Eastern Europe; Germany
administrative cartography, 17, 177
cartographic duplicity, 197–200, 199, 1652
journals, 1097
secrecy, 198, 245, 1735
topographic mapping, 177, 197–200, 199, 1589, 1589
- “East Village, The” (Kostelanetz), 783
- Eastern Airlines, 39
- Eastern Alps . . . Handbook* (Baedeker), 1712
- Eastern Europe. *See also* specific countries
boundary changes in, 335–38, 336, 996, 1003, 1053
- cartographic conventions, 275
- cartographic duplicity, 200
- cartographic societies, 1413–14
- ethnographic mapping, 294, 295, 335, 411, 1003
- maps, 177, 178
- military mapping, 926, 938–39, 963, 965–66
- postcolonial cartography and, 308
- regional atlases, 104
- secrecy, 241, 245, 1589, 1590
- Soviet military mapping and, 938–39, 940, 965–66
- topographic mapping, 1550, 1587–91, 1588, 1589, 1590
- U.S. military mapping of, 889–91, 890
- Eastham, Melville (1885–1964), 245
- Eastman, J. Ronald, 497, 635, 1442
entry by, 635
- Easton, Roger L. (b. 1921), 553
- eaZimap series, 1358, 1359
- Ebster, Fritz (1901–1987), 45, 594
- ECDIS (Electronic Chart Display and Information System), 632, 819, 1018
- IHO standards for, 684, 828, 843–44, 846, 1433–34, 1648
- National Geospatial-Intelligence Agency and, 832
- SOLAS on, 685
- WECDIS and, 826
- Echo sounding. *See* Sonar
- Eckert (Eckert-Greifendorff), Max (1868–1938), 338–40
academic cartography and, 6, 10, 338, 339, 340
- cartograms by, 196
- cartographic dictionaries and, 317
- on cartography as science, 343–44
- on color, 263
- on generalization, 371
- on history of cartography, 339, 344, 610
- influence of, 346
- Kartenkunde* editorship, 339, 344
- on perception/cognition, 1071
- on persuasive cartography, 1087, 1089
- in *Petermanns Geographische Mitteilungen*, 1096
- projections by, 339, 339, 1172, 1193, 1503
- on psychophysics, 1083
- statistical mapping by, 1465
- on thematic mapping, 339, 1505, 1507
- on visual perception, 1056
- World War I and, 339, 911
- Eckhardt, F. E., 128
- Eco, Umberto (b. 1932), 782–83, 783, 785, 787
- École de cartographie (France), 121–22
- École nationale des sciences géographiques (France), 646
- École pratique des hautes études (France), 122
- Ecological mapping. *See* Environmental protection
- Economic Atlas of Ontario*, 103, 105
- ECOSOC (UN Economic and Social Council), 671–72. *See also* UN Group of Experts on Geographical Names; UN Regional Cartographic Conferences
- Ecuador. *See also* Latin America
boundary disputes, 139, 143, 151, 153, 892
- topographic mapping, 1560, 1563
- Ed. Hölzel (Vienna), 107, 109
- EDA (exploratory data analysis), 419, 421–23, 422, 423, 497, 1685
- Edge detectors, 379
- Edinburgh World Atlas, The*, 703
- Editora Abril (Brazil) (publisher), 1353–54
- EDM. *See* Electromagnetic distance measurement
- Edmont, Edmond (1849–1926), 778–79
- Edney, Matthew H., 607, 615, 616, 978
entries by, 577–79, 607–16, 978–80, 1761–64
- EDOC (European Doppler Observation Campaign), 477
- Education. *See also* Academic cartography; Apprenticeship; Geography education; Pedagogic role of cartography; School atlases; Textbooks
for marine charting, 827, 828
- Educational Centre for Urban/Rural Surveying, Planning and Management (ECURSPAM), 687
- Edward Stanford Ltd., 24
- Edwards, Leslie, 782
- Edwards, R. G., 493
- Eells, Walter Crosby (1886–1962), 214
- EEZs (Exclusive Economic Zones), 523, 629, 761–62, 830, 976. *See also* Law of the Sea
- Egbert, Stephen L., 61
- Egenhofer, Max J., 496
- Egloffstein, Frederick W. von (1824–1885), 1150, 1267
- EGMs (Earth Gravity Models), 427, 463
- Egypt, 163–64, 899, 902, 969, 1003–4, 1005, 1207. *See also* Africa; North Africa
- Egypt-Israel Peace Treaty (1979), 163
- Ehrenberg, Ralph E. (b. 1937), 1245
entries by, 22–30, 35–40, 863–64, 1009–19, 1764–66
- Eicher, Cory L.
entry by, 298–300
- Eidgenössische Technische Hochschule (ETH) (Switzerland), 6, 206, 341, 342, 640, 1267
- Eidgenössisches Landestopographie (Switzerland), 179
- Eidgenössisches Topographisches Bureau (Switzerland), 178–79
- Eidgenössisches Vermessungsdirektion (Switzerland), 182
- Einstein, Albert (1879–1955), 85
- Eisenhower, Dwight D. (1890–1969), 679, 890, 1273, 1670

- Eisenstein, Sergei (1898–1948), 1767
Ekonomicheskaya kartografiya (Preobrazhenskiy), 341
Ekonomisk Karta över Sverige, 1581, 1581
 El Salvador, 1353. *See also* Latin America
 Electoral mapping, 349–55
 animation in, 61
 cartograms for, 195, 352, 355, 1503,
 1516, 1518, 1520
 choropleth symbolization for, 350, 352,
 1489, 1520
 color in, 350, 351, 352, 353, 355
 in historical atlases, 350, 352, 354
 on television, 352, 354, 1489
 Electro Gyrolocator (in-vehicle navigation system), 1717, 1717
 Electromagnetic distance measurement (EDM), 355–56
 Antarctica, 68
 for cadastral surveying, 184, 187,
 1196–97, 1220, 1222
 Cold War and, 240
 in colonial/imperial cartography, 323
 geodetic computations and, 460, 461
 for geodetic surveying, 453, 466, 468,
 475, 483
 Geodimeter, 240, 356, 454, 460, 483,
 1196, 1222
 Tellurometer, 323, 356, 454, 460, 483,
 1196, 1222, 1223
 total stations, 184, 187, 460, 1197, 1197,
 1220, 1222, 1549
 trilateration and, 454
Electronic Atlas Mark I, 90, 90
Electronic Atlas of Arkansas, The, 103, 106
 Electronic atlases, 89–90, 90
 historical, 93
 historical-boundaries, 95
 HyperCard for, 659
 hypermapping in, 90, 634
 John Bartholomew & Son, 706
 in map libraries, 770
 national, 100
 regional, 106
 thematic, 114–15
 Electronic cartography. *See also* Cartographic visualization; Data capture; Digital databases; Display hardware; Electronic atlases; Electronic cartography development impacts; Electronic marine charting; Geographic information systems
 automated name placement, 358, 375–78,
 376, 377, 384, 505
 conferences overview, 386–89
 development overview, 356–59
 Experimental Cartography Unit role,
 418–19
 Institut Cartogràfic de Catalunya and,
 644–45
 intellectual movements in, 382–85
 Istituto Geografico De Agostini and,
 698–99
 Electronic cartography development impacts,
 269–70
 academic cartography, 128, 340, 342
 administrative cartography, 16, 270
 aerial photography, 1116
 alpine cartography, 45–46
 analytical cartography, 358
 animation, 61, 1531
 astrophysics, 89
 bathymetric mapping, 1028
 biogeographical cartography, 128
 bivariate maps, 131, 132–33
 boundary delineation, 378–82
 boundary disputes, 140
 boundary surveying, 162
 cadastral surveying, 187, 1197, 1210–11,
 1212, 1218–19
 cartograms, 194–95
 cartographic conventions, 275–76
 cartographic visualization, 1065, 1683,
 1684–85
 cartometry, 202, 203–4, 205–6
 cave maps, 207
 census mapping, 208–9
 Chinese military mapping, 946–47, 946,
 947
 Chorley Report on, 1304–5
 choropleth symbolization, 221, 223
 coastal mapping, 238
 color, 257
 color reproduction, 260–63, 1324–25,
 1333
 community mapping, 267–68
 coordinate systems, 282, 284
 customization, 293
 definitions of “map,” 800
 democratization of cartography, 270,
 359, 1335
 dialect maps, 781
 Directorate of Overseas Surveys, 323
 drawing media, 331
 epidemiological maps, 404, 406
 feature extraction, 1291, 1292–93
 forensic mapping, 431–33
 French topographic mapping, 648
 generalization, 371–72, 384–85
 geologic mapping, 527, 529
 geophysics, 534–35
 geospatial data, 488–89, 489
 hazard/risk mapping, 585
 history of cartography, 613
 hydrography, 625, 626
 indigenous peoples and Western cartography, 642, 643
 journalistic cartography, 716
 labeling, 358, 371, 747–48. *See also*
 Automated name placement
 land use maps, 752
 map design, 808–9, 1064, 1333, 1335,
 1509
 map libraries, 613, 768, 769–71, 1421
 map pins, 815–16
 map publishers, 358, 577, 706, 1247
 map reproduction, 260–61, 1321, 1329
 map-use skills, 1078–79
 marine charting. *See* Electronic marine charting
 mathematics and cartography, 867–68
 meteorology, 876
 narrative and cartography, 990, 991
 national map collections, 772
 national mapping agencies, 177, 178,
 180, 181
 Ordnance Survey, 1036–37, 1036,
 1039–40
 pedagogic role of cartography, 219, 348
 personalization, 293
 perspective maps, 1023
 persuasive cartography, 1094
 photogrammetric mapping, 367–68,
 1112, 1130–32, 1132, 1134, 1603
 printing, 804, 1311
 projections, 1172, 1174, 1183
 regional atlases, 105
 relief depictions, 1262, 1263, 1266, 1269,
 1271
 road mapping, 358, 1362
 scale, 810, 1386–87
 social theory, 1402–3
 statistical mapping, 1466
 subject testing, 1073
 symbolization, 358, 384
 tactile maps, 1482
 temporal dynamics, 1528, 1531
 thematic atlases, 114–15
 thematic mapping, 1507–11, 1508
 tidal measurement, 1526–27
 Tissot’s indicatrix, 1533
 topographic mapping, 1552, 1585,
 1613
 uncertainty, 1642
 urban mapping, 1652–53
 urban/regional planning, 1161
 U.S. Geological Survey, 1662–64
 wall maps, 1694–95
 Electronic Chart Display and Information System. *See* ECDIS
 Electronic Cultural Atlas Initiative, 600
 Electronic distance measurement. *See* Electromagnetic distance measurement
 Electronic map labeling. *See* Automated name placement
 Electronic mapping systems (EMSs), 507
 Electronic maps, 808, 808–11, 809. *See also* Electronic cartography
 Electronic marine charting, 632, 633,
 834–35, 835
 Argentina, 836
 CARIS, 496, 499, 830
 for coastal mapping, 238
 color and, 826–27
 data formats for, 839
 display hardware for, 822–23, 826–27,
 842
 ECDIS, 632, 684, 685, 819, 826, 828,
 832, 844, 1018, 1648
 electronic navigation charts, 819, 819,
 823, 825, 846, 853
 geographic information systems and,
 819
 hydrographic techniques and, 629
 interactive, 822–23

- Japan, 853
military development and applications, 823, 825
North Sea Hydrographic Commission and, 843–44
projections for, 1191
scientific uses, 824
United Kingdom, 839
- Electronic navigation charts (ENCs), 819, 819, 823, 825, 846, 853, 1018, 1019
- Electronic Visualization Laboratory (EVL), 1681
- Electroplot, 506–7
- Electrostatic photocopying, 183, 1306–7, 1307, 1311, 1324
- Electrotape, 356
- Elementar-Atlas* (Habenicht), 721
- “Elementary School Classroom in a Slum, An” (Spender), 785
- Elements of Cartography* (Robinson)
academic cartography and, 2, 340, 344–45, 346, 1366
on accuracy, 1402
on color, 259
on demographic mapping, 311
on drawing instruments, 329
on generalization, 371
on proportional symbol mapping, 1516
Raisz and, 1244
on statistical mapping, 1466
on thematic mapping, 1501
on three-dimensional mapping, 1520
- Elevation profiles, 1706–7, 1707
- Elkins, William McIntire (1882–1947), 245
- Ellger, Christof, entry by, 40–42
- Ellington, Edward L. (1877–1967), 413, 414
- Ellipsoidal projections, 1184–85, 1185
- Ellipsoids. *See* Reference ellipsoids
- Elliptic functions, 271
- Elliptical equal-area projections, 51, 1174
- Ellsworth, Lincoln (1880–1951), 76
- Elvhage, Christian, 1262, 1263
- Emancipatory cartography, 1742
- Emberger, L. (1897–1969), 125
- Embossing, 1480, 1724
- Emch, Michael, entry by, 403–7
- Emergency planning, 389–93, 390, 391, 585, 587, 589–90. *See also* Hazard/risk mapping
- Emergency Planning and Community Right-to-Know Act (EPCRA) (United States), 389, 592
- Emergency planning zones (EPZs), 589–90
- Empire des cartes, L'* (Jacob), 614
- Empire Survey Review* (Close), 232
- Empiricism, 79, 308, 608, 609–10
- EMs (electronic mapping systems), 507
- Encyclopédia Italiana*, 1619
- ENCs (electronic navigation charts), 819, 819, 823, 825, 846, 853, 1018, 1019
- Encyclopaedia Britannica*, 1702
- Encyclopedia of Chicago, The* (Grossman, Keating, & Reiff), 604, 606
- Encyclopedias, 90
Endeavor (space shuttle), 1293
- Engelhardt, N. L. (1882–1960), 34
- Enggass, Peter M., 247
- Engineer Reproduction Plant (ERP) (United States), 1670
- English Patient, The* (Ondaatje), 782, 952–53
- Engraving, 1312, 1314–16. *See also* Copperplate engraving; Lithography; Wax engraving
photogravure, 1310, 1314, 1314, 1315, 1317
in Swiss topographic mapping, 180–81
for topographic mapping, 1540, 1541, 1551
wood, 1148, 1308, 1314, 1316
- ENIAC, 209
- Enlightenment, 609, 701, 1400
- Enroute charts, 28, 28
- Enterprise GIS, 493, 494
- Entertainment Technology Center (ETC), 1681
- Entrecasteaux, Joseph-Antoine-Raymond Bruny d' (1739–1793), 842
- Entstehung der Kontinente und Ozeane, Die* (Wegener), 523
- Enumerative cartobibliography, 191, 192
- Environment Canada, 76, 493, 875–76
- Environmental justice, 385, 386
- Environmental protection, 393–96, 394, 395, 396. *See also* Climate change
aerial photography for, 393, 395, 1299
boundary delineation and, 378
cartograms and, 197, 198
coastal mapping and, 238
data capture for, 369
digital libraries and, 318
earth-from-space perspective and, 522
emergency planning and, 389
ESRI services, 398, 399
fire insurance maps and, 393, 428
geographic information systems and, 395, 398–99, 502
GIS and, 394, 398–99
hazard/risk mapping and, 395–96, 585, 586, 587, 592
indigenous peoples and, 642–43
persuasive cartography for, 392, 1088–89, 1088, 1092, 1094
regional atlases and, 105, 106
Russian Geographical Society, 1380
U.S. intelligence community mapping and, 1670
- Environmental Protection Agency (EPA) (United States), 389, 590, 592, 1294, 1299
- Environmental Science Services Administration (ESSA), 630
- Environmental Systems Research Institute. *See* ESRI
- Environmental Systems Science Centre (United Kingdom), 419
- Enzyklopädisches Wörterbuch Kartographie in 25 Sprachen* (Neumann), 317
- EOS (Earth Observing System) (NASA)
(satellite), 566, 992, 1280
- EOSAT (Earth Observation Satellite Company), 369, 548, 566, 756–57
- Eötvös de Vásárosnamény, Loránd (1848–1919), 455, 530
- EPA (Environmental Protection Agency) (United States), 389, 590, 592, 1294, 1299
- Epidemiological maps, 403–7
American Geographical Society, 51, 52, 53
animation in, 61
boundary delineation in, 378
cartograms, 195, 197, 197
choropleth symbolization in, 224, 224
geographical societies and, 1415
GIS and, 406
hazard/risk mapping and, 587, 592
interactive, 406, 407
military mapping and, 969
privacy issues and, 1170
Snow's cholera map, 393, 403, 497, 587, 1070
- Epidioscopes, 1104
- Epimap, 1404
- Epsilon generalization, 372, 373
- Epstein, Earl F., 1198
- Equal-area projections. *See also* Goode homolosine projection
Briesemeister, 51, 1174
- Equal-population cartograms, 195, 197, 197
- Erasers, 326, 328, 333
- Eratosthenes (ca. 275–194 B.C.), 1167
- ERBE (Earth Radiation Budget Experiment), 1275–76
- ERDAS (Earth Resources Data Analysis System), 1441, 1442
- Eritrea, 141, 143, 154, 156. *See also* Africa
- Ernst, Max (1891–1976), 80
- Ernst Klett Schulbuchverlag (Germany) (publisher), 724, 1099
- EROS (Center for Earth Resources Observation and Science), 318, 321
- EROS (satellite), 567
- Errors. *See* Accuracy
- ERS (European Remote Sensing satellite), 537, 548, 631, 1277, 1286
- ERTS (Earth Resources Technology Satellite). *See* Landsat
- ESA (European Space Agency), 462, 548, 566, 631, 1462
- Escape/evasion maps, 233, 234, 703, 1709–11, 1709–11, 1710, 1711
- ESDA (exploratory spatial data analysis), 421
- ESDI (European Spatial Data Infrastructure), 418
- Espèces d'espaces* (Perec), 787
- Espenhorst, Jürgen, entries by, 1673–74, 1690–91
- Espenshade, Edward Bowman (1910–2008), 568
- ESPON (European Spatial Planning Observation Network), 417

- ESRI (Environmental Systems Research Institute) (United States), 320, 397–403
See also ArcInfo
- ArcGIS, 361, 401, 402, 497, 500, 735, 1437, 1511
- ArcView, 401, 402, 402, 502, 694, 1436
- cartographic style and, 1472
- conferences, 387, 398, 403, 678
- Dangermond's influence, 397–98
- data models, 361
- Digital Chart of the World and, 320, 401, 508, 660, 903, 1431, 1455
- geographic information systems and, 1441
- GIS Day, 388
- hazard/risk mapping and, 592
- labeling packages, 378
- proportional symbol mapping and, 1516
- Russian Federation, 1378
- subject testing and, 1074
- thematic mapping and, 1508
- women in cartography and, 1760
- ESRI Map Book*, 509
- ESSA (Environmental Science Services Administration), 630
- Esselte Conference on Applied Cartography, 667
- Esselte Kartor AB (company) (publisher) (Sweden), 407–9, 667
- Estes, John, 1525
- Etak (company), 450, 1717–18
- ETC (Entertainment Technology Center), 1681
- ETH (Eidgenössische Technische Hochschule) (Switzerland), 206, 341, 342, 640, 1267
- ETH (Institut für Kartographie) (Switzerland), 6, 640, 661
- Ethics, 368, 1220. *See also* Privacy issues
- Ethiopia, 141, 143, 154, 156. *See also* Africa
- Ethnic cleansing, 1163
- Ethnographic Atlas of Ifugao* (American Geographical Society), 53, 53, 411
- Ethnographic Atlas of Rajasthan*, 411
- Ethnographic mapping, 409, 411–13. *See also* Race
- colonial/imperial cartography and, 411, 413
- Eastern Europe, 294, 295, 335, 411, 1003
- exclusionary politics and, 305, 306
- indigenous peoples and, 411, 412, 641
- linguistic, 776–78, 778, 779
- post–World War I settlement and, 294, 335, 411, 776, 777, 865, 866, 963, 1234–35, 1236
- in school atlases, 107
- Ethnographische Karte der Österreichischen Monarchie* (Czernig), 776
- ETRS (European Terrestrial Reference System), 417–18, 478
- EU Joint Research Centre, 417
- Eugenics, 1233–34
- Eugenics Record Office (ERO) (United States), 1233–34
- Euler, Leonard, 1403
- Eumorphic projection. *See* Boggs eumorphic projection
- Eurasian Heartland* (Chapin), 715, 716
- Euro-Carto conference, 387
- EuroBoundaryMap, 178
- Eurocentric bias, 413–16
- in child-created maps, 218
 - in historical atlases, 92, 94
 - history of cartography and, 121, 612, 638
 - Mercator projection and, 1088, 1100, 1179–80
 - Peters projection and, 244, 415, 872, 1100
 - postcolonial cartography and, 307
 - in world atlases, 115
- EuroGeographics, 162, 267, 278, 417–18, 478
- EuroGeoNames, 520
- EuroGlobalMap, 178
- Europe. *See also* Eastern Europe; European Union; Military mapping of Europe; Western Europe; specific countries and organizations
- academic cartography overview, 6–13, 340–41, 342
 - boundary surveying, 158–62, 159, 160, 161
 - cadastral mapping, 16
 - cadastral surveying, 1210–12, 1211
 - cartographic societies, 1410–14, 1411
 - census mapping, 17
 - Comité Européen des Responsables de la Cartographie Officielle, 266–67
 - electoral mapping, 354
 - forestry, 433
 - geodetic surveying, 475–79, 476, 477, 478, 645, 649
 - geographic names, 512
 - geographical societies, 1417–19
 - map collecting, 248–51, 249, 250
 - marine charting, 843–46, 845
 - road mapping overview, 1359–63, 1360, 1361, 1362
 - unification, 17, 42
- Europe and the Middle East* (map) (British Council), 597
- Europe from the East* (Harrison), 581
- European Association of Remote Sensing Laboratories (EARSeL), 1425
- European Committee of Representatives for Official Mapping (Comité Européen des Responsables de la Cartographie Officielle) (CERCO), 178, 266–67, 417, 478, 1455, 1585–86
- European Community in Maps, The* (Kormoss), 417
- European Datum (ED), 426, 460, 463, 475–77, 651
- European Doppler Observation Campaign (EDOC), 477
- European GIS (EGIS) conference, 387
- European Reference Frame (EUREF), 417, 477–78, 478
- European Remote Sensing satellite (ERS), 537, 548, 631, 1277, 1286
- European Space Agency (ESA), 462, 548, 566, 631, 1462
- European Spatial Data Infrastructure (ESDI), 418
- European Spatial Data Research (EuroSDR), 686
- European Spatial Planning Observation Network (ESPON), 417
- European Terrestrial Reference System (ETRS), 417–18, 478
- European Union (EU), 278, 338, 416–18, 548
- Galileo, 284, 418, 462, 551, 556, 843
- European Union Directive on the Legal Protection of Databases, 657
- European Vertical GPS Reference Network (EUVN), 478
- European Vertical Reference System (EVRS), 478
- EuroRegionalMap, 178, 418
- EuroSpec, 418
- Eurostat, 417
- EUVN (European Vertical GPS Reference Network), 478
- Evans, E. Estyn (1905–1989), 811
- Evans, Gary W., 1081
- Evans, Russ, entries by, 529–39, 679–80
- Everard, Cyril E., 1736
- Everett, J. E., 531
- Evidence Recorder (software), 433
- Evolena-Zermatt-Monte Rosa* (Imfeld), 735, 736
- Evolution, 539
- EVRS (European Vertical Reference System), 478
- Ewing, W. Maurice (1906–1974), 456, 463, 1392, 1499, 1500
- Excel (software), 1433
- Exclusionary politics, 304–7, 305, 306, 1001, 1091
- Exclusive Economic Zones (EEZs), 523, 629, 761–62, 830, 976. *See also* Law of the Sea
- Existence theorems, 868–69
- Expedition maps, 952–53
- Experimental Cartography Unit, Royal College of Art (United Kingdom), 357–58, 418–19, 420, 421
- analytical cartography and, 56, 358
 - color, 261
 - geographic information systems and, 1440
 - map production and, 504
 - Ordnance Survey and, 357, 418, 1036–37, 1036
 - subject testing and, 1072
 - thematic mapping and, 1508
- Experimental map-psychology, 1080–82
- Explokart project, 612
- Exploratory data analysis (EDA), 419, 421–23, 422, 423, 497, 1685
- Exploratory Data Analysis* (Tukey), 419

- Exploratory spatial data analysis (ESDA), 421
Explorer (satellites), 566, 1273
Explorers Club (United States), 1416, 1417
Exploring Geovisualization (Dykes, MacEachern, & Kraak), 1686
Extraterrestrial cartography. *See* Lunar and planetary mapping
Exxon Oil Company, 261
Exxon Valdez oil spill, 400, 401, 585
Eye movements, 1072, 1072, 1509
- F. W. Putzgers historischer Schul-Atlas zur alten, mittleren und neuen Geschichte (Putzger), 92
fabMAPs, 234, 234
Fabrikant, Sara Irina, 1505
Facets, 749, 1271
Facilities maps, 424–25
Facsimile-Atlas to the Early History of Cartography (Nordenskiöld), 91, 608
Facsimile atlases, 90–92, 608
Facts in Review, 1091, 1092
Fair, Ethel M., 247
Fair Housing Act (1968) (United States), 1254
Fair use, 657–58
Fairbairn, David, entry by, 1326–30
Fairchild, Sherman M. (1896–1971), 1298
Falconer, George, entry by, 116–17
FalconView (software), 1432
Faletto, Enzo, 308
Falk, Gerhard (1922–1978), 1336, 1337
Falk folding system, 1336, 1337
Falk-Verlagsgruppe (Germany) (publisher), 797, 1336, 1337
Falklands War (1982), 902–3, 1496, 1498
Faller, J. E., 455
Falsification. *See* Cartographic duplicity
Family Atlas of the World, The (Bartholomew), 703, 705
Fang Jun, 1783
Farah, Nuruddin (b. 1945), 785
Farrar, John (d. ca. 1651), 1092
Fat masking, 1327, 1327
Fathometers, 1024
Faulkner, William (1897–1962), 783
Fawcett, C. B. (1883–1952), 312, 746
Feature displacement, 372, 374, 374
Feature extraction, 1120, 1291–93, 1292
Feature naming. *See* Geographic names
Febvre, Lucien (1878–1956), 122
Fechner, Gustav Theodor (1801–1887), 1082
Federal Aviation Administration (FAA) (United States), 28, 557
Federal Board of Surveys and Maps (United States), 1556
Federal Emergency Management Agency (FEMA) (United States), 389, 390, 589, 590, 776
Federal Geographic Data Committee (FGDC) (United States), 494, 510–11, 1455
Federal'naya sluzhba geodezii i kartografii Rossii (Roskartografiya) (Russian Federation), 551, 1213, 1377, 1378, 1596
Fédération Internationale des Géomètres (International Federation of Surveyors) (FIG), 670, 671, 827, 828
Feiffer, Jules (b. 1929), 783
Feigenbaum, Mitchell Jay (b. 1944), 869, 1184
Feist Publications, Inc., v. Rural Telephone Service Co., Inc., 285
Feldmann, Hans-Uli, entries by, 178–82, 326–34, 573–74, 638–39, 735–37, 1040–43
Fels, Franz Rudolf, 573
Fels, John, 1404
Ferber, Robert, 1142
Fernerkundungskartographie mit Satellitenaufnahmen (Gierloff-Emden & Buchroithner), 1283
Fernow, Bernhard Eduard (1851–1923), 433
Ferrajoli de Ry, Enzo (d. 1966), 1678
Ferrogallic process, 1306
Ferschke, Hans, 726
Fersman, A. E. (1883–1945), 1640
Fessenden, Reginald Aubrey (1866–1932), 622–23, 1024
FGDC (Federal Geographic Data Committee) (United States), 494, 510–11, 1455
Fichtner, Uwe, 726
Ficker, Adolf (1816–1880), 1511
Fictional maps. *See* Literature and cartography
Field, Kenneth S., entry by, 200–201
FIG (Fédération Internationale des Géomètres) (International Federation of Surveyors) (FIG), 670, 671, 827, 828
Figure of the earth, 425–28, 466. *See also* Geodesy; Geodetic surveying
Cold War and, 240, 427, 455
geodetic surveying in Africa and, 473
geodetic triangulation and, 426, 453
gravimetric surveys and, 455, 469
Heiskanen on, 425, 427, 593
International Geophysical Year and, 679, 679
Molodenskiy on, 426, 980, 981
sea-surface altimetry and, 536–37, 630
U.S. Army Corps of Engineers on, 1656
Filchner, Wilhelm (1877–1957), 1418
File transfer protocol (FTP), 661
Filippov, Yu. F., 1640
Film. *See* Cinema
Finch, V. C. (1883–1959), 752, 753
Fine, Oronce (1494–1555), 1175
Finland
 administrative cartography, 18
 boundary surveying, 161
 military mapping, 962
 national atlases, 18, 96, 112, 117–19, 117, 118, 131, 1465, 1501
Finnegans Wake (Joyce), 786, 787
Finsterwalder, Richard (1899–1963), 45, 594, 595
Finsterwalder, Sebastian (1862–1951), 43, 1127
Fire insurance maps, 389, 393, 428–30, 429, 430, 601
FIRMs (flood insurance rate maps), 589, 590, 591, 776
First Gulf War. *See* Gulf War (1991)
First Nations, 146, 286, 307, 642, 1007, 1094. *See also* Indigenous cartography; Indigenous peoples and Western cartography
Fischer, Alois, 440
Fischer, Hans (1860–1941), 1692
Fischer, Irene K., 1656
Fischer, Joseph (1858–1944), 1680, 1757
Fish, Carolyn, entry by, 504–10
Fisher, Howard T. (1903–1979). *See also* SYMAP
 Dangermond and, 397
 on definitions of “map,” 800, 802
 Harvard Laboratory for Computer Graphics and Spatial Analysis, 56, 582, 583, 1427, 1440
 influence on Warntz, 1700
 on printing, 506
Fisher, Irving (1867–1947), 582, 1177
Fisher, Peter F. (1955–2014), 15, 557, 688, 1170, 1677
 entries by, 688–89, 1676–78
Fisher, Ronald Aylmer (1890–1962), 1468
Fishnet surface maps, 1520, 1520
Fitch, Richard, 247
Fitchet, Duncan M. (1925–1992), 667, 1375
Fite, Emerson David (1874–1953), 246
Fitzgerald, Gerald F., 247
FitzGerald, Lawrence (b. 1903), 976
Fiziko geograficheskiy atlas mira, 1382, 1640
Flannery, James John, 3, 1064, 1065, 1083, 1083, 1084, 1516
Flash (software), 600
Flat-polar projections, 1172, 1193, 1503. *See also* Robinson projection
Flatness, James A., entry by, 110–12
Flattening the Earth: Two Thousand Years of Map Projections (Snyder), 1399
Fleure, H. J. (1877–1969), 1233
Fliegerkarte, 722, 1698
Float lettering, 1148
Flood insurance rate maps (FIRMs), 589, 590, 591, 776
Flooding, 589, 590, 591, 592
Floriano, Antonio, 1175
Florin, John William, 94
Flow mapping, 1464, 1518–20, 1520
Fly-through technology
 animation and, 61–62
 boundary disputes and, 138, 141, 142, 143, 892
fMRI (functional magnetic resonance imaging), 1070, 1082
Folding strategies, 24, 655, 879–80, 1336–38, 1336, 1337, 1707

Folger, Timothy, 1392
 Foncin, Myriem (1893–1976), 772, 1759
 Fonts. *See* Typography
 Food Security Act (1985) (United States), 1447
 Force, Peter (1790–1868), 245
 Ford, James B. (1845–1928), 50
 Ford Foundation, 583
 Fordham, Herbert George (1854–1929), 191, 192, 799, 1373
 Forecasting. *See* Temporal dynamics
 Forensic mapping, 430–33, 431, 432
 Forest Atlas (United States), 436
 Forestry, 17, 433–34, 433–37, 434, 435
 Forgotson, J. M., 1428
Forms of Nationhood (Helgerson), 612
 Forrest, David (b. 1956), 275
 entry by, 727
 Forrest, George (1873–1932), 124, 126
 Forry, Samuel (1811–1844), 1415
Forschungs- und Sitzungsberichte der ARL, 41
Forschungs-Unternehmen Nepal Himalaya, 594
 Fortes, Luiz Paulo Souto, entry by, 465–68
 Fortin, Marie-Josée, entry by, 378–82
 FORTRAN (programming language), 342, 376, 1428, 1431, 1479. *See also* SYMAP
Fortune magazine, 2, 20, 708, 712, 1022, 1505
 Fosberg, F. Raymond (1908–1993), 127
 Fotheringham, A. Stewart (b. 1954), 1471
Fotogrammetrische Kaart des Rijks, 1580
 Foucault, Michel (1926–1984), 308, 579, 613, 1170, 1401
 Four-dimensional maps. *See* Temporal dynamics
 Fourcade, Henry Georges (1865–1948), 1103, 1126, 1127, 1137, 1576
 Fourdrinier, Henry (1766–1854), 1048
 Fourdrinier, Sealy (1773–1847), 1048
 Fourier analysis, 58, 59, 427
 Fowler, Robert J., 378
 Fowler, Thaddeus Mortimer (1842–1922), 1020, 1021
Fox Went Out on a Chilly Night, The (Spier), 217
 Fractal representation, 437–39, 438, 439, 869, 1385
 FRAGSTATS (software), 205, 205
Fram (ship), 74
 Framme (software), 1442
 Francaviglia, Richard V., 309
 France. *See also* Europe; French colonial/imperial cartography; French military mapping
 aeronautical charts, 22, 23, 24, 28
 biogeographical cartography, 128, 129
 cadastral surveying, 1485
 cartobibliography, 191
 coordinate systems, 280–81
 electronic cartography development, 358
 Franco-Prussian War, 281, 905

geographic names, 512
 marine charting, 840, 842–43, 844
 national map collection, 771, 772
 place promotion, 1637, 1638, 1639
 political boundaries, 162
 postcolonial cartography, 308
 road mapping, 1361, 1362
 topographic mapping, 1579. *See also* Institut Géographique National; Service géographique de l'armée
 Francis Edwards (dealer) (London), 246, 248, 249, 250
 Franco, Francisco (1892–1975), 653
 Franco-British Convention (1920), 163
 Franco-Prussian War (1870–1871), 281, 905
Francophonie nord-américaine à la carte, La, 634
 Frank, Andre Gunder, 308
 Frank, Andrew U., entry by, 1210–12
 Franklin, Benjamin (1706–1790), 1392
 Franklin, W. Randolph, 60
 Free and open-source software (FOSS), 657
 Free Library of Philadelphia, 72
 Free-recall maps, 811
 Free Software Foundation (FSF), 657
 Freedom of Information Act (FOIA) (1966) (United States), 1170, 1228–29
 FreeHand (software), 262, 509, 1435, 1436, 1509
 Freeman, Archibald (b. 1866), 246
 Freeman, Herbert (b. 1925), 376–77, 377, 505
 Freie Universität Berlin, 342
 Freitag, Ulrich, 10, 10, 945
 French colonial/imperial cartography, 255
 boundary surveying, 153, 163, 164, 169
 cadastral surveying, 1209
 geodetic surveying in Africa, 474
 military mapping, 856, 908, 955, 968, 972, 972
 regional atlases and, 105
 Southeast Asia, 972, 972
 topographic mapping, 1542, 1568–72, 1569, 1570, 1571, 1598
 French military mapping, 904–9
 Cold War, 907–8
 colonial/imperial, 908, 954–55, 968, 972, 972
 World War I, 645–46, 905–6, 905, 906, 907, 1770
 World War II, 646–47, 907, 969, 1492, 1492
 Freundlich, Beth, 616
 Frey, Allan E., 1470
 Frey, Beat (b. 1939), 737
 Frey, Heinrich (1878–1957), 736
 Frey, Max (1905–1992), 736
 Frey, Walter (b. 1941), 737
 Freytag, Gustav (1852–1938), 350, 351, 439–40, 441, 442
 Freytag-Berndt und Artaria KG (Austria) (publisher), 439–42, 1694
 Friedman, S. J., 1138
 Friel, Brian (b. 1929), 787
 Friendly, Michael (b. 1945), 1501, 1507, 1521
 Frisbie, Douglas W., 288
 Fritsch, Werner von (1880–1939), 1118
Frontiers of Language and Nationality in Europe, The (Dominian), 1235
 Froschauer, Christoph (1532–1585), 1040
 Froschauer, Christoph (d. 1564), 1040–41
 Frost, Wade Hampton (1880–1938), 403
 Frumin, Mitia, entry by, 846–49
 Frye, Alex Everett (1859–1936), 1260
 Fryman, James F., 1436
 FTP (file transfer protocol), 661
 Fuchs, Vivian (1908–1999), 680
 Fujita, Tetsuya Theodore (1920–1998), 1747, 1748, 1749
 Fuller, John, 784
 Fuller, R. Buckminster (1895–1983), 20, 21, 582, 1175, 1176, 1177, 1394
 Fuller, W. G., 1363
 Furness, Thomas A., 1681
 Fuzzy set theory, 15, 496
 G. F. Cram (publisher) (United States), 1702
G. Freytag's Welt-Atlas, 440
 G. Philip & Son (publisher) (United Kingdom), 1694
 G. W. Bacon & Co. (publisher) (United Kingdom), 738–39
 Gabon, 136, 138, 138. *See also* Africa
 Gabor, Dennis, 619
 Gaebler, Eduard (1842–1911), 1755
 Gäfvert, Björn, entry by, 961–62
 Gagnon, Pierre, 1221
 Galaxies, 85
 Galbraith, John Kenneth (1908–2006), 397
 Galeano, Eduardo H., 308
 Galileo (satellite navigation system), 284, 418, 462, 551, 556, 843
 Galileo Galilei, 1529
 Gall, James (1808–1895), 244, 1100, 1100
 Gall-Peters projection. *See* Peters projection
 Gallois, Lucien (1857–1941), 1050
 Galperin, G. L., 317
 Galton, Francis (1822–1911), 1521, 1529
 Gambit (satellite), 1124, 1669
 Gamma rays, 88
 Gamow, George (1904–1968), 87
 Ganado, Albert (b. 1924), 249
 Gandin, L. S., 733
 Gannett, Henry (1846–1914), 443–44, 1657
 Gao Jun, 945
 Garbutt, Paul E. (1919–2008), 791
 Garcia, João Carlos, entry by, 285–86
 Gardiner, Samuel Rawson, 93
 Gardiner-Hill, R. C., 1036
 Garland, Ken, 789, 791
 Garland, Nicholas, 784
 Garrett, John Work (1872–1942), 245
 Garrett, Virginia (b. 1920), 247
 Garrison, William Louis (b. 1924), 5, 1469, 1534
 Gartner, Georg F., entry by, 1739–42
 Gas maps. *See* Road mapping

- Gaspar, Joaquim Alves, entry by, 1167–69
 Gasser, Max (1872–1954), 1127–28, 1128
 Gasser Projector, 1127–28, 1128
 Gaudi, Antoni, 1251
 Gauss, Carl Friedrich (1777–1855), 425, 694, 1172, 1184
 Gauss-Krüger coordinate system
 for Austrian military mapping, 926, 926, 927
 for Chinese military mapping, 943, 945
 for German colonial/imperial cartography, 1573–74
 for German military mapping, 912, 915, 916
 origins of, 1184
 for Prussian topographic mapping, 1165
 for Soviet military mapping, 935, 937
 for Soviet topographic mapping, 1592
 Universal Transverse Mercator coordinate system and, 1186
 Gauss-Schreiber Transverse Mercator Projection, 1606
 Gaussen, Henri (1891–1981), 53, 125, 127, 128, 129
 Gavish, Dov (b. 1938), 967
 Gazetteers, 517, 519–20, 1085
 GBF/DIME format (Geographic Base File/ Dual Independent Map Coding), 60, 360, 360, 449, 450
 cadastral surveying and, 1212
 Harvard Laboratory for Computer Graphics and Spatial Analysis and, 583
 mapping software and, 1430
 spatial statistics and, 498
 statistical mapping and, 1466–67
 GCTP (General Cartographic Transformation Package) (software), 1399, 1431
 GDDD (Geographical Data Description Directory), 267
 GDF (Geographic Data File), 1720
 GDT (Geographic Data Technology Inc.), 369, 450, 1717
 GDTA (Groupe pour le développement de la télédétection aérospatiale), 648
 GDZ (GeoDatenZentrum) (Germany), 177
 Ge Jianxiong (b. 1945), 96
 Geary's *c*, 498
 GEBCO (General Bathymetric Chart of the Oceans) (*Carte générale bathymétrique des océans*), 320–21, 444–45, 446, 447, 818, 1027–28, 1028, 1029
 contour mapping in, 822
 European marine charting and, 844
 French contributions, 842
GEBCO Digital Atlas, 321, 632, 824, 844
 Global Positioning System and, 632
 Indonesia, 1611
 International Hydrographic Organization and, 321, 682–83
GEBCO Digital Atlas, 321, 632, 824, 844
 Gebhard, Hannes (1864–1933), 1465
 Geddes, Patrick (1854–1932), 701, 751
 Gee (radio navigation system), 843, 902, 1014, 1024, 1699, 1775
 Geelan, Patrick, 1086
 Gehlke, C. E. (1884–1968), 1468
 Geisler, Walter (1891–1945), 341
Gekkan Kochizu (journal), 1420
Gelände und Karte (Imhof), 640
 Geller, Margaret J. (b. 1947), 85
 Gender, 1078. *See also* Women in cartography
 General Bathymetric Chart of the Oceans.
 See GEBCO
 General Cartographic Transformation Package (GCTP) (software), 1399, 1431
General Cartography (Raisz), 1244
 academic cartography and, 1–2, 340, 344
 on accuracy, 1402
 cartographic dictionaries and, 317
 on choropleth symbolization, 221
 on color, 259
 on definitions of “map,” 799
 demographic mapping in, 311
 on drawing instruments, 327–28
 on drawing media, 330
 on geography and cartography, 524
 on pen-and-ink drafting, 333
 on statistical mapping, 1465
 on thematic mapping, 1507
 on three-dimensional mapping, 1520
General Catalogue of Maps, Atlases, Maprouting Systems, etc. (Hammond Map Company), 576
 General Drafting Company (publisher)
 (United States), 36, 1246, 1345, 1348, 1351–52, 1353, 1354
 General Public License (GPL), 657
 General Strjelbitzki (Russian Empire), 1587
 Generalization, 371–75
 analytical cartography on, 59
 animation and, 62
 in British topographic mapping, 1036, 1037
 in Chinese military mapping, 947, 947, 948
 data models and, 372, 373, 374
 in electronic atlases, 90, 90
 electronic cartography development impacts, 371–72, 384–85
 Experimental Cartography Unit and, 419
 fractal representation and, 438
 intellectual property and, 655–56
 Jenks on, 3, 374
 line simplification, 3, 59, 371–72, 385
 in marine charting, 822
 persuasive cartography and, 1089
 soils maps and, 1444, 1447, 1448–49
 web-based, 374–75
 Generalized linear models (GLMs), 1470
Generalkarte von Mitteleuropa, 925
 General'noye mezhavaniye zemel' (Russian Empire), 1379–80
 Generalstabens litografi ska anstalt (GLA) (Sweden), 407–9
 Generalstabens litografiska inrättning (Sweden), 408
 Generic Mapping Tools (GMT) (software), 535, 853, 1433, 1433
 Genetic mapping, 445–48, 448
 Genetrix program (United States), 1668
 Genette, Gérard (b. 1930), 1404
 Geneva Convention on the Continental Shelf (1958), 141
 Geneva Convention on the Territorial Sea and Contiguous Zone (1958), 141
 Genographic Project, 1237
 Gentleman, David (b. 1930), 1163–64, 1164
 Geo. A. Ogle & Co. (Chicago), 110
 GEO Brazil conference, 388
 Geo-EAS (Geostatistical Environmental Assessment Software), 502
 Geo-Information Society of South Africa (GISSA), 1410
Geobyte (journal), 1430
 GeoCenter Internationales Landkartenhaus (dealer), 1450
 Geocentric Datum of Australia, 485, 485, 1219
 Geocoding, 209–10, 448–52, 449, 450, 451, 816, 1128–29, 1718–19. *See also* GBF/DIME format
 GeoDa (software), 498
 Geodætisk Institut (Denmark), 460, 961, 962
 GeoDatenZentrum (GDZ) (Germany), 177
 Geodeettinen laitos (Finland), 455, 460
 Geodesics, 166
 Geodesy, 452–65. *See also* Figure of the earth; Geodetic datums; Geodetic reference systems; Geodetic surveying; Geodetic triangulation; Global Positioning System; Gravimetric surveys; Reference ellipsoids; Reference spheroids; Satellite geodesy; specific organizations
 Cold War and, 14, 239, 240–41, 463
 computations for, 459–62
 geodetic trilateration, 453, 453–54
 military development and applications, 14, 463–65
 photogrammetric mapping and, 1132–36
Geodesy, Mapping, and Photogrammetry (journal), 719
Geodesy and Aerophotography (journal), 719
Geodesy for the Layman, 455
 Geodetic datums. *See also* Geodetic reference systems; World Geodetic System
 accuracy and, 13
 Antarctica, 68
 Arc Datum, 473
 Australian Geodetic Datum, 483, 484–85
 Australian Height Datum, 484
 Canadian Geodetic Vertical Datum, 467, 1553
 Cape Datum, 473
 cruise missiles and, 289

- Geodetic datums (*continued*)
 European Datum, 426, 460, 463, 475–77, 651
 Geocentric Datum of Australia, 485, 485, 1219
 for geographic information systems, 555
 Latin America, 469
 for marine charting, 820–21
 National Geodetic Vertical Datum (United States), 238, 467, 1135, 1556
 National Height Datum (China), 1605–6
 New England Datum, 1135
 North American Datum, 240, 426, 460, 463, 466, 467, 1135, 1553
 North American Vertical Datum, 467, 1135, 1556–57
 Ordnance Datum Newlyn, 1527
 Pulkovo Datum, 477
 reference ellipsoids and, 426
 Sandy Hook Datum, 1135
 secrecy and, 199
 South African Hartebeesthoek Datum, 473
 South American Datum, 469
 for tidal measurement, 1527
 Tokyo Datum, 463, 1606
 for topographic mapping, 1556–57, 1585, 1596, 1605–6
 topographic mapping and, 1553
 U.S. Standard Datum, 1135
 Geodetic Infrastructure of Antarctica (GIANT), 69–70
 Geodetic reference systems (GRSs), 425
 BIH Terrestrial System, 466–67
 for cadastral surveying, 1213, 1222
 Canadian Spatial Reference System, 467
 European Terrestrial Reference System, 417–18, 478
 feature extraction and, 1292
 International Terrestrial Reference System/Frame, 426, 462, 467, 470, 478, 485, 1169, 1606
 Latin America, 150
 Military Grid Reference System, 281, 282, 283, 464, 1189
 SIRGAS, 150, 468, 469–70, 471, 472
 Soviet Union, 1213
 Geodetic Survey of Canada (GSC), 466, 467, 467
 Geodetic Survey of South Africa, 473
 Geodetic surveying, 465–88. *See also* Soviet geodetic surveying; specific organizations
 accuracy in, 13
 Africa, 472–75, 473, 620, 1576
 Australia, 483, 483, 483–85, 484, 485
 British military mapping and, 897
 China, 1602, 1604–5
 for colonial/imperial cartography, 150, 322, 323, 472–74, 1573–74
 Europe, 475–79, 476, 477, 478, 645, 649
 Hotine and, 473, 620, 897
 Japan, 851, 1606
 journals, 478
- Latin America, 147, 456, 468, 468–72, 470, 471, 662–66, 664, 665
 lunar and planetary mapping and, 485–88, 487
 North America overview, 465, 465–68, 467
 Russian Empire, 479, 1380
 Russian Federation, 1377
 secrecy and, 199
 textbooks, 478
 U.S. Army Corps of Engineers, 1656
 Geodetic triangulation, 452, 452–53, 465.
See also Aerial triangulation; Geodetic surveying; Reference ellipsoids
 aerial triangulation by independent models, 324, 1109, 1111, 1111, 1130, 1131, 1140
 for boundary surveying, 147, 154, 159, 160–61
 for coastal mapping, 235
 for colonial/imperial cartography, 323
 computations for, 460, 461
 figure of the earth and, 426, 453
 vs. trilateration, 454
 Geodetic trilateration, 453, 453–54
Geodéziai és Kartográfia (journal), 1414
Geodéziai és Kartográfiai Egyesület (Hungary), 1414
Geodeziya i Aeroftosz (journal), 478
 Geodimeter, 240, 356, 454, 460, 483, 1196, 1222
 Geodolite, 356
 GeoEye (corporation), 369, 567, 1301
 “Geofencing,” 495
 GEOGRAF (software), 1441
Geografi czno-statystyczny atlas Polski (Romer), 335
 “Geographer’s Line, The” (Kirchwey), 785
 Geographers’ A-Z Map Company (publisher) (United Kingdom), 1054
 Geographia (company) (United Kingdom), 119
Geographic Background of Chicago, The (Goode), 568
 Geographic Data File (GDF), 1720
 Geographic Data Technology Inc. (GDT), 369, 450, 1717
 Geographic districting problem, 500
 “Geographic Europa” (Gomringer), 783
 Geographic Information Management and Manipulation System (GIMMS), 496, 1439, 1440
 Geographic information science (GISci), 490
 academic cartography and, 1, 340
 data models and, 364–65
 electoral mapping and, 352
 foci of, 995, 995
 Goodchild on, 55
 map design and, 1065
 perception/cognition and, 1070
 privacy issues and, 1169
 scale and, 1386
 spatial thinking and, 1070
 Geographic Information System for Breast
- Cancer Studies on Long Island (LI GIS), 406, 407
 Geographic information systems (GIS), 488–511. *See also* ArcInfo; Canada
 Geographic Information System; ESRI
 academic cartography and, 4, 340, 341, 342, 488–91, 493, 494, 994–95
 accuracy and, 14, 16
 administrative cartography and, 16, 493–94, 1488
 Africa, 1576
 analytical cartography and, 55, 358
 Bertin and, 1466
 biogeographical cartography and, 128
 boundary disputes and, 138, 143
 cadastral surveying and, 1198, 1212, 1220
 cartographic visualization and, 1685
 cartometry and, 205
 for cave maps, 207
 Chen Shupeng on, 216
 Chorley Report, 1304–5
 choropleth symbolization and, 223–24, 1511
 cinema maps and, 226
 color and, 263
 commercial applications, 492, 493, 1301
 community mapping and, 267, 268–69
 conceptual implications, 488–92
 crime mapping and, 288
 dasymetric symbolization and, 298, 300, 695, 1515
 data capture/conversion for, 369
 data models for, 360, 361, 362, 363–65, 369, 1439, 1440
 definitions of “map” and, 800, 802
 democratization of cartography and, 397, 401, 635, 642
 dot maps and, 1515
 vs. electronic atlases, 90
 electronic cartography development and, 809, 810
 emergency planning and, 389, 390
 enterprise vs. project-level, 493, 494
 environmental protection and, 395, 398–99, 502
 Experimental Cartography Unit role, 418
 facilities maps and, 425
 forestry and, 436
 fractal representation and, 438
 geocoding and, 449, 451, 452
 geodetic datums for, 555
 geographic names and, 516
 geography and cartography and, 525
 geologic mapping and, 527
 GEOSPACE and, 548
 geospatial data marketing and, 856
 “GIS and society” debates, 386
 Gulf War (1991) and, 570
 Harvard Laboratory for Computer Graphics and Spatial Analysis and, 583, 584, 1440–41
 historical-boundaries atlases and, 95
 historical geography and, 605
 for historical research, 599–600

hypermapping and, 634
IDRISI, 497, 499, 500, 635, 1442
illustration software and, 1436–37
images as maps and, 1550
in-vehicle navigation systems and, 1718
indigenous peoples and, 642
institutional implications, 492–95
intellectual property and, 655, 656, 657,
 658
interpolation and, 502, 735
Istituto Geografico De Agostini and, 699
ITC and, 687
journals, 49, 490, 688–89, 718
land information systems and, 1212
land systems analysis and, 751
land use maps and, 752
landscape architecture and, 758
Latin America, 387–88, 388
lunar and planetary mapping and, 796
map design and, 1065
“map in, map out” and, 267–68
map libraries and, 766, 770
map reproduction and, 263, 504–10, 505,
 506, 507, 508, 509, 527, 804, 1311
marine charting and, 819
mathematics and, 869
metadata and, 510–11
military development and applications,
 358, 493–94, 570
for military mapping, 902, 930, 946–47
nation-state formation/maintenance and,
 1001
object-oriented data models for, 497,
 1441–42
ODYSSEY, 398, 399, 496, 583, 584, 585,
 1440, 1441
Ordnance Survey and, 1039
orthophotography and, 1144–45
pedagogic role of cartography and, 348
photocopying and, 1307
printing and, 804
privacy issues and, 1169, 1170, 1656
public access to cartographic information
 and, 1227, 1229
public participation GIS, 268–69, 386,
 1403
redlining and, 1255
Russian Federation, 1377, 1378
satellite imaging and, 992
shapefiles, 1431
societies, 494, 1407
software overview, 1438–43, 1442, 1443
spatial analysis overview, 495–504
statistical mapping and, 1467
statistics and, 1470–71
subject testing and, 1073
tax maps and, 1488
textbooks, 688
thematic mapping and, 1508, 1509, 1515
three-dimensional mapping and, 1521
topographic mapping and, 181, 1552,
 1559, 1613
training, 401
turnkey systems, 398, 499, 810

Universal Transverse Mercator coordinate
 system and, 992
urban/regional planning and, 1161
U.S. Geological Survey and, 493, 494,
 504, 1664
viewshed mapping and, 1676, 1677
web-based wayfinding and, 1740
Geographic knowledge discovery (GKD), 422
Geographic names, 511–21. *See also*
 Labeling
 in Antarctica maps, 68
 applied toponymy, 516–19
 in Arctic maps, 74
 counter-mapping and, 286
 cultural/social significance of, 134,
 293–94, 301–2, 304, 511–16, 512,
 513, 514, 515, 521
 customization and, 293–94
 derogatory, 294
 digital libraries and, 319
 gazetteers, 517, 519–20, 1085
 indigenous peoples and, 134, 512–13,
 514, 515, 642
 military development and applications,
 134–35, 513, 1085
 nation-state formation/maintenance and,
 304, 512
 Permanent Committee on Geographical
 Names, 134, 1085–87, 1086
 place-name studies, 520–21
 postcolonial cartography and, 301–2,
 304, 513–14
 Russian Federation, 1378
 in school atlases, 108
 standards for, 134, 514, 515, 516–17,
 518, 520, 1047, 1644, 1646–47, 1646
 in thematic atlases, 112
 UNEGN, 134, 514, 515, 516, 517, 520,
 1047, 1644, 1646–47, 1646
 U.S. Board on Geographic Names,
 133–35, 319, 443, 1085
 in world atlases, 1531
Geographic Names Information System
 (GNIS), 505
Geographic optimization, 499–500
“Geographic Pivot of History” (Mackinder),
 413, 415
Geographic Society of Chicago, 1416
Geographical Analysis (journal), 56
Geographical Data Description Directory
 (GDDD), 267
Geographical discovery, 1389–94
Geographical Journal, 311, 597
Geographical Magazine (RGS) (magazine),
 861
Geographical mapping, 521–24
Geographical Review (journal), 50, 51, 53,
 147, 148, 311, 350, 353
Geographical Section, General Staff (GSGS)
 (United Kingdom)
 aeronautical charts, 23, 26
 Close’s role, 232, 896
 creation of, 895, 956
 escape/evasion maps, 1710
Hotine’s role, 620
International Map of the World and, 691,
 763
Royal Geographical Society and, 1373
World War II and, 897–98, 899, 954, 955
Geographical societies, 1415–19. *See also*
 specific societies
 Europe, 1417–19
 North America, 1415–17
Geographical Society of Baltimore, 1416
Geographical Society of California, 1415
Geographical Society of Philadelphia, 1416
Geographical Society of the Pacific (United
 States), 1415
Geographical Survey Institute (Japan), 358
Géographie des élections françaises (Goguel),
 352
Geographische Verlagsanstalt Justus Perthes
 Darmstadt (West Germany) (pub-
 lisher), 723–24
Geographischer Anzeiger (journal), 721–22
Geographischer Zeichenatlas (Rothaug), 440
Geographisches Praktikum (Eckert & Krüm-
 mel), 339
“Geography” (Pitt-Kethley), 785
Geography (Ptolemy), 1167
Geography and cartography, 524–26. *See*
 also Geography education
 academic cartography and, 2, 524, 525
 analytical cartography and, 55–56
 cartographic visualization and, 1684
 definitions of “map” and, 799
 electoral mapping and, 352
 Richard E. Harrison on, 580
 history profession and, 600–601
 pedagogic role of cartography and, 216
 Robinson’s role, 524, 525, 1366
 textbooks and, 343
Geography and Politics in a World Divided
 (Cohen), 415
Geography education. *See also* Pedagogic
 role of cartography; School atlases
 academic cartography and, 524
 geographical societies and, 1416–17
 interwar period, 107–8
 perception/cognition and, 1074–75, 1075,
 1078
 sketch maps for, 216, 217, 218, 218, 219
 tactile maps for, 1480
Geography for Life, 1078
Geography from the Air (Walker), 1114
Geoid. *See* Figure of the earth
Geoidal undulations, 425–26
Geoinformation science (*diqu xinxì kexué*),
 215–16
GEOINT (geospatial intelligence), 572
GeoKartenbrief, 1450
GeoKatalog, 1450
Geologic mapping, 526–29, 528, 529
 color in, 257
 mapping software and, 1428
 soils maps and, 1444
 terrain analysis and, 1490, 1497
World War I and, 527, 1773–75, 1773

Geological Map of Scotland (Geikie), 701
 Geological Society of America, 1025
 Geological Society of Washington, 444
 Geological Survey of Japan (Chishitsu chōsa sōgō senta), 731
 Geological surveys, 526–27
 Geologische Landesaufnahme (Switzerland), 182
 Geology. *See* Geologic mapping
 Geomatics, 1221. *See also* Surveying
 Geometric line generalization, 59
 Geometry, 55, 59–60, 202, 496, 868. *See also* Coordinate systems
 Geomorphology
 anaglyph maps and, 54
 data models for, 365
 land systems analysis and, 749
 Lobeck on, 788
 marine charting for, 822, 826
 Martonne on, 865
 relief maps and, 1260
 terrain analysis and, 501, 1495
Geomorphology: An Introduction to the Study of Landscapes (Lobeck), 788
 Geophysical inverse theory, 535
 Geophysics, 529–39. *See also* Plate tectonics; Seismological mapping
 gravimetric surveys and, 530–31, 535, 536
 synthetic aperture radar, 537, 538
Geopolitica (journal), 542
 Geopolitical cartography, 539–48, 540. *See also* Cold War persuasive cartography; Political persuasive cartography
 cultural/social significance of, 544–45
 interwar Germany, 539, 541–42, 541, 542, 543, 544, 544, 547
 interwar Italy, 542, 545
 social theory on, 1402
 World War II, 542–43
Geopolitik, 539, 541. *See also* Geopolitical cartography
Géopolitique (journal), 544
 Geopositioning, 1291, 1292
Geoprocessing (journal), 688
 GEOREF (World Geographic Reference System), 281, 894
 George, Lloyd, 1053, 1163
 George F. Cram (publisher), 1503
 George H. Walker & Company (publisher), 1340
 George Peabody Library (Johns Hopkins University), 72
 George Philip & Son (publisher) (United Kingdom), 1147–48, 1252, 1733
George R. Broadbent's Road Map of Victoria, 1363, 1364
 George V (1865–1936), 703
 GEOS (satellites), 536, 631, 891
 Geosat (U.S. Navy Geodetic Satellite), 537, 631
 Geoscience and Remote Sensing Society (GRSS), Institute of Electrical and Electronic Engineers, 1425

GEOSPACE Beckel Satellitenbilddaten GmbH (Austria) (publisher), 548
 Geospatial data. *See also* Census data; Data conversion; Data models; Digital databases; Digitization; Geographic information systems; Spatial analysis; TIGER
 Antarctica, 70
 ArcInfo and, 399, 401
 in astrophysics, 89
 for cadastral mapping, 185–86
 conversion of, 366–70, 489
 digital libraries, 318–20, 319, 645
 electronic atlases and, 90
 electronic cartography development and, 357, 358
 electronic cartography development impacts, 488–89, 489
 European Union sharing of, 417–18
 exploratory data analysis, 419, 421–23, 422, 423, 497, 1685
 French military mapping and, 909
 geocoding, 209–10, 448–52, 449, 450, 451, 816, 1128–29, 1718–19
 ICA Commission on Spatial Data Standards, 1455–56
 in map libraries, 769–71
 marketing of, 369, 855–60, 857, 1037, 1039
 military mapping and, 891–92
 national atlases and, 100
 National Geospatial Data Infrastructure, 90, 401, 510, 592, 836, 1227
 tactile maps and, 1723
 Tobler on, 57
 topology and, 869
 transfer standards for, 419, 684, 810, 846, 853, 1304, 1431, 1455–56, 1456, 1457
 U.S. Geological Survey and, 1663–64
 web-based wayfinding and, 1739, 1740, 1741
 Geospatial Information & Technology Association (GITA), 493, 494, 1407
 Geospatial intelligence (GEOINT), 572
 Geospatial One-Stop system (FGDC), 318, 511
 Geospatial tagging, 992
 GeoSpectra (company), 1442
 GeoSphere Image, 522
 Geostationary Operational Environmental Satellites (GOES), 566, 874, 1746, 1747
 Geostatistical Environmental Assessment Software (Geo-EAS), 502
 Geostatistics, 502, 1291, 1471. *See also* Interpolation
 GeoSystems Global Corporation, 1753
 GeoTIFF (data format), 992, 1431
 GeoVISTA Center, 1681
 Geovisualization, 1685–86. *See also* Cartographic visualization
 academic cartography and, 1, 4
 anaglyph maps and, 54
 data mining and, 497
 exploratory data analysis and, 422
 perception/cognition and, 1064–65, 1070
 thematic mapping and, 1511
 virtual reality and, 1681–82
 Gergely, Tibor (1900–1978), 217
 Gerlach, Arch C. (1911–1972), 4, 97, 993
 German Automobile Club, 1738, 1738
 German military mapping, 909–21
 Middle East, 919, 968
 reunification and, 921
 sub-Saharan Africa, 959
 World War I, 909, 910, 911–12, 911, 912, 913, 914, 915, 968
 World War II, 915–17, 916, 917, 918, 919, 920, 963, 964, 1776–77, 1777, 1778
 German Southwest Africa. *See* Namibia
 Germany. *See also* East Germany; German military mapping; Nazi Germany; Prussia; West Germany
 academic cartography, 6, 340, 341
 administrative cartography, 17, 176–77
 aeronautical charts, 23, 27
 Africa geodetic surveying, 474
 anaglyph maps, 54
 Antarctica maps, 177
 boundary surveying, 161, 162
 Bundesamt für Kartographie und Geodäsie, 176–78, 179
 cadastral surveying, 1211–12
 cartobibliography, 191, 192
 colonial/imperial cartography, 909, 956, 959, 1409, 1572–76, 1573, 1574, 1575
 electoral mapping, 350, 351
 geographic names, 512, 513
 interwar geopolitical cartography, 539, 541–42, 542, 543, 544, 544, 547
 national atlases, 97
 national map collection, 771
 photogrammetric mapping, 1108, 1584–85
 political boundaries, 162
 post–World War I settlement and, 337, 338
 regional atlases, 103
 reunification, 162, 177, 198, 338, 724, 921, 1099
 road mapping, 1359, 1360, 1362, 1362
 school atlases, 107, 108
 topographic mapping, 176–78, 179, 1579, 1583–85
 urban/regional planning, 40–42, 1159
 Gerrymandering, 210, 500. *See also* Electoral mapping
 Gersmehl, Philip J., entry by, 1443–50
Geschichte der Kartographie, Die (Bagrow), 609
Geschiedenis van de kartografie van Nederland (Koeman), 728
 Gesellschaft für Erdkunde zu Berlin, 1417, 1418

- Gesellschaft für Technische Zusammenarbeit (GTZ) (Germany), 1575–76
Gesicht der Erde, Das (Neef), 317
Gestalt Photo Mapper (GPM), 1143–44, 1292, 1553, 1664
Gestalt theory, 1060–61, 1061
Geudeke, P. W., entry by, 1535–39
Gewestkaarten van de Nederlanden door Jacob van Deventer, 1536–1545 (Koeman), 728
Ghana, 155–56. *See also* Africa
GIANT (Geodetic Infrastructure of Antarctica), 69–70
Giebultowicz, Sophia, entry by, 403–7
Gierloff-Emden, Hans Günter (1923–2011), 1283
Gifft, Thomas H., 1024
Gigas, Erwin (1899–1976), 177, 667, 1142
Gil Montaner, Fernando (1887–1954), 649
Gilbert, G. K. (1843–1918), 788
Gilbert, J. Freeman (b. 1931), 535
Gilcrease, Thomas (1890–1962), 245
Gill, David (1843–1914), 472, 473
Gilliéron, Jules (1854–1926), 778–80
Gillot, Charles (1853–1903), 1317
Gillot, Firmin (1820–1872), 1317
Gillotage, 1317
Gilman, Daniel Coit (1831–1908), 350, 1416
Gilmartin, Patricia P., 3, 1073
Gilray, James (1757–1815), 1162, 1163
GIMMS (Geographic Information Management and Manipulation System), 496, 1439, 1440
Ginzburg, Georgiy Aleksandrovich, 1173, 1182, 1641
Giordano, Alberto, entries by, 266–67, 696–99, 921–24, 1438–43
GIRAS (Geographic Information Retrieval and Analysis System), 1295
GIS. *See* Geographic information systems
“GIS and society” debates, 386
GIS Brazil conference, 388
GIS Day, 388, 401
GIS/LIS, 387
GIS Markets and Opportunities, 507
GIS World (magazine), 504, 507
GISci. *See* Geographic information science
GIScience and Remote Sensing (journal), 719
GISCO (Geographic Information System of the European Commission), 417
Giscombe, C. S. (b. 1950), 783
Giscome Road (Giscombe), 783
GITA (Geospatial Information & Technology Association), 493, 494, 1407
Gitsevich, Vera, 1770
Gjøa (ship), 74
GKD (geographic knowledge discovery), 422
Glaser, Charles Lynn, 72
Glasgow Online, 634
Glavkartografiya (Komitet geodezii i kartografi) (Soviet Union), 1596
Glavnoye upravleniye geodezii i kartografii (GUGK) (Soviet Union), 240, 480, 482, 549, 549–51, 935, 983, 1214, 1595–96, 1640. *See also* VGU
Glavnoye upravleniye navigatsii i okeanografii Ministerstva oborony SSSR (GUNiO MO) (Soviet Union), 848, 849, 1595–96
Glennon, J. Alan, entry by, 206–7
Glidden Tour (AAA), 47
GLMs (generalized linear models), 1470
Global 30 Arc-Second Elevation Data Set, 321
Global Bathymetric Grid, 445
Global data models, 362
Global Geodetic Observing System (GGOS), 462
Global Gravimetric Mapping Project, 427
Global Hawk (unmanned aerial vehicle), 1670
Global Land Cover Characteristics Data Base, 321
Global Land Survey, 1289
Global Mapper (software), 1028
Global Mapping Project (Japan), 321, 418, 731, 1402, 1455, 1457, 1648–49
Global navigation satellite systems (GNSS), 1018. *See also* Satellite navigation systems
Global Positioning System (GPS), 461, 551–58, 553, 1018, 1024. *See also* GPS military development and applications; In-vehicle navigation systems; Web-based wayfinding
accuracy and, 13, 14, 469
administrative cartography and, 18
advertising and, 20
aeronautical charts and, 29, 1190
Africa, 474
Antarctica maps and, 69–70
augmentation systems, 557, 558
Australia, 483, 485
boundary surveying and, 156, 163, 166
cadastral surveying and, 187–88, 1197, 1220, 1224, 1226–27
cartometry and, 202
census mapping and, 210
Chen Shupeng on, 216
Chinese military mapping and, 948
cinema maps and, 227
for coastal mapping, 236
Cold War and, 241, 244, 553
commercial applications, 556, 856
computations for, 461–62
coordinate systems and, 282–83, 284
cruise missiles and, 291
design of, 552–55
Differential GPS, 628, 632
diffusion of, 553, 554, 555, 555, 556
electronic cartography development and, 359
emergency planning and, 391
Europe, 477–78, 478
facilities maps and, 425
feature extraction and, 1292
figure of the earth and, 426
geocoding and, 449, 452
geodetic surveying and, 466, 467–70, 471, 472
geographical discovery and, 1392
geologic mapping and, 529
hazard/risk mapping and, 592
hiking/trail maps and, 1712
for Himalaya cartography, 595
humanitarian applications, 556, 556
for hydrography, 628, 629, 632–33
indigenous peoples and, 642
interactive mapping and, 661
International Civil Aviation Organization and, 676
Latin America, 468–70, 471, 472
lidar and, 774, 775
mapping software and, 1433
for marine charting, 843, 854. *See also* ECDIS
mass marketing and, 861, 862
Michelin and, 880
mobility maps and, 1724, 1725
monumentation and, 1225, 1226
NASA and, 557, 992
Navstar GPS, 14, 241, 461, 474, 477, 552, 775, 1018, 1292
for orientation maps, 1727
pattern recognition and, 1293
photogrammetric mapping and, 1132, 1136
prime meridian and, 1169
privacy issues, 18, 368, 494–95, 557, 1170–71
projections and, 1190
public access to cartographic information and, 1228, 1229
as public utility, 555
remote sensing and, 368
Russia, 482
satellite configuration for, 552, 555
satellite geodesy comparison chart, 457
secrecy and, 244, 284, 553, 557
shortest path algorithm and, 500
social/political implications of, 556–57
spatial analysis and, 489
tidal measurement and, 1527
timing and, 456, 459, 459, 552
topographic mapping and, 1549
tracking stations, 553, 554
trilateration and, 454
U.S. Geological Survey and, 1664
for visual impairment, 1483
wide area augmentation system, 1718
Global Precipitation Climatology Centre, 229
Global/regional interchange algorithm (GRIA), 500
Global Resource Information Database (GRID) (UNEP), 635
Global Sea Level Observing System (GLOSS), 1526
Global Spatial Data Infrastructure, 1457
Global tectonics. *See* Plate tectonics

- Globe* (journal) (AMC), 1415, 1422
Globe Studies: The Journal of the International Coronelli Society, 562
Globen (journal) (Sweden), 718
Globes, 558–68
 advertising and, 20
 air-age globalism and, 33, 33, 1401
 cultural/social significance of, 558–63, 560, 561, 562, 563
 as decoration, 309, 310, 559, 560
 earth-from-space perspective and, 565–68
 Freytag-Berndt und Artaria KG, 440
 geodesy and, 464
 interrupted projections and, 1175
 lunar/planetary, 561, 563
 manufacture of, 563–65, 564, 565
 Office of Strategic Services and, 1030
 virtual, 227, 229, 559, 561–62, 564, 661–62, 1385, 1387. *See also Google Earth*
 world revolution theory and, 1766, 1767, 1768, 1769, 1770
Globus (journal), 1097
Globusfreund, Der (journal), 562, 1420
GLONASS (Global'naya Navigatsionnaya Sputnikovaya Sistema) (satellite navigation system), 284, 291, 551, 1018, 1024. *See also Global Positioning System*
 Africa and, 474
 cadastral surveying and, 1216, 1224
 computations for, 462
 figure of the earth and, 426
 geodetic surveying and, 481–82
 Latin America and, 469
 marine charting and, 843
 military mapping and, 940
 prime meridian and, 1169
 Russian Federation and, 1378
 satellite geodesy comparison chart, 457
GLORIA (Geological Long Range Inclined ASDIC), 627
GLOSS (Global Sea Level Observing System), 1526
Glossaire français de cartographie (Comité français de cartographie), 317
GMT (Generic Mapping Tools) (software), 535, 853, 1433, 1433
GNIS (Geographic Names Information System), 505
 Gnomonic projections, 39, 1177, 1191
GNSS (global navigation satellite systems), 1018. *See also Satellite navigation systems*
GOCE (Gravity Field and Steady-State Ocean Circulation Explorer), 427, 462, 469, 631
 Godfrey, John Henry (1888–1971), 1492
 Goeman, Mishuana, 990
GOES (Geostationary Operational Environmental Satellites), 566, 874, 1746, 1747
 Goguel, François (b. 1909), 352
 Gohm, Douglas Charles, 247
Goings maps
 British, 899, 900, 953, 954, 969, 1491, 1493, 1493, 1696, 1799
 French, 1492, 1492
 secrecy and, 1696
Gold Coast, 1565–66
Goldfinger (film) (Hamilton), 227
Goldstein, Richard M., 992
Gole, Susan, entry by, 1473–77
Golledge, Reginald G. (1937–2009), 1068–69, 1723
 entry by, 1722–26
Gomringen, Eugen (b. 1925), 783
Goniometers, 1106, 1549
Good Roads movement (United States), 1339–40, 1341
Goodchild, Michael F. (b. 1944), 4, 55, 438, 504
 entries by, 13–16, 994–95, 1383–89
Goode, J. Paul (1862–1932), 568. *See also Goode homolosine projection*
 academic cartography and, 1, 340, 568
 Eurocentric bias and, 415
 on geography and cartography, 524
 Mollweide projection, 568, 1503, 1504
 school atlas, 104, 108, 115, 340, 568, 1245–46, 1401, 1503
 thematic atlases, 112
 thematic mapping and, 1505
 world atlases, 115
Goode homolosine projection, 340, 1173, 1246
 advantages of, 568, 1177
 Eurocentric bias and, 415
 geographical discovery and, 1393–94
 interruption and, 1172, 1193
 Mercator projection and, 871, 1245–46
 Robinson projection and, 1367
 for thematic mapping, 112, 1179, 1503
Goode's School Atlas, 104, 108, 115, 340, 568, 1245–46, 1401, 1503
Goode's World Atlas, 108, 568, 1177
Goodman, Paul (1911–1972), 1161
Goodman, Percival (1904–1989), 1161
Goodness-of-variance fit (GVF), 374
Goodspeed's (company) (Boston), 246
Google Earth
 anaglyph maps, 55
 cinema maps and, 227
 climate maps and, 229
 electronic cartography development and, 359
 Gulf War (1991) and, 570
 map pins and, 815–16
 mass marketing and, 861
 scale and, 1385, 1387
 success of, 662
Google Maps (web-based wayfinding service). *See also Web-based wayfinding*
 animation, 62
 electronic cartography development and, 359
 geocoding and, 450
 intellectual property and, 656
 map pins and, 815–16
 mapping software and, 1434
 MapQuest and, 818
 pattern recognition and, 1293
 privacy issues and, 1170
 shortest path algorithm and, 500
 as web-based wayfinding standard, 1740
Gorbachev, Mikhail (b. 1931), 1163, 1164, 1376
Gordon, H. W., 473
Gore, Albert (b. 1948), 1385, 1670, 1751
Gores, 1175
Göring, Hermann (1893–1946), 915
Gorziglia, Hugo M., entry by, 680–82
Gostsent Priroda (Russian Federation), 551
Gotha School, 721
Gott, J. Richard, 84, 86–87
Gottschalk, Hans-Jörg, 59
Gould, Benjamin Apthorp (1824–1896), 700
Gould, Peter (1932–2000), 406, 869, 1067, 1069, 1069
Gousha, Harry M., 618
Government applications. *See Administrative cartography*
GPS. *See Global Positioning System*
GPS military development and applications, 464, 1699. *See also Selective Availability policy*
 Cold War, 241, 244, 553, 554
 design process and, 552
 Earth Gravity Models and, 463
 Gulf War (1991), 241, 551, 555, 570, 572, 892, 1018, 1229, 1433
 military essentialism, 556–57
 strategy implications of, 555–56
GRACE (Gravity Recovery and Climate Experiment), 427, 462, 469, 631, 1277, 1278
Gradient depictions, 1706–7, 1707
Graf, Otto, 344
Graf Zeppelin (airship), 76
Graff, Everett D. (1885–1964), 245
Grahame, Kenneth (1859–1932), 812
Grand Atlas de Géographie moderne (Stieler), 721
Grand Tour, 1620, 1629, 1630, 1637
Grande atlante d'Europa, 699
Grande atlante d'Italia, 699
Grande atlante geografico, 697, 698
Grandinetti, Fred S., entry by, 787–88
Granö, J. G. (1882–1956), 1465
Grant, Madison (1865–1937), 1233, 1235
Graph paper, 330
Graph theory, 1403
Graphic map indexing, 1450, 1450, 1451
Graphic Summary of American Agriculture, 1464, 1466
Graphicacy, 1069–70, 1078
Graphical user interface (GUI), 1442
Graphics software, 1335
 airbrush and, 35
 for cave maps, 207

- color and, 262–63, 1333
geographic information systems and, 504, 509
for relief depictions, 1271
television and, 1489, 1744
- Graphique et le traitement graphique de l'information* (Bertin), 123
- GRASS (Geographic Resources Analysis Support System), 1442–43
- Graticules, 113, 1172, 1173, 1183–84, 1187. *See also* Coordinate systems; Projections
for Space Oblique Mercator Projection, 1453, 1453
- Gravimetric surveys, 454–56, 459–61
geoidal undulations and, 425–26
geophysics and, 530–31, 535, 536
Heiskanen on, 455, 593
Latin America, 469, 470
marine charting and, 839
military development and applications, 455, 456, 463
Soviet Union, 482
- Gravity Field and Steady-State Ocean Circulation Explorer (GOCE), 427, 462, 469, 631
- Gravity Field Map of the World's Oceans*, 1026
- Gravity Recovery and Climate Experiment (GRACE), 427, 462, 469, 631, 1277, 1278
- Gravity's Rainbow* (Pynchon), 785
- Gray, Colin S., 543–44
- Grayscale
in choropleth symbolization, 222–23, 1512, 1513, 1513, 1514
for relief depictions, 1271
visual perception and, 1056, 1057
- "Great American History Machine" (software), 605
- Great Britain. *See* United Kingdom
- Great Britain* (Dilke), 413
- Great Patriotic War. *See* World War II
- Greater Philadelphia Geohistory Network, 600
- Greece, 161
- Greece, ancient, 55, 359, 539
- Greeley, Ronald, 794
- Green, David R., entry by, 854–55
- Green, J. E. (1865–1957), 1363
- Green, Janet (d. 1991), 247
- Green Guides. *See* Michelin Maps and Guides
- Green's Motor and Cycling Map of New Zealand*, 1363
- Green's New Zealand Road Book*, 1363
- Greene, Graham (1904–1991), 787
- Greene, Mott T., entry by, 227–32
- Greenlee, Susan K., entry by, 774–76
- Greenwalt, Clyde R., 1454
- Greenwich meridian, 1167–68
- Gregory, Cecil (1894–1974), 1363
- Gregory, Derek (b. 1951), 1402
- Gregory, William M., 700
- GRID (Global Resource Information Database) (UNEP), 635
- GRID (software), 398, 501, 585, 1441
- Grid coordinates. *See* Coordinate systems
- Grid/raster data models, 359–60, 384. *See also* SYMAP
analytical cartography and, 58
in bathymetric mapping, 1026, 1028
for cadastral mapping, 185
for census mapping, 210
in colonial/imperial cartography, 323
conversion software for, 189, 369
for demographic mapping, 311
digital filters and, 58
for geographic information systems, 363, 364, 1439
geographic optimization and, 500
for image processing software, 364, 501, 1437
images as maps and, 805, 807
for natural resource management, 364
raster-vs.-vector debate, 364, 372, 382
remote sensing and, 361, 372, 992
for topographic mapping, 182
- GRID-TOPO (software), 1441
- Grids for military mapping, 1186–89, 1696–97, 1771. *See also* Coordinate systems; Universal Transverse Mercator (UTM) coordinate system
- Griffin, Amy L., entry by, 1055–59
- Grim, Ronald E., entries by, 72–73, 428–30
- Gróf, László, 248
- Groll, Max (1876–1916), 340, 341, 346
- Gromyko, Andrei (1909–1989), 241
- Groop, Richard E., 4
- Groot, Richard, 96
- Grootschalige BasisKaart Nederland* (GBKN), 185
- Große Shell-Atlas*, 1362
- Grossen Kalten Berge von Szetschuan*, Die (Imhof), 640
- Großglobus für Staats- und Wirtschaftsführer*, 559
- Großer Geographischer Wandatlas*, 722
- Großer Historischer Wandatlas*, 722
- Großer offizieller Führer des Automobilclubs von Deutschland*, 1250
- Großer Volksatlas* (Velhagen & Klasing), 1673
- Grosvenor, Edwin A. (1845–1936), 259
- Grosvenor, Gilbert Hovey (1875–1966), 74, 259, 996–97, 1246
- Ground control. *See* Geodesy
- Groupe géographique autonome de Joigny (GGA) (France), 907
- Groupe pour le développement de la télédétection aérospatiale (GDTA), 649
- Growth of the British Empire, The*, 413, 414
- GRSS (Geoscience and Remote Sensing Society, Institute of Electrical and Electronic Engineers), 1425
- Gruber, Otto von (1884–1942), 44, 45, 1106, 1128, 1138, 1139
- Gruffudd, Pyrs, 812
- Grünreich, Dietmar, 344
entry by, 176–78
- Grupo de Trabajo de Cartotecas Pùblicas Hispano-Lusas (Ibercarto) (Spain), 1423
- GS50 projection (Snyder), 272, 272
- GSC (Geodetic Survey of Canada), 466, 467, 467
- GSGS. *See* Geographical Section, General Staff
- Gsharp (software), 735
- Guatemala. *See also* Latin America
political boundaries, 139, 146–47, 150, 1564
topographic mapping, 1560–61, 1564
- Guatemala-Honduras Boundary Arbitration* (1933), 140
- Guattari, Félix (1930–1992), 807–8, 1400
- Guérin, Jules Vallée (1866–1946), 1157, 1158, 1630
- Guerry, A.-M. (1802–1866), 221
- GUGK (Glavnoye upravleniye geodezii i kartografi) (Soviet Union), 240, 480, 482, 549, 549–51, 935, 983, 1214, 1595–96, 1640. *See also* VGU
- Guía Roji (Mexico) (publisher), 1353
- Guida d'Italia*, 1616, 1618, 1619
- Guide images, 1148
- Guide rouge* (Michelin), 879, 880
- Guidebook of the Western United States* (USGS), 1729
- Guidebooks, 48, 1369, 1620, 1627, 1627, 1628, 1629, 1637
hiking/trail maps, 1711–12, 1714
- Guilin qixingyan kasite dongxue dimao tu* (Graphic illustration of Qixingyan cave system, Guilin) (Chen), 215
- Guinea, 1572. *See also* Africa
- Gulf states, 167. *See also* Middle East
- Gulf War (1991), 568–72, 571
Corona and, 1295
geographic information systems and, 570
Global Positioning System and, 241, 551, 555, 570, 572, 892, 1018, 1229, 1433
journalistic cartography and, 570, 717
map reproduction and, 1311
military mapping, 892, 903, 908, 970
planning for, 568, 569, 570
satellite imaging and, 572
U.S. Army Corps of Engineers and, 1656
U.S. intelligence community mapping and, 1669
- Gumilev, Lev N. (1912–1992), 1380
- GUNiO MO (Glavnoye upravleniye navigatsii i okeanografii Ministerstva oborony SSSR) (Soviet Union), 848, 849, 1595–96
- Guojia cehui ju (State Bureau of Surveying and Mapping) (SBSM) (China), 594, 1602
- Guptill, Stephen C., 5, 58, 688, 800
entry by, 356–59
- Gutenberg, Beno (1889–1960), 530
- Guth, Peter L., entry by, 1426–34

- Gutsell, Bernard V., 201
 Gutteridge, Don (b. 1937), 785
 Guy, Nicola C., 162
 Guyot, Arnold H. (1807–1884), 1415
 Gyger, Hans Conrad (1599–1674), 1267
 Gyrocompass, 1009–10
- H. M. Gousha Company (publisher) (United States), 36, 616–18, 617, 1246, 1345, 1346–47, 1348, 1349, 1351
 H. P. Kraus Company, 246
 Haack, Hermann (1872–1966), 350, 721, 722, 1097, 1503, 1516
Haack Großer Weltatlas, 723
 Haardt, Robert (1884–1962), 1420
 Haardt von Hartenthurn, Vinzenz (1843–1914), 1675
 Habenicht, Hermann (1844–1917), 721
 Habsburg empire. *See* Austro-Hungarian empire
 Hatchures, 43, 179, 895–96, 1032, 1267, 1483, 1566
 Hadden, Robert Lee, entry by, 1655–56
 Hadley Centre for Climate Prediction and Research (Great Britain), 229
 Haefke, Fritz, 722–23
 Haft, Adele J., entry by, 782–86
 Hagen, Carlos B. (1929–2010), 1534
 Hägerstrand, Torsten (1916–2004), 362, 497, 1428, 1439, 1530
 Haggett, Peter (b. 1933), 347, 406, 1428, 1470, 1530
Hagstrom's Map of New York, 1630, 1632
 Haig, Robert Murray (1887–1953), 1159
 Hailey, Lord William Malcolm, 321
 Hain, E. L., 1660
 Hake, Günter (d. 2000), 341, 344
 Halbrook, J. W., 1138
 Haldane, J. B. S. (1892–1964), 445
 Halftones
 for color separation, 334, 509, 1146, 1151, 1314, 1318, 1320, 1320, 1324
 facsimile atlases and, 91
 Levy screen, 1150–51, 1151
 for photolithography, 802, 1317–18
 for relief depictions, 1151, 1309, 1309, 1317, 1318, 1332
 Hall, John K., 1025, entry by, 1023–30
 Haller, Niklaus Emanuel (1672–1721), 573
 Hallett, Holt S. (1841–1911), 169
 Halley, Edmond (1656–1742), 530, 1392
 Hallwag Kümmeler+Frey AG (Switzerland) (publisher), 573, 574, 737, 797–98
 Hamilton, Guy (b. 1922), 227
 Hammer-Wagner projection, 1172, 1193
 Hammond, C. Dean, III, 577
 Hammond, Caleb D., Jr. (1915–2006), 577
 Hammond, Caleb Stillson (1862–1929), 574
 Hammond, J. A., 455
Hammond Atlas of the World, 869, 871, 1184
 Hammond Map Company (United States) (publisher), 574–77, 575, 871, 1503, 1693
- Hammond's Commercial and Library Atlas of the World*, 575, 576
Hammond's Modern Atlas of the World, 575
 Hand lettering, 738–40
 aids for, 738–39, 740, 741
 Richard E. Harrison's use of, 580
 interwar period, 1332
 lithography and, 744
 Soennecken method, 738, 739
 textbooks on, 328, 344
- Handatlas. See* Reference atlases
Handbook of the Indians of California (Kroeber), 411, 412
Handbuch der Thematischen Kartographie (Arnberger), 7, 345
 Handel-Mazzetti, Heinrich (1882–1940), 124, 127
Handleiding voor de studie van de topografische kaarten van Nederland, 1750–1850 (Koeman), 728
 Haptic mouse, 1482
 Haptic pointer interface (HPI), 1724, 1724
 Harbeck, Rolf, 726
 entry by, 726–27
 Harbor charts. *See* Coastal mapping; Marine charting
 Hardy, Thomas (1840–1928), 783, 812
 Haring, Hester, 1499–1500
 Harley, J. B. (1932–1991), 577–79
 on cartographic conventions, 275
 on cartometry, 205
 on colonial/imperial cartography, 251
 on community mapping, 268
 on definitions of “map,” 799, 1764
 on Eurocentric bias, 413
 on facsimile atlases, 91
 on history of cartography, 577–79, 578, 609, 612, 614, 1400
 History of Cartography Project and, 577, 578, 579, 614–15, 1762, 1764
 on *Imago Mundi*, 636, 638
 on map-use skills, 1075
 on narrative, 990
 on persuasive cartography, 1089
 on political cartoons, 1163
 social theory and, 1404
 Harmon, Katharine A., 814
 Harnapp, Vern, 1262
 Harness, Henry Drury (1804–1883), 221, 298
 Harö, A. Sakari, 314, 314
 Harries, Keith D., entry by, 288–89
 Harrington, Bates, 110
 Harris, R. Cole (b. 1939), 604
 Harris, Trevor M., 269
 Harris, Wilson (b. 1921), 785
 Harrison, Benjamin (1833–1901), 133, 517
 Harrison, John (1693–1776), 492, 1023
 Harrison, Richard Edes (1901–1994), 579–82
 academic cartography and, 1, 2, 340
 advertising and, 20
 air-age globalism and, 32, 33, 241, 243, 415, 543, 1179, 1180, 1401
- airline maps, 37
 bathymetric mapping, 1392
 earth-from-space perspective and, 522
 influence on Thrower, 1525
 perspective maps by, 33–34, 241, 243, 522, 708, 713, 1022, 1179, 1180
 on political persuasive cartography, 1088
 signature style, 1472
 thematic mapping and, 1505, 1506, 1507
 “This Troubled World” series, 715
 urban mapping, 708, 712
- Harrison, Ross G. (1870–1959), 2
 Harrison, Tom, 235
 Harrisse, Henry (1829–1910), 245
 Harrower, Mark, 223, 1522
 entry by, 1528–31
Harry Potter and the Prisoner of Azkaban (Rowling), 216
 Hart, Albert Bushnell (1854–1943), 350
 Hart, Ian, 72
 Hart, John Fraser (b. 1924), 603
 Hart, Roger A., 217
 Hartman, Gail, 217
 Hartshorne, Richard (1899–1992), 1667
 Harvard Center for Environmental Design Studies, 583
 Harvard Computer Graphics Week conferences, 584
 Harvard Laboratory for Computer Graphics and Spatial Analysis, 582–85, 1427, 1429. *See also* SYMAP
 analytical cartography and, 56
 ASPEX, 582
 CALFORM, 221, 582, 1441, 1441
 conferences, 387
 Dangermond and, 397
 founding of, 582, 1440
 geographic information systems and, 583, 584, 1440–41
 GRID, 398, 501, 585, 1441
 landscape architecture and, 760
 ODYSSEY, 398, 399, 496, 583, 584, 585, 1440, 1441
 POLYVRT, 360, 361, 361, 584, 1441
 printing and, 506
 SYMVU, 582, 582, 1023, 1441, 1521
 topological digitizing software, 584
 Warntz's role, 583, 1440, 1700
Harvard Library of Computer Graphics Mapping Collection (Harvard Laboratory for Computer Graphics and Spatial Analysis), 584
Harvard Papers in Theoretical Geography (Harvard Laboratory for Computer Graphics and Spatial Analysis), 1700
Harvard Papers on Geographic Information Systems (Harvard Laboratory for Computer Graphics and Spatial Analysis), 583
 Harvard Travelers Club, 1416
 Harvard University, 1, 2, 494. *See also* Harvard Laboratory for Computer Graphics and Spatial Analysis
 Harvey, David (b. 1935), 613

- Harvey, P. D. A., 608, 610
Hasegawa, Koji (b. 1947), 949
Haskins, Charles Homer (1870–1937), 1049
Hassinger, Hugo (1877–1952), 440
Hassler, Ferdinand Rudolph (1770–1843), 139, 871, 1184
Hatch, Edward J., 1372
Hau'ofa, Epeli, 304
Haupka, Bernd (1939–2009), 1250
Hausdorff-Besicovitch dimension (D), 205
Haushofer, Karl (1869–1946), 539, 541, 544, 1090
Haussmann, Georges Eugène (1809–1891), 1157
Hawai'i Volcanoes, 1253, 1253
Haxby, William F. (1950–2006), 631, 1026
Hayden, F. V. (1829–1887), 443
Hayes, Derek, entry by, 73–78
Hayes, Harvey C. (1916–2007), 623
Hayes-Roth, Barbara (b. 1949), 1081
Hayes Sonic Depth Finder, 623
Hayford (International) ellipsoid, 425, 475, 593, 651, 836
Hayford, John Fillmore (1868–1925), 425, 454–55, 475
Hazard/risk mapping, 585–93. *See also* Emergency planning
color in, 588–89, 1472
disaster management and, 587–88, 588
environmental protection and, 395–96, 585, 586, 587, 592
scale in, 589, 589, 590
seismological mapping and, 585, 586, 590, 592
vulnerability mapping, 585, 587
HDF/GRID (tagging format), 992
He Jianbang, entries by, 215–16, 1783–85
Head-mounted displays (HMDs), 1680, 1681
Healey, Christopher G. (b. 1967), 1521
Health Insurance Portability and Accountability Act (HIPAA) (1996), 1170
Heart of Darkness (Conrad), 782
Heat Capacity Mapping Mission (HCMM), 1285
Heat Moon, William Least, 785–86
Heawood, Edward (1863–1949), 1373
Hébert, John R., entry by, 1338–39
Hecht, Horst, entry by, 632–33
Hedbom, Olof W. (1920–2001), 409
Hedin, Sven Anders (1865–1952), 1418
Hedley, Nick, 1681–82
entry by, 1680–83
Hedley, Walter Coote (1865–1937), 1373
Heezen, Bruce C. (1924–1977), 531, 533, 997, 1022, 1025, 1393, 1499, 1500
Heffernan, Michael (b. 1959), 707, 1666
entries by, 762–65, 1417–19
Heilig, Morton L. (1926–1997), 1681
Heilprin, Angelo (1853–1907), 1416
Heim, Albert (1849–1937), 788, 1263
Heim, Michael, 1682
Heine, Aida A., 1050
Heiskanen, Veikko Aleksanteri (1895–1971), 425, 427, 455, 461, 593–94
Helava, Uno Vilho (1923–1994), 1130, 1553
Helgerson, Richard (1940–2008), 612
Heliogravure, 1314, 1551
Helios (satellites), 908
Heliozincography, 1552
Helmfrid, Staffan, entry by, 407–9
Hema Maps (Australia) (publisher), 1363
Hemmerich, Gerlach (1879–1969), 915
Henrikson, Alan K., entry by, 31–34
Henry Stevens, Son & Stiles (dealer), 245, 248
Henson, Matthew (1866–1955), 1389
Henson, Robert, entry by, 1743–44
Herb, Guntram H., 411, 1002, 1003
entry by, 539–48
Herbert, Francis, entry by, 1371–75
Herlin, Emil (1904–1943), 714
Hermann, Michael J., 605, 607, 1435
Hermon Dunlap Smith Center for the History of Cartography, 604, 612
Hérodote (journal), 543, 544
Herring, John R., 496
Herrmann, Christian, entry by, 1754–55
Herschel, John Frederick William (1792–1871), 1305
Herschel, William (1738–1822), 85, 793
Hess, Harry Hammond (1906–1969), 463
Hessler, John W., entries by, 270–73, 485–88, 867–70, 1367–68, 1397–1400, 1452–53, 1700–1701
Hettner, Alfred (1859–1941), 6, 340
Hewlett-Packard Graphics Language (HPGL), 1324–25
Hexagon (Big Bird) (satellite), 1669
Hexagonal mesh data model, 361
Heyde, Herbert, 723
Hickmann, Anton Leo (1834–1906), 440
High-accuracy reference networks (HARN), 1197
High Performance Computing and Communication Act (1991) (United States), 1751
High-Precision Transcontinental Traverse (HPTT), 240
High Ridge Books, 247
Highway maps. *See* Road mapping
Hiking/trail maps, 1711–13
Freytag-Berndt und Artaria KG, 440, 441
geographical societies and, 1415–16
guidebooks, 1711–12, 1714
for orienteering, 292, 1043–46, 1044, 1045, 1046, 1047
in Swiss topographic mapping, 182
topographic mapping and, 1548, 1549
Hilgard, Eugene W. (1833–1916), 1444, 1444, 1445
Hilgard, J. E. (1825–1890/91), 212
Hill shading. *See* Relief depictions
Hillary, Edmund (1919–2008), 595, 680, 1389
Hillier, Amy, entry by, 1254–60
Hills, Edmond Herbert Grove (1864–1922), 321, 1565
Himalaya cartography, 594–97, 595, 596
Hinks, Arthur R. (1873–1945), 597
boundary surveying and, 158, 159
Permanent Committee on Geographical Names and, 1085
post–World War I settlement and, 597, 1373
on projections, 871, 1186
Royal Geographical Society and, 597, 1372, 1373
on textbooks, 344
on topographic mapping, 1546
Hints to Travellers (Royal Geographical Society), 597, 1371–72
Hipparchus (ca. 190–after 126 B.C.), 278, 1167
Hipparcos Space Astrometry Mission, 1461, 1462
Hirsch, Stephen A., 376, 377, 378
Hirtle, Stephen C., 995
Historic preservation maps, 601–3, 602
Historic Towns Atlas Programme, 1652
Historical Atlas of Canada, 505, 505, 509, 604
Historical Atlas of Maine, 605
Historical Atlas of South Asia (American Geographical Society), 53
Historical Atlas of the Jewish People, A, 113, 114
Historical Atlas of the United States (National Geographic Society), 999, 1002
Historical Atlas of United States Congressional Districts, 1789–1983 (Martis), 94
Historical atlases, 92–94, 94, 350, 352, 354, 604–5
Historical-boundaries atlases, 94–96
Historical cartography, 205, 599–600, 599, 999, 1002
Historical Geographic Information System (HGIS) (Great Britain), 95–96
Historical geography, 603–7, 604, 605, 606, 607, 609
Historical GIS, 605
Historical Records of the Survey of India (Phillimore), 1476
Historical United States County Boundary Files (HUSCO) (Earle), 94–95
History of cartography, 607–14. *See also* Premodern cartography
in academic cartography, 342, 608, 610, 612, 613
Almagià on, 42
cartobibliography and, 608
cartographic dictionaries and, 318
colonial/imperial cartography and, 608, 613
Cortesão on, 285–86
Dainville on, 297
Eckert on, 339, 344, 610
empiricism and, 308, 608, 609–10
Eurocentric bias and, 121, 612, 638
facsimile atlases and, 91
Harley on, 577–79, 578, 609, 612, 614, 1400

- History of cartography (*continued*)
Imago Mundi, 121, 608, 612, 636–38, 637, 638, 732, 773
internal paradigm in, 610, 612, 613
Koeman on, 728
Kretschmer on, 610, 732
map theft and, 72
nation-state formation/maintenance and, 335
Nebenzahl Lectures, 1762, 1763
paradigms overview, 607, 608
persuasive cartography in, 1089
postcolonial cartography and, 308
processual paradigm in, 614
on public transportation maps, 1732
Robinson on, 610, 1366
social theory and, 1400
sociocultural paradigm in, 612–13, 615, 1762, 1763, 1764
Thrower on, 610, 1525
timelines, 610, 611
traditional paradigm in, 607–10, 613
University of Kansas program, 3
on women in cartography, 1760
Woodward on, 612, 614, 1400, 1761–62, 1762
- History of Cartography Project, 614–16, 615, 616
definitions of “map” in, 799, 800, 1764
on facsimile atlases, 91
Harley’s role in, 577, 578, 579, 614–15, 1762, 1764
indigenous peoples in, 612, 615, 640
Kretschmer’s role in, 732
modes of cartographic practice in, 978, 979
national map collections and, 773
processual paradigm in, 614
Woodward’s role in, 614–16, 1366, 1761, 1762–63
- History of Middle-earth series (Tolkien), 783
- History of Portuguese Cartography (Correia & Albuquerque), 285–86
- History of the United States and Its People, A (Avery & Abbatt), 744
- History of Topographical Maps, The (Harey), 610
- History profession, 597–601, 598, 599
cartographic sources in, 597, 598–99, 598, 599
historical cartography, 205, 599–600, 599, 999, 1002
vs. historical geography, 603
- Hitchcock, Charles B. (1906–1969), 50, 53, 147
- HITLab (Human Interface Technology Laboratory), 1681
- Hitler, Adolf (1889–1945), 915, 1159. *See also* Nazi Germany
- HMS Challenger, 64, 701, 837, 1024
- Hoban, Russell (b. 1925), 785, 787
- Hobbit, The (Tolkien), 783, 784, 986
- Hobrecht, James (1825–1902), 1166
- Hobrough, Gilbert L. (1918–2002), 1111, 1143, 1553, 1698
- Hochgebirgsforschung* (journal), 594
- Hodgeman, Alfred James, 820
- Hodgkiss, A. G. (1921–2007), 804
- Hodson, Donald, 1535
- Hodson, Yolande, 1737
- Hoffmann, C. F. (1838–1913), 443
- Hogenberg, Frans (ca. 1538–1590), 112
- Hohenemser, Christoph, 585
- Holdich, Thomas Hungerford (1843–1929), 158, 321, 618–19, 1371, 1565
- Holland, George S. (1909–1994), 1372
- Holland, W. Pennefather, 1372
- Hollerith, Herman (1860–1929), 1656
- Hollerith system, 209, 209, 1656
- Holmes, Arthur (1890–1965), 531
- Holmes, Brian, 1403
- Holmes, Nigel (b. 1942), 1732, 1747
- Holmes, William Henry (1846–1933), 788
- Holographic maps, 619–20, 620
- Hölzel, Eduard (1817–1885), 1674–75
- Hölzel, Fritz (1899–1977), 726, 1262
- Hölzel, Hugo (1852–1895), 1675
- Home Owners’ Loan Corporation (HOLC) (United States), 1254, 1255, 1257, 1258
- Homographic (Mollweide) projections, 88, 89, 568, 1192, 1192, 1503, 1504
- Homolosine projection. *See* Goode homolosine projection
- Honduras, 150, 664, 665, 1563, 1564. *See also* Latin America
- Hong Kong, 897
- “Hoo-cry” surveying method, 1224
- Hopkins, B. Thomas, 1138
- Hörmander, Lars (b. 1931), 980
- Horowitz, Howard (b. 1947), 783
- Horwood, Edgar M. (1919–1985), 342, 489, 1440
- Hoskins, W. G. (1908–1992), 598–99
- Hoskinson, Albert J. (1895–1987), 463
- Hotine, Martin (1898–1968), 620–21
- Directorate of Overseas Surveys and, 321, 322, 323, 620–21
geodetic surveying and, 473, 620, 897
Loper-Hotine Agreement (1942), 886–87, 899, 964–65, 971, 1778
monumentation and, 1225
photogrammetric mapping and, 1104, 1549
topographic mapping and, 1566
- Houdoy, Etienne, entry by, 878–83
- Hough, Floyd W. (1898–1976), 888, 1667
- Houghton Library (Harvard University), 72
- House, Edward Mandell (1858–1938), 1049, 1234
- Housing. *See* Redlining
- How Maps Work* (MacEachren), 346, 1073
- Howard, Ebenezer (1850–1928), 752
- Howe, G. Melvyn (b. 1920), 404
- Howell, D. G. (b. 1944), 264
- Howell, Edwin E., 1309
- Howes, Wright (1882–1978), 247
- Hoyt, Homer (1895–1984), 1254, 1255, 1256
- Hrvatsko kartografsko društvo (Croatia), 1414
- Hsu, Mei-Ling (1932–2009), 3, 1760
- Hub-and-spoke maps, 39, 40
- Huback, Michael, 72
- Hubble, Edwin Powell (1889–1953), 85, 1461
- Hübl, Arthur von (1852–1923), 925, 1133
- Huchra, John P. (b. 1948), 85
- Hudson, Alice C., entry by, 1421–23
- Hudson, John C. (b. 1941), 603–4, 604
- Hufnagel, Herbert, 1100
- Huggan, Graham (b. 1958), 784–85
- Hull House (Chicago), 267, 268, 269
- Human ecology movement, 216
- Human Genome Diversity Project (HGDP), 1237
- Human geography, 50. *See also* Thematic mapping
- Human Interface Technology Laboratory (HITLab), 1681
- Human migration, 1464, 1464, 1465. *See also* Thematic mapping
- Humboldt, Alexander von (1769–1859), 124, 1392, 1415
- Hummel, Arthur W. (1884–1975), 247
- Humor, 19
- Hungary. *See also* Eastern Europe
boundary surveying, 161, 161
cartographic societies, 1414
ethnographic mapping, 411
post-World War I settlement and, 337, 777, 1418
topographic mapping, 1238, 1588
- Hunke, Heinrich (1902–2000), 41
- Hunt, John (1910–1998), 1418
- Hunter, Robert Lloyd (1914–1986), 247
- Huntington, Archer M. (1870–1955), 50, 245
- Huntington, Ellsworth (1876–1947), 539, 1233, 1401
- Huntington, Henry Edwards (1850–1927), 245–46
- Huntington, Samuel P. (1927–2008), 415–16
- Hurault, Louis (1886–1973), 646, 647, 1109, 1569–70
- Hurd, Thomas (1747–1823), 837
- Hurricane Andrew, 587–88
- Hussein, Saddam (1937–2006), 568, 569, 1006
- Huxley, Julian (1887–1975), 1237
- Huyssen, Andreas (b. 1942), 807
- Hydrogeological mapping, 1699
- Hydrographic Manual* (U.S. Coast and Geodetic Survey), 623
- Hydrographic Review* (journal), 623, 684
- Hydrography, 819–21, 827, 1024–25. *See also* GEBCO; International Hydrographic Organization; Marine charting
aerial photography for, 625, 625–26, 626, 833–34
- Australia, 854–55

- for coastal mapping, 235–37, 237, 621
colonial/imperial cartography and, 1574
early twentieth-century, 621–25, 622, 624
Europe, 843
France, 842
Global Positioning System for, 628, 629,
 632–33
HMS Challenger, 64, 701, 837, 1024
International Hydrographic Chart,
 680–82, 681
Japan, 851
Russia/Soviet Union, 846, 1595–96
satellite imaging and, 626, 628, 628,
 629–32, 1024–25
sounding, 623, 625, 626, 626–29, 627,
 819–20, 820, 827, 843
United Kingdom, 837, 837
Hydrological mapping, 502
Hyperbolic navigation, 26, 1014, 1015
HyperCard (software), 634, 659–60
Hyperlinks. *See* Hypermapping
Hypermapping, 90, 311, 315, 633–34, 634,
 634, 1686, 1687
HYPERSNIGE, 634
Hyperspectral approach to pattern recogni-
tion, 1293
Hypsometry, 136, 1262
- IAGS (Inter-American Geodetic Survey), 147,
 456, 468, 662–66, 1353, 1542
IAU. *See* International Astronomical Union
Ibáñez e Ibáñez de Ibero, Carlos (1825–
 1891), 649
IBCAO (*International Bathymetric Chart of
the Arctic Ocean*), 76, 78, 1027
IBM (International Business Machines)
Corporation, 209
ICA. *See* International Cartographic
Association
ICA Commission on National and Regional
Atlases, 100
ICA Commission on Spatial Data Standards,
 1455–56
ICA Working Group on National Atlases, 97
ICAN (International Commission on Air
Navigation), 26
ICAO (International Civil Aviation Organiza-
tion), 26, 27, 274–75, 673–77, 692,
 1015–16, 1018, 1648, 1765
Ice sheet observation, 1277, 1278
ICHC (International Conferences in the His-
tory of Cartography), 610, 636, 637,
 638, 732, 773
ICJ (International Court of Justice), 140–41,
 151, 155, 173
Iconography, 612, 715
Ideal Communist City, The (Novyy element
rasseleniya) (Moscow University),
 1159, 1161, 1161
Ideal Tour, The (Judd), 1369
IDRISI (software), 497, 499, 500, 635, 1442
IDW (inverse distance weighting) interpola-
tion, 502, 694, 696
IERS (International Earth Rotation and
Reference Systems Service), 426, 462,
 478, 1169
IERS Reference Meridian (IRM), 1169
IGARSS (International Geoscience and Re-
mote Sensing Symposium), 1425
IGC (International Geographical Congress),
 64, 444, 516, 610, 689, 763, 1168,
 1473
IGDA (Istituto Geografico De Agostini)
 (Italy) (publisher), 696–99, 697, 698,
 1616
IGDS (Interactive Graphics Design Soft-
ware), 666
Iglehart, C. F., 1428
IGM (Istituto geografico militare) (Italy),
 255, 921–24, 952, 1588, 1616, 1616,
 1617
IGN. *See* Institut Géographique National
IGU. *See* International Geographical Union
IHB (International Hydrographic Bureau),
 444–45, 623, 682, 842, 843, 844,
 850, 852, 1475. *See also* International
Hydrographic Organization
IHC (International Hydrographic Chart),
 680–82, 680–82, 681
IHC (International Hydrographic Confer-
ence), 517, 625, 680, 682, 844, 850,
 853
IHO. *See* International Hydrographic
Organization
IHO marine charting standards
 British marine charting and, 839
 Canadian marine charting and, 829
 data format, 684–85, 839
 data transfer, 684, 844, 846, 1455
 ECDIS, 684, 828, 843–44, 846, 1433–34,
 1648
 French marine charting and, 842
 hydrographic surveying, 627, 628, 684
 map design, 684, 822, 836, 843, 844, 853
 U.S. marine charting and, 835
IKONOS (satellite), 188, 567, 1120, 1125,
 1301, 1335, 1550
Illustrated Road Atlas of Africa, 1358
Illustration software, 262, 1434–37,
 1471–72, 1509
Illustrator (software), 262, 509, 1434–35,
 1435, 1436, 1509
ILWIS (software), 1442
IMA (Intermap Analytic) (software), 666
Image compression, 1438
Image correlation, 1559, 1603
 Gestalt Photo Mapper, 1143–44, 1292,
 1553, 1664
 UNAMACE for, 891, 1111–12, 1144,
 1295, 1698
Image of the City, The (Lynch), 1161, 1403
Image processing software, 1437–38
 boundary disputes and, 141
 data models and, 364, 501, 1437
 geographic information systems and, 501
 geographical mapping and, 522
 photointerpretation and, 1120
Image restoration, 1438
Images as maps, 804–5, 805. *See also*
 Orthophotography
in British colonial/imperial cartography,
 1567
data models and, 805, 807
Directorate of Overseas Surveys, 324–25
in Dutch topographic mapping, 1538
geographic information systems and,
 1550
military mapping and, 954, 972, 1108,
 1698
Ordnance Survey, 1035
photogrammetric mapping and, 1108,
 1550
recreational, 1251, 1252
satellite imaging and, 805, 1335, 1336
topographic mapping and, 1550
 in urban mapping, 1652
ImageSat International, 567
Imagesetters, 1326
IMAGINE (software), 1144, 1441
Imago Mundi (journal), 121, 608, 612,
 636–38, 637, 638, 732, 773
IMCoS Journal, 72, 1421
Imfeld, Xaver (1853–1909), 332, 736, 1263
IMGRID (software), 501, 1441
Imhof, Eduard (1895–1986), 638–39
 academic cartography and, 6, 7, 341,
 342
 alpine cartography, 44–45
 Eckert and, 339
 on history of cartography, 610
Institut für Kartographie and, 640, 661
on labeling, 375–76
national atlases, 97
relief depictions. *See* Imhof's cartographic
style
school atlases, 1041, 1042, 1043
Swiss topographic mapping, 180, 640,
 1465, 1465
thematic mapping and, 1505
wall maps and, 1694
Imhof's cartographic style, 44–45, 44, 1267–
 68, 1268. *See also* Alpine cartography;
 Physiographic diagrams; Relief models
Kartographische Geländedarstellung on,
 345, 610, 640, 1262
in North American maps, 1269, 1272
relief models and, 1263, 1264, 1264
in school atlases, 639, 1042, 1043, 1268
topographic mapping and, 640, 1267,
 1579
 in wall maps, 1694
ImmersaDesk, 1681
Immigration, 1232–33, 1237
IMO (International Maritime Organiza-
tion), 685, 828, 832, 844, 1015, 1017,
 1433–34, 1648
Imperatorskoye Russkoye geograficheskoye
obshchestvo. *See* Russkoye geogra-
ficheskoye obshchestvo
Imperial Atlas of the World, 115
Imperialism/colonialism. *See* Colonial/
 imperial cartography

- IMUs (inertial measurement units), 774, 775, 1132
 IMW. *See* International Map of the World
 In-ear navigation systems, 1483
 In-flight magazines, 39
 In-flight tracking charts, 39–40
 In-vehicle navigation systems, 1716–22, 1717, 1719, 1721
 accuracy in, 1719–20, 1720
 electronic cartography development and, 810
 geocoding for, 450, 1718–19
 geospatial data marketing and, 856
 interactive mapping and, 661
 mapping software and, 1433
 mass marketing and, 861
 Michelin and, 880
 vs. mobility maps, 1725
 R. R. Donnelley & Sons, 1376
 road mapping and, 1349–50, 1362
 web-based wayfinding and, 1740
 Incipient period of academic cartography, 1–2
 Inclined contour (orthographical relief) method, 1269, 1271, 1483–84, 1484, 1485
 Independence. *See* Postcolonial cartography
 Independent Commission on International Development Issues, 1100
Index-Gazetteer (Bartholomew), 1531
 Indexed street maps, 183, 185, 1714–16, 1715, 1716
 India. *See also* Survey of India
 geographic names, 514
 national atlases, 97
 political boundaries, 139, 1476
 postcolonial cartography, 105, 301, 302, 304, 304
 regional atlases, 105
Indian Atlas, 1473
Indian Borderland, The (Holdich), 618
 Indian Institute of Remote Sensing (IIRS), 687
 Indian Law Resource Council (ILRC), 643
 Indian Photo-Interpretation Institute (IPI), 687
 Indian Remote Sensing Satellites (IRS), 368, 548, 566, 1286
 Indian Society of Remote Sensing (ISRS), 1426
Indianische Karten Nordamerikas (Vollmar), 612
 Indigenous and Tribal Peoples Convention (1989–2000), 641
 Indigenous cartography, 146, 640, 643–44, 812, 990, 1237, 1529. *See also* Counter-mapping; Indigenous peoples and Western cartography
 Indigenous peoples and Western cartography, 640–44
 cadastral surveying and, 16, 1219
 counter-mapping, 286–87, 287, 641, 643–44
 ethnographic mapping, 411, 412, 641
 geographic names, 134, 512–13, 514, 515, 642
 historical atlases, 92, 94
 history of cartography and, 612
 History of Cartography Project and, 612, 615
 Indonesia
 military mapping, 972
 topographic mapping, 1608–12, 1609, 1610, 1612
 Industrialization, 17, 539, 601, 1649
Industriya sotsializma (Skvortsov et al.), 983
 Inertial measurement units (IMUs), 774, 775, 1132
 Inertial navigation systems (INS), 1018, 1717
 Infomap (software), 496
 Information structure, 57–58, 58
 Information theory, 7, 8, 9–10. *See also* Communication paradigm
 Informed consent, 1171
 Infrared photography, 754
 color, 367, 1114, 1116, 1118, 1119, 1122, 1299
 Directorate of Overseas Surveys, 324
 environmental protection and, 395
 geographic analysis and, 1113, 1114
 Infrared radiation, 88–89
 Inhelder, Bärbel (1913–1997), 217
 Inkjet printers, 507, 1325, 1325, 1335
 Inks, 328, 328, 333
 Inquiry, The, 158, 1234–35. *See also* Post-World War I settlement
 INS (inertial navigation systems), 1018, 1717
 InSAR (interferometric synthetic aperture radar), 537, 538, 992–93
 INSPIRE (Infrastructure for Spatial Information in the European Community), 278, 645
 Institut Cartogràfic de Catalunya (ICC) (Cartographic Institute of Catalonia) (Spain), 644–45, 773, 1144
 Institut de physique du globe de Paris, 842
 Institut Français de Pondichéry, 125, 127
 Institut français de recherche pour l'exploitation de la mer, 842
 Institut für Angewandte Geodäsie (IfAG) (Germany), 176, 177, 917
 Institut für Kartographie (ETH) (Switzerland), 640, 661
 Institut für Militärisches Geowesen (Austria), 927
 Institut géographique du Congo Belge (IGCB), 474, 959
 Institut géographique militaire (Belgium), 1584
 Institut Géographique National (IGN) (National Geographical Institute) (France), 645–49. *See also* SPOT
 bathymetric mapping and, 445
 BD Carto series, 374, 648, 648
 boundary disputes and, 136
 Carte du france, 1583, 1583
 cartographic conventions and, 278
 cartographic style, 1547, 1548
 colonial/imperial cartography, 255, 956, 1542, 1568–69
 creation of, 645, 907
 electronic cartography development and, 358
 generalization, 385
 geodetic surveying, 474, 649–50
 Geographic Documentation Service, 672
 marine charting and, 844
 military mapping, 645–47
 NATO and, 908
 photogrammetric mapping, 1106, 1108
 road mapping, 1361
 World War II and, 1584
 Institut International de Géopolitique, 544
 Institut royal colonial belge, 105
 Institut scientifique et technique des pêches maritimes (France), 842
 Institute of Geographical Exploration (Harvard University), 1, 1242, 1244
 Institute of Oceanographic Studies (United Kingdom), 418
 Institutional review boards (IRBs), 1171
 Instituto Brasileiro de Geografia e Estatística (IBGE), 470
 Instituto Cartográfico Militar (Dominican Republic), 1560
 Instituto Cartográfico Nacional (ICN) (Cuba), 664
 Instituto Geográfico Agustín Codazzi (Colombia), 665, 687, 1561
 Instituto Geográfico de Venezuela Simón Bolívar (IGVSB), 1563
 Instituto Geográfico Militar (Bolivia), 1560
 Instituto Geográfico Militar (Chile), 1560
 Instituto Geográfico Militar (Ecuador), 147, 1560
 Instituto Geográfico Militar (IGM) (Argentina), 836, 1201, 1560
 Instituto Geográfico Nacional (Costa Rica), 1563, 1564
 Instituto Geográfico Nacional (Guatemala), 1560–61
 Instituto Geográfico Nacional (IGN) (Spain), 158, 650–54, 652, 653
 Instituto Geográfico Nacional (Nicaragua), 1563
 Instituto Geográfico Nacional (Peru), 1560
 Instituto Geográfico Nacional “Tommy Guardia” (Panama), 1563
 Instituto Geográfico y del Catastro Nacional (El Salvador), 1353
 Instituto Panamericano de Geografía e Historia (IPGH). *See* Pan American Institute of Geography and History
Instruktionen, 191
 Instrument enroute charts, 24, 26
 Instrument flight rules (IFR), 28
 Insurance. *See* Fire insurance maps; Redlining
 INT (International) Chart Series, 680, 684, 844, 845, 853

Intaglio printing, 1312, 1314. *See also* Copperplate engraving
Integrated Approaches to Participatory Development (IAPAD), 269
Integrated Global Observing Strategy Partnership (IGOS-P), 462
Integrated Land and Water Information System (ILWIS), 499
Intellectual property (IP), 284–85, 654–59, 1228, 1230, 1754
Intellicast (website), 876
Intelligence applications. *See* Military development and applications
Intelligence data fusion, 1669
Intelligent vehicle highway systems (IVHS), 1718
Inter-American Court of Human Rights (IACtHR), 643
Inter-American Geodetic Survey (IAGS), 147, 456, 468, 662–66, 1353, 1542
Inter-American Indian Institute, 641
Inter-Service Topographical Department (ISTD) (United Kingdom), 954, 1492, 1779
Interactive and Animated Cartography (Peterson), 61
Interactive Graphics Design Software (IGDS), 666
Interactive mapping, 659–62, 1753. *See also* Google Earth; Virtual reality; Web-based wayfinding
advertising and, 20
animation in, 63
campus maps, 1704, 1705, 1706
cartographic visualization and, 1683, 1686–87, 1687, 1688
census mapping, 210
climate maps, 229
in crime mapping, 288
demographic, 311, 315
Digital Chart of the World, 320, 401, 508, 660, 903, 1431, 1455
in electronic atlases, 90, 106
electronic cartography development and, 359
epidemiological, 406, 407
gazetteers, 519
globes, 559, 561–62
historical-boundaries atlases and, 95
in historical cartography, 600, 600
hypermapping, 90, 311, 315, 633–34, 634, 1686, 1687
map pins, 814–16
marine charting and, 822–23
in national atlases, 100, 116
in recreational maps, 1250
in regional atlases, 106
social activism and, 1403
symbolization and, 1686
thematic mapping, 1509
three-dimensional, 1521
virtual globes, 227, 229, 559, 561–62, 564, 661–62, 1385, 1387

wall maps and, 1693–94
weather maps, 876
Interdisciplinarity, 492–93, 638
Interferometry, 461
Intergovernmental Oceanographic Commission (IOC) (UNESCO), 321, 445, 632, 844, 848, 1027, 1526
Intergraph Corporation, 507, 666–67, 1378, 1442
Intermap Analytic (IMA) (software), 666
Intermodal Surface Transportation Efficiency Act (ISTEA) (1991) (United States), 1718
Intermountain States Geographic Names Conference (United States), 134
Internal paradigm in history of cartography, 610, 612, 613
International (Hayford) ellipsoid, 425, 475, 593, 651, 836
International (INT) Chart Series, 680, 684, 844, 845, 853
International Advanced Study Symposium on Topological Data Structures for Geographic Information Systems, 583
International Aeronautical Conference, 871
International Archives of Photogrammetry and Remote Sensing (journal), 1424
International Association of Accident Reconstruction Specialists, 432
International Association of Geodesy (IAG), 461, 467. *See also* International Earth Rotation and Reference Systems Service
Africa and, 475
Europe and, 417, 475, 476
gravimetric surveys and, 456
International Cartographic Association and, 670, 671
Latin America and, 468
International Association of Physical Oceanography, 445
International Astronomical Union (IAU), 85, 426, 793, 1459. *See also* International Earth Rotation and Reference Systems Service
International Bathymetric Chart of the Arctic Ocean (IBCAO), 76, 78, 1027
International Bathymetric Chart of the Mediterranean (ICBM), 848, 1027
International Bathymetric Charts, 76, 78, 848, 1027
International Bibliography of Photogrammetry (ITC), 686
International Boundary Studies monographs (U.S. Department of State), 138
International Cartographic Association (ICA), 667–72
academic cartography and, 10, 667, 670
Africa and, 1410
on automation, 358
award recipients, 672, 672
Canadian Institute of Surveying and, 1406
cartographic dictionaries and, 317
Cartographic Journal special issue, 201
Cartographica and, 201
Cartography and Children Working Group, 218–19, 220
on cartometry, 202
census mapping and, 211
Cold War and, 667, 669–70, 671
Commission on National and Regional Atlases, 100
conferences, 387, 1641
on definitions of “map,” 799, 800
executive committee members, 668, 669
geographic names and, 518
history of cartography and, 610, 732
International Civil Aviation Organization and, 673
International Geographical Union and, 667, 670, 677, 678
International Institute for Geo-Information Science and Earth Observation and, 686
Joint IGU-ICA Working Group on Environmental Atlases, 97, 101
Koláčný’s role in, 732
Latin America and, 1408
Maling’s role in, 798
Mannerfelt’s role in, 409, 667
on marine charting, 827, 828
meeting venues, 671
national map collections and, 773
Ormelinc’s role in, 670, 1047
relief depictions and, 1271
statistical mapping and, 1466
tactile maps and, 1481
Western European cartographic societies and, 1410, 1411
women in cartography and, 1760
Working Group on Cartographic Information, 8
Working Group on National Atlases, 97
International Cartographic Committee, 517
International Cartographic Conferences, 8, 1268–69
International Center for Remote Sensing of Environment (ICRSE), 1425
International Civil Aviation Organization (ICAO), 26, 27, 274–75, 673–77, 692, 1015–16, 1018, 1648, 1765
International Classification and Mapping of Vegetation (UNESCO), 128
International Commission on Aeronautical Maps, 22
International Commission on Air Navigation (ICAN), 26
International Conferences in the History of Cartography (ICHC), 610, 636, 637, 638, 732, 773
International Congresses of Photogrammetry, 1424
International Convention on Safety of Life at Sea (SOLAS), 632, 685, 828, 1017, 1433–34
International Coronelli Society for the Study of Globes, 562, 732

- International Council for Science (ICSU), 672
 International Council of Scientific Unions (ISCU), 68, 679
 International Court of Justice (ICJ), 140–41, 151, 155, 173
International Directory of Current Research in the History of Cartography and in Carto-Bibliography, 610, 612
 International Earth Rotation and Reference Systems Service (IERS), 426, 462, 478, 1169
 International Federation of Hydrographic Societies, 628
 International Federation of Library Associations (IFLA), 766, 768, 772, 773, 1422
 International Federation of Surveyors (Fédération Internationale des Géomètres) (FIG), 670, 671, 827, 828, 1212, 1408
 International Geographical Congress (IGC), 64, 444, 516, 610, 689, 763, 1168, 1473
 International Geographical Union (IGU), 677–79
 census mapping and, 211
 centrography, 212
 Close's role, 232
 commissions/study groups, 97, 190, 297, 311–12, 678
 International Cartographic Association and, 667, 670, 677, 678
 Martonne's role, 865
 International Geophysical Year (1957–1958), 679, 679–80
 Antarctica maps and expeditions and, 65, 68, 679–80, 1543
 satellite geodesy and, 536, 679, 679
 International Geoscience and Remote Sensing Symposium (IGARSS), 1425
 International GNSS Service (IGS), 469
 International GPS Service (IGS), 461, 469
 International Gravity Bureau, 456
 International Gravity Standardization Net, 456, 660
 International Hydrographic Bureau (IHB), 444–45, 623, 682, 842, 843, 844, 850, 852, 1475. *See also* International Hydrographic Organization
 International Hydrographic Chart (IHC), 680–82, 680–82, 681
 International Hydrographic Conference (IHC), 517, 625, 680, 682, 844, 850, 853
 International Hydrographic Organization (IHO), 682–85, 826. *See also* IHO
 marine charting standards
 bathymetric mapping, 1027
 Canadian Hydrographic Service and, 829
 on coordinate systems, 236
 on education, 827, 828
 GEBCO and, 321, 632, 682–83
 geographic names and, 514–15
 International Cartographic Association and, 671
 International Civil Aviation Organization and, 673
 International Hydrographic Chart, 680–82
 SOLAS and, 685, 1433–34
 Survey of India and, 1475
 tidal measurement, 1527
 U.S. Coast and Geodetic Survey and, 835
 on World Geodetic System, 821
International Hydrographic Review (IHR) (journal), 684
 International Institute for Aerial Survey and Earth Sciences (ITC), 686
 International Institute for Aerospace Survey and Earth Sciences (ITC), 687.
See also International Institute for Geo-Information Science and Earth Observation
 International Institute for Geo-Information Science and Earth Observation (ITC), 342, 685–88, 687, 1047
 International Isostatic Institute, 455, 593
International Journal of Geographical Information Systems/Science (IJGIS), 490, 688–89
 International Labour Organization (ILO), 641, 642, 643
 International Map Collectors Society (IMCoS), 72, 247, 1421
 International Map of the World (IMW), 689–93, 690, 692. *See also* Millionth Map
 accuracy standards and, 1453–54
 cadastral surveying and, 1213
 cartographic conventions and, 273, 274–75, 274
 Close's role, 232
 coordinate system for, 1188–89
 Directorate of Overseas Surveys and, 325
 ethnographic mapping and, 777
 Gannett and, 444
 geographical discovery and, 1389
 geographical mapping and, 523
 German role in, 177
 Hinks and, 597
 Indonesian role in, 1610, 1611
 League of Nations and, 763–64, 765
 map reproduction, 1331
 mass marketing and, 860
 metric system in, 689, 878
 military mapping and, 690, 916, 935
 Penck's role, 273, 689, 763, 1054
 Karl Peucker's role, 1101
 prime meridian for, 1168
 Radó's role, 1238
 Royal Geographical Society role in, 689, 763, 1373, 1374
 social theory and, 1402
 Soviet military mapping and, 935
 Survey of India and, 1389, 1473
 topographic mapping and, 1540, 1541, 1589, 1600, 1610, 1611
 UN role in, 177, 691, 692, 693, 1645
 World Aeronautical Chart and, 692, 1766
 world revolution theory and, 1767–68
 International Map Trade Association (IMTA), 671
International Maps and Atlases in Print (Winch), 1452
 International Maritime Organization (IMO), 685, 828, 832, 844, 1015, 1017, 1433–34, 1648
 International Meridian Conference, 1167–68, 1392
 International Meteorological Organization, 870
 International Organization for Standardization (ISO), 145, 278, 496, 511
 International Orienteering Federation (IOF), 1044
 International Polar Motion Service, 478
 International Research Council (IRC), 677
 International Society for Digital Earth (ISDE), 1426
 International Society for Photogrammetry and Remote Sensing (ISPRS), 670, 671, 673, 686, 1408, 1424
 International Society for the Curators of Early Maps, 1423
 International Spatial Data Handling Symposium, 387
 International Statistical Institute, 1466
 International Steering Committee for Global Mapping (ISCGM), 321, 418, 671
 International Symposium on Computer-Assisted Cartography (Auto-Carto), 56, 59, 318, 386–87, 504, 505, 1212, 1406
 International Terrestrial Reference System/Frame (ITRS/ITRF), 426, 462, 467, 470, 478, 485, 1169, 1606
 International Training Centre for Aerial Survey (ITC), 686, 1424. *See also* ITC (International Institute for Geo-Information Science and Earth Observation)
 International Union of Geodesy and Geophysics (IUGG), 425, 426, 475, 530, 1169
 International Union of Official Travel Agents, 517
 International Users' Conference on Computer Mapping Software and Data Bases, 583
 International Water Management Institute, 229
International Yearbook of Cartography, 10
 Internationale Coronelli-Gesellschaft für Globenkunde, 1420
 Internationale Erdmessung, 475
 Internet, 1750–54. *See also* Interactive mapping; Web-based wayfinding
 advertising on, 18–19, 20
 anaglyph maps on, 55
 animation on, 63, 1511, 1512, 1531
 astrophysics and, 89

cadastral mapping and, 186
campus maps on, 1704
cartobibliography and, 192
cartographic journals on, 718
cartographic visualization and, 1686–87
Central Intelligence Agency and, 1670
choropleth symbolization on, 224, 224
climate maps on, 229
color and, 223, 263, 265
communication paradigm and, 1750
community mapping and, 269
crime mapping and, 288
democratization of cartography and, 1511, 1511, 1753
demographic mapping on, 315–16
development of, 1750–51
digital libraries on, 318–19, 320, 645
electoral mapping on, 352
electronic atlases on, 90
electronic cartography development and, 359, 810
epidemiological maps and, 406
expansion of, 1751–52, 1752
facsimile atlases on, 91
folding strategies and, 1338
gazetteers on, 519
generalization and, 374–75
geographic information systems and, 503
geographic names and, 516, 518, 520
geospatial data marketing and, 859
hazard/risk mapping and, 589
hiking/trail maps on, 1712
images as maps and, 805
in-vehicle navigation systems and, 1718
indigenous peoples and, 642
Institut Cartogràfic de Catalunya and, 645
intellectual property and, 655, 656, 1754
map collecting and, 251
map libraries and, 768, 769
map pins and, 815–16
map revision and, 1753
mapping software and, 1434
meteorology and, 876
Michelin and, 880
mobility maps and, 1725
national atlases on, 100, 114, 116, 993
personalization and, 292
persuasive cartography on, 1094
public access to cartographic information and, 1229–30
regional atlases on, 106
temporal dynamics and, 1528
thematic mapping and, 1511, 1511
TIGER and, 1753, 1753
U.S. Geological Survey and, 1665
weather maps on, 1746, 1749
world maps on, 321
Interpolation, 384, 693–96, 694
aggregate data and, 499
for alpine cartography, 43
analytical cartography on, 59
environmental protection and, 394, 395
for genetic mapping, 446

geographic information systems and, 502, 735
inverse distance weighting, 502, 694, 696
kriging, 394, 395, 502, 694, 733–35, 734, 1469
for marine charting, 822
for photogrammetric mapping, 1129–30
pyncnophylactic, 59, 695, 695, 696, 1514, 1534
software for, 384, 502, 694
for thematic mapping, 695, 695
Tobler on, 59
Interrogation, Recording, and Location System (IRLS), 630
Interrupted projections, 1174–77, 1176, 1178. *See also* Goode homolosine projection
Intiya, 304
Inuit Land Use and Occupancy Project, 642
Inuit Tapirisat, 642
Inverse distance weighting (IDW) interpolation, 502, 694, 696
Investing in Maps (Baynton-Williams), 247, 250
Invisible Cities (Calvino), 787
IOC (Intergovernmental Oceanographic Commission) (UNESCO), 321, 445, 632, 844, 848, 1027, 1526
IPGH (Instituto Panamericano de Geografía e Historia). *See* Pan American Institute of Geography and History
Iran, 167, 969, 970, 1598, 1600
Iran-Iraq War, 970, 1600
Iraq. *See also* Gulf War (1991)
ethnographic mapping, 411, 413
Iran-Iraq War, 970, 1600
Kuwait invasion (1990), 1006, 1006
Kuwait political boundaries, 141, 164, 166, 166, 167
military mapping, 970
topographic mapping, 1598–99
IRAS (Infrared Astronomical Satellite), 89
Ireland, Republic of, 1584, 1584
Irwin, B. St. G., 1035–36
Isachsen, Gunnerius Ingvald (1868–1939), 73
Isard, Walter, 1529–30
Isarithmic maps, 802, 1508, 1514
ISBD (CM) International Standard Bibliographic Description for Cartographic Materials, 773, 1422
ISCGM (International Steering Committee for Global Mapping), 321, 418, 671
Iskander, Hosni N., 397
Island cartography, 107
ISO (International Organization for Standardization), 145, 278, 496, 511
ISO Technical Committee 211 Geographic Information/Geomatics (ISO/TC 211), 1456, 1457, 1457
Isobaths, 444, 629
Isochrones, 1529
Isochronic Passage Chart for Travellers (Galton), 1529
Isoglosses, 779
Isometric terrain diagrams, 1494, 1494
Isopleth symbolization, 113, 311, 312–13, 314, 872
Isostasy, 593
ISPRS (International Society for Photogrammetry and Remote Sensing), 670, 671, 673, 686, 1408, 1424
Israel. *See also* Arab-Israeli dispute; Middle East
boundary surveying, 163–64, 166–67
military mapping, 929–31, 931
nation-state formation/maintenance, 1002, 1002
topographic mapping, 1600, 1601, 1602
Issues in the Middle East: Atlas (CIA), 103, 105
ISTD (Inter-Service Topographical Department) (United Kingdom), 954, 1492, 1779
Istituto Geografico De Agostini (IGDA) (Italy) (publisher), 696–99, 697, 698, 1616
Istituto geografico militare (IGM) (Italy), 255, 921–24, 952, 1588, 1616, 1616, 1617
Italia (airship), 76
Italia (Magini), 42
“*Italia*” di Giovanni Antonio Magini e la cartografia dell’Italia nei secoli XVI e XVII, L’ (Almagià), 42
Italo-Turkish War (1911–1912), 952
Italy
aeronautical charts, 22
Almagià, 42–43
Antarctica maps, 68
cartobibliography, 191
colonial/imperial cartography, 1616, 1617, 1619
interwar political persuasive cartography, 542, 545
military mapping, 921–24, 922, 923, 952, 963
national atlases, 97
road mapping, 1361, 1362
topographic mapping, 921–24, 952, 1588, 1616, 1616, 1617
ITC (International Institute for Geo-Information Science and Earth Observation), 342, 685–88, 687, 1047
ITC Journal, 686
ITRS/ITRF (International Terrestrial Reference System/Frame), 426, 462, 467, 470, 478, 485, 1169, 1606
ITT Visual Information Solutions (company), 1294
IUGG (International Union of Geodesy and Geophysics), 425, 426, 475, 530, 1169
Iuliano, Marco, entry by, 1615–20
Ivan IV (czar of Russia) (1530–1584), 1214
Ives, Frederic Eugene (1856–1937), 1150
IVHS (intelligent vehicle highway systems), 1718

- Izenour, George C. (1912–2007), 562
 Izotov, A. A. (1907–1988), 982, 1639
- Jaaatinen, Stig (1918–1999), 117
 Jaberg, Karl (1877–1958), 779
 Jackson, Ian, entry by, 526–29
 Jackson, Michael, 419
 Jacob, Christian (b. 1955), 614, 988, 990
 Jacobs, Jane (1916–2006), 1161
 Jacot-Guillarmod, Charles (1868–1925), 333
 Jacotin, Pierre (1765–1827), 928
Jahrbuch der Kartographie (journal), 1412
 Jakobson, Roman (1896–1982), 578–79
 James, C. L. R. (1901–1989), 308
 James, George N., 1407
 James, Henry (1803–1877), 1317
 James Ford Bell Library (University of Minnesota), 72
 Jameson, J. Franklin (1859–1937), 350
 Jansky, Karl G. (1905–1950), 86
 Japan
 accuracy standards, 1454
 Antarctica expeditions, 68
 electronic cartography development, 358
 geographic names, 514–15
 intellectual property, 657
 marine charting, 849–54, 850, 851, 854
 military mapping, 948–51, 971, 972–73, 974
 school atlases, 110
 topographic mapping, 68, 729–31, 730, 1606–8, 1607
 Japanese Earth Resources Satellite (JERS), 368, 1286
 Japanese Imperial Land Survey (JILS) (Dai Nippon teikoku rikuchi sokuryōbu), 948–49, 1606, 1607, 1608
 Jarrell, Randall (1914–1965), 785
 JATOP (Djawatan Topografi) (Indonesia), 1611
 Java, 1610
 JavaScript (programming language), 63
Jaworzina boundary case (1920), 140
 Jeansoulin, Robert, 1643
 Jefferson, Mark Sylvester William (1863–1949), 700–701, 1049–50, 1053, 1169, 1235
 Jefferson, Thomas (1743–1826), 465, 831
 Jeffreys, Harold (1891–1989), 531
 Jenkins, Rolland (b. 1887), 1623
 Jenks, George F. (1916–1996)
 academic cartography and, 3, 340, 341, 342
 on choropleth symbolization, 221–22, 1511
 on generalization, 3, 374
 on geography and cartography, 524, 525
 National Institute of Cartography proposal, 4
 perception/cognition and, 1509
 on statistical mapping, 525
 on subject testing, 1072
 on thematic mapping, 868, 1505, 1507
 on three-dimensional mapping, 1521
 Jennings, Peter (1938–2005), 570
 Jense, G. J., 1681
 Jensen, John R., 1525
 entry by, 565–68
 Jeppesen, Elrey (1907–1996), 1396
 Jeppesen Sanderson Co. (United States), 24, 25, 26, 26, 28, 28, 37, 38, 1396
 JERS (Japanese Earth Resources Satellite), 368, 1286
 Jervis, W. W. (d. 1959), 274
 Jesuits, 297
 Jet Navigation Charts, 28, 320
 Jet Propulsion Laboratory (JPL) (NASA), 631, 992, 1749, 1749
 JILS (Dai Nippon teikoku rikuchi sokuryōbu) (Japanese Imperial Land Survey), 948–49, 1606, 1607, 1608
 Jingshi lujun cehui xuetang (Military Survey Institute) (China), 942, 1602
 Joerg, W. L. G. (1885–1952), 1113
 John Bartholomew & Son (United Kingdom) (publisher), 701–6, 702, 706
 Antarctica maps, 64, 65
 atlases, 703, 704, 705, 706
 Automobile Association and, 119
 epidemiological maps, 403–4
 escape/evasion maps and, 1709–10
 projections, 1173, 1174, 1193
 road mapping, 1362
 thematic mapping, 1503
 Times Atlas of the World, 115, 229, 311, 519, 703, 706, 1531–32
 travel mapping, 1620
 wall maps, 1694
 Johns, Jasper (b. 1930), 83
 Johnson, Doug, 1093
 Johnson, Douglas Wilson (1878–1944), 1, 787, 788, 1050, 1053, 1153, 1241
 Johnson, Federico, 1615
 Johnson, Jay T., 286, 287
 Johnson, John J. (1912–2004), 1162
 Johnson, Martin E. (1884–1937), 226, 987
 Johnson, Phillip C., 1198
 Johnson, Willard D. (1861–1917), 1659
 Johnson-Reed Immigration Act (1924)
 (United States), 1232–33
 Johnston, Edward (1872–1944), 791
 Johnstone, R. H., 249
 Join-count statistic, 498
 Joint IGU-ICA Working Group on Environmental Atlases, 97, 101
 JointSTARS radar system, 572
 Jomard, Edme-François (1777–1862), 91
 Jones, Christopher B., 378
 Jones, Mrs. Robert W., 1050
 Jones, Richard, 314
 Jones, Stephen B. (1903–1984), 159
 Jordan, 166–67, 1599–1600, 1601. *See also* Middle East
 Jordan, David Starr (1851–1931), 1415
 Jordan, Kenneth C., 1372
 Jordan, Terry G., 603
Journal of Geography, 347, 568, 1416
Journal of Government Information, 16
Journal of Spatial Science, 1414
Journal of the Royal Geographical Society, 1371
 Journalistic cartography, 706–18. *See also*
 Harrison, Richard Edes; Newspapers;
 Persuasive cartography; Television;
 Weather maps; *specific publications*
 advertising and, 20
 cartographic style in, 33, 34, 580, 580,
 582, 708, 713, 715, 717, 1471–72
 Cold War and, 715, 716, 717, 1179
 color in, 260, 715
 geographical mapping and, 522
 Geopolitik and, 541
 Gulf War (1991), 570, 717
 indigenous peoples and, 642, 643
 map as metaphor in, 807
 mass marketing and, 861
 military development and applications,
 707–8, 709, 710, 712, 714, 714
 nation-state formation/maintenance and,
 1002
 National Geographic Society and, 997
 perspective maps in, 708, 710, 711, 712,
 713, 714, 1022
 pictorial depictions in, 707, 708, 708,
 712, 714, 715
 projections in, 33, 243–44, 415, 580, 714,
 1088, 1173, 1179
 satellite imaging and, 1301, 1303
 thematic mapping in, 1509, 1510, 1511
 World War I and, 707–8, 709, 710
 World War II and, 415, 708, 712, 714,
 714, 715, 1022, 1091–92
 Journals, 718–20, 720. *See also specific journals*
 administrative cartography, 16
 analytical cartography, 56
 geodetic surveying, 478
 geographic information systems, 49, 490,
 688–89, 718
 history of cartography, 608
 map availability and, 1452
 school cartography, 107
 software, 1430
 thematic mapping and, 1507, 1508
 Western Europe, 1412, 1413
 Journeel, A. G., 734–35
Journey Without Maps (Green), 787
 Joyce, James (1882–1941), 786, 787, 986,
 988, 989
 JSTOR, 718
 Jud, Jakob (1882–1952), 779
 Judd, Almon C., 1369
 “Judging Distances” (Reed), 785
 Junkins, John L. (b. 1943), 1453
 Junta das Missões Geográficas e de Investigações Coloniais (JMGIC) (Portugal), 474
 Junta de Investigações do Ultramar (Portugal), 255
 Jusatz, Helmut J. (1907–1991), 404
 Just noticeable difference (JND), 1056
 Juster, Norton (b. 1929), 783

- Justus Perthes (publisher) (Germany), 720–25
John Bartholomew & Son and, 701
map collection, 721
Petermanns Geographische Mitteilungen, 718, 721, 722, 724, 1095–97, 1097, 1098
projections and, 1182
school atlases, 107, 721, 722
thematic mapping, 722, 723, 723, 724, 1503
wall maps, 722, 1694
- Kaijō hoanchō kaiyō jōhōbu (JHOD) (Japan), 849
Kain, Roger J. P. (b. 1944), 613, 616
Kaindlstorfer, Hans (1882–1944), 440
Kainz, Wolfgang, entry by, 732–33
Kakkuri, Juhani, entry by, 593–94
Kalinin, Mikhail (1875–1946), 513
Kamāl, Yūsuf (Yousouf Kamal), 91
Kanazawa, Kei (1920–2013), entry by, 1483–84
Kane, Elisha Kent (1820–1857), 1416
Kansas Geological Survey, 1427
Kant, Immanuel (1724–1804), 84
Kapp, Kitt S., 246
Karjala, Dennis S. (b. 1939), 285
Karl Wenschow GmbH (publisher) (Germany), 1694
Karrow, Robert W. (b. 1945), 317
entries by, 190–93, 245–48, 1419–21
Karta narodov, 777
Karte des Deutschen Reiches, 721, 722, 909, 1579
Karte des Glärnisch-Gebietes (Blumer), 45
Kartenkunde (Groll), 339, 341, 344
Kartenmacher aller Länder und Zeiten (Bonnacker), 317
Kartenwissenschaft, Die (Eckert)
cartographic dictionaries and, 317
on generalization, 371
history of cartography and, 344, 610
influence of, 346
on perception/cognition, 1071
on psychophysics, 1083
thematic mapping and, 1505
Kartografia ekonomiczna (Ratajski), 1249
Kartograficheskiye masterskiye (Russia), 846
Kartografická společnost České Republiky (Czech Republic), 1414
Kartografická spoločnosť Slovenskej Republiky (Slovakia), 1414
Kartografie (journal), 719
Kartografisch Tijdschrift (journal), 719
Kartografisch Woordenboek (Bos), 317
Kartografische Afdeling (Indonesia), 1609–10
Kartografiska Sällskapet (Sweden), 1423
Kartografiya (company) (Russian Federation), 551
Kartogramm zur Reichstagswahl (Haack & Wiechel), 350
- Kartographia Winterthur (publisher) (Switzerland), 1041, 1042
Kartographie (Hake), 341, 344
Kartographie: Ihre Aufgaben und Bedeutung für die Kultur der Gegenwart (Eckert), 339
Kartographie in Stichworten (Wilhelmy), 317
Kartographie und ihre Randgebiete, Die (Arnberger), 317, 610
Kartographiehistorisches Colloquium, 732
Kartographische Geländedarstellung (Cartographic Relief Presentation) (Imhof), 345, 610, 640, 1262, 1263
Kartographische Institut (Austria), 926
Kartographische Nachrichten (KN) (journal) (Germany), 49, 718, 726–27, 732
Kartographische und Schulgeographische Zeitschrift (journal), 107, 440, 1102
Kartographisches Institut der Eidgenössischen Technischen Hochschule (Zurich), 6, 640, 661
Kartographisches Institut Kurt Mair. See Mairs Geographischer Verlag
Kashani-Sabet, Firoozeh, 1009
Kater, Henry (1777–1835), 455
Kates, Robert W. (b. 1929), 585
Katz, Amrom H. (1915–1997), 1123, 1425
Kaula, William M. (1926–2000), 461
Kavrayskiy, Vladimir Vladimirovich (1884–1954), 1172, 1182, 1503, 1641
Keates, J. S. (1925–1999), 200, 274, 342, 727, 727, 799, 1328, 1585
Keller, C. Peter, 486, 1073
Keller, Heinrich (1778–1862), 736
Kelly, Walt (1913–1973), 680
Keltie, John Scott (1840–1927), 597, 689, 1372
Kennedy, John F. (1917–1963), 832, 1273
Kent, Alexander J., 275
entries by, 273–78, 1331–35
Kentucky Place Names, 520
Kenya, 156, 322, 323, 902, 1209, 1566. See also Africa
Kerfoot, Helen, entry by, 519–20
Kern & Co., 326
Kernels, 58, 379, 380, 501
Kerr, Adam J., entries by, 625–26, 818–29, 843–46
Kessler, Elizabeth A., entries by, 84–89, 1459–62
Kessler, Fritz C., entry by, 1500–1525
Keyhole (company), 227
Khozyaystvenno-statisticheskiy atlas Yevropeyskoy Rossii, 96
Khrushchev, Nikita (1894–1971), 513, 1273
Khumbu Himal (journal), 594
Khumbu Himal (Nepal) (map), 595
KIAR Database of Old Maps, 192
Kidder, James H., 1416
Kidron, Michael (1930–2003), 116, 197, 1516, 1517
Kiikka, Osmo, 1420
Kikuchi, Shinichi, entry by, 849–54
Kilbridge, Maurice D. (b. 1920), 585
- Killander, Ernst Victor (1882–1958), 1043
Kimerling, A. Jon, 3, 4, 222–23, 1084
entries by, 1191–94, 1322–26
King, Clarence (1842–1901), 443
King, Debbie, 1262
King, Jerome J., IV, 265
Kinn, Gerald J., entry by, 1288–94
Kirchwey, Clara Barbara, 347
Kirchwey, Karl (b. 1956), 785
Kirishjian, Vahe (1913–1988), 37
Kirk, W., 139
Kirsch boundary delineation operator, 380
Kish, George (1914–1989), 610
Kislak, Jay, 247
Kislov, N. M., 982
Kissinger, Henry (b. 1923), 543
Kitchener, Horatio Herbert (1850–1916), 897, 929, 967
Kite observation, 872–73
Kjellén, Rudolf (1864–1922), 539
Klau, Gunnar W., 378
Klawe, Janusz J., 312
Kleffner, Wilhelm, 344
Kleine Rad- und Autokarte, 1249
Kleiner Volksatlas (Haefke & Heyde), 722–23
Klett-Perthes Verlag (Germany) (publisher), 724. See also Justus Perthes
Klinger, Allen, 362
Klinkenberg, Brian (b. 1954), 201
Klipell, Viohla, 1759
Klove, Robert C. (1911–1995), 1466
Kniffen, Fred Bowerman (1900–1993), 603
Knipling, Edward B., 1114, 1119
Knorr, E. R., 680, 682, 684
Knos, Duane Sidney (b. 1924), 222
Knowledge discovery. See Geographic knowledge discovery
Knowles, Anne Kelly, entries by, 597–601, 603–7
Koch, Wolf Günther (b. 1943), 199–200
entry by, 1693–96
Koeman, Cornelius (1918–2006), 91, 687, 728–29
Kohl, Helmut (b. 1930), 1163
Köhler, Franz, 1694
Köhler & Volckmar (dealer), 1691
Kojinteki na taiken (Öe), 787
Kok, Hans D., entries by, 672–77, 1189–90
Köke, Friedrich (1823–1882), 439
Kokudo chiruiin (Geographical Survey Institute) (GSI) (Japan), 68, 729–31, 730, 1608
Koláčný, Antonín (1910–1991), 8–9, 10, 12, 12, 731–32, 945
Kolmogorov, A. N. (1903–1987), 461, 733
Kolonialkartographisches Institut (Germany), 909, 956, 959, 1409, 1572
Komedchikov, Nikolay (d. 2011), entry by, 1249
Komitet geodezii i kartografi (Glavkartografiya) (Soviet Union), 1596
Komkov, Anatoliy Markovich (b. 1910), 1213, 1641

- Konecny, Gottfried, 1138
 entry by, 1125–32
- Königliche Bibliothek (Berlin), 771
- Koninklijk Nederlands Aardrijkskundig Genootschap, 1418
- Konvitz, Josef W. (b. 1946), 613
- Koppe, Carl (1844–1910), 1136
- Köppen, Wladimir Peter (1846–1940), 227–28, 229, 230, 231
- Korea, 514–15, 946, 949, 972–74, 974. *See also* Korean War
- Korean War, 973, 1266, 1655, 1667
- Koretskiy, Viktor, 1770
- Kormoss, I. B. F., 417
- Korpus voyennykh topografov (KVT) (Soviet Union), 479, 932, 934–35, 1213
- Kort, V. G., 70
- Kort over Landgrænsen mellem Tyskland (Projesen) og Denmark*, 161
- Kosslyn, Stephen Michael (b. 1948), 1060
- Kostelanetz, Richard (b. 1940), 783
- Kostka, Robert (b. 1935), 594, 1282
 entries by, 43–46, 594–97
- Kozenn, Blasius (1821–1871), 1674
- Kozenn-Slanar atlases, 107, 109, 1674–75, 1675
- Kozlov, Petr (1863–1935), 1418
- Kraak, M. J. (b. 1958), 634, 687, 1682, 1686, 1739
 entry by, 1683–89
- Krallert, Wilfried (1912–1969), 777
- Kramar, Ernst (b. 1902), 1014
- Krarup, Torben (1919–2005), 426, 460, 980
- Krasovskiy, Feodosiy Nikolayevich (1878–1948). *See also* Krasovskiy ellipsoid
 cadastral surveying and, 1213
 geodetic surveying and, 479, 480, 982, 1592, 1639
 MIIGAiK and, 982, 983, 985
 Molodenskiy and, 981
 photogrammetric mapping and, 1109
 on projections, 1182, 1641
 topographic mapping and, 549
- Krasovskiy ellipsoid, 477, 481, 981, 982, 1589, 1604, 1639
- Kravtsova, V. I., 1216
- Krawciw, Bohdan (1904–1975), 247
- Krebs, Norbert (1876–1947), 341
- Krehbiel, Edward B., 353
- Kretschmer, Ingrid (1939–2011), 732–33
 entries by, 317–18, 338–40, 439–42, 548, 924–27, 1054–55, 1099–1102, 1674–76
 cartographic dictionaries by, 317
 on history of cartography, 610, 732
 on Imhof, 6
 on Peters projection, 1100
- Krige, D. G. (b. 1919), 694, 733, 1469
- Kriging, 394, 395, 502, 694, 733–35, 734, 1469
- Krisch, Charles B., 1050
- Kriz, Karel, entry by, 292–94
- Kroeger, A. L. (1876–1960), 411, 412
- Krogst, Peter van der, entry by, 728–29
- Krottendorfer, Heinz, 595
- Krüger, Louis (1857–1923), 1184
- Krumbein, William C. (1902–1979), 1428
- Krümmel, Otto (1854–1912), 339
- Krygiel, Annette J., 892
- Krygier, John, 80
 entry by, 73–84
- Kubitschek, Juscelino (1902–1976), 1353
- Kubrick, Stanley (1928–1999), 227
- Küchler, A. W. (1907–1999), 53, 127
- Kudryavtsev, M. K. (1901–1984), 935
- Kuiper, Gerard Peter (1905–1973), 792–93
- Kulldorff, Martin, 498
- Kümmerly, Arnold (1862–1931), 736
- Kümmerly, Gottfried (1822–1884), 735
- Kümmerly, Hermann (1857–1905), 736, 736, 1260
- Kupffer, Adolf Theodor (1799–1865), 983
- Kurath, Hans (1891–1992), 104, 780
- Kurdistan, 1006, 1007
- Kurds, 286
- Kurz, Louis (1833–1921), 736
- Kuwait. *See also* Middle East
 Iraqi invasion (1990), 1006, 1006
 political boundaries, 141, 164, 166, 166, 167
 topographic mapping, 1600
- Kuwait in World Maps*, 1006
- Lab-Log* (Harvard Laboratory for Computer Graphics and Spatial Analysis), 583, 583
- Labeling, 738–44. *See also* Automated name placement; Hand lettering; Mechanical lettering techniques
 automated name placement, 358, 375–78, 376, 377, 384, 505
 for cadastral surveying, 183
 cartographic style and, 1472, 1702
 display hardware and, 371, 747
 electronic cartography development
 impacts, 358, 371, 747–48
 Richard E. Harrison on, 580
- Imhof on, 375–76
 for in-vehicle navigation systems, 1718
 in National Geographic Society maps, 745, 746, 746, 996, 997, 1472, 1503
 in persuasive cartography, 1091, 1092
 reduction strategies, 1146, 1147
 for tactile maps, 1480, 1481
 typography, 744–49, 746, 747, 748, 1057–58, 1059
 visual perception and, 1057–59, 1059
 wax engraving and, 739–40, 744, 745, 1245, 1331, 1436, 1472, 1702
- Laboratoire de Cartographie (Paris), 6
- Laboratoire de graphique, 122
- Laboratory for Computer Graphics, Harvard University. *See* Harvard Laboratory for Computer Graphics and Spatial Analysis
- Land Labourde, Edward Dalrymple (1890–1962), 799
- Land Labourde, Jean, 272, 867, 1183, 1185
- Laclavère, Georges (1906–1994), 647, 648
- Lacmann, Otto (1887–1961), 1142
- LaCoste, Lucien (1908–1995), 530
- LaCoste, Yves (b. 1929), 543
- Ladd, Florence C., 811
- LADS (Laser Airborne Depth Sounder), 625, 824
- Lagrelius, Axel (1863–1944), 408
- Lake Seminole: Jim Woodruff Lock & Dam*, 1253
- Lake Survey, 831–32
- Lallemand, Charles (1857–1938), 22
- Lam, Nina Siu Ngan, 59, 205
 entry by, 437–39
- Lamb, Alastair (b. 1930), 169
- Lambert, Bruce Philip (1912–1990), 483
- Lambert, Johann Heinrich (1728–1777), 55, 1100, 1182, 1184
- Lambert conformal conic projection, 24, 871, 906, 1184–85, 1186, 1190, 1192
- Lamont Geological Observatory, 445, 533
- Land Change Modeler for Ecological Sustainability (LCM), 635
- Land Cover Map of Britain, 752
- Land cover maps, 751
- Land description methods, 1194–96, 1194, 1195, 1196
- Land Information New Zealand (LINZ), 188
- Land information systems (LIS), 856, 1212
- Land ownership, 279. *See also* Cadastral mapping; Cadastral surveying
- Land reform, 301, 1201
- Land Remote Sensing Policy Act (1992) (United States), 757
- Land surveying. *See* Surveying
- Land systems analysis, 749–51, 750, 1119, 1497
- Land Use and Its Patterns in the United States* (Marschner), 862
- Land Use and Natural Resource (LUNR) system (New York state), 490
- Land use and occupancy projects (LUOPs), 642
- Land use maps, 751–54, 753
 accuracy in, 14–15
 in administrative cartography, 17
 automated, 1289
 in colonial/imperial cartography, 255, 256, 257
 digital filters in, 58
 European Union, 417
 Japan, 730, 730
 Marschner, 862, 862
 Russian Federation, 1214, 1217
 taxation and, 1486
 urban mapping and, 1651
- Land Utilisation Survey (United Kingdom), 751
- Landau, Barbara, 1076

- Landen, David, 1106, 1550
- Landform maps, 1153, 1154–55, 1244, 1269. *See also* Physiographic diagrams
- Landkarte, Die* (journal), 1102
- Landsat (satellite), 754–58, 1283–84, 1284. *See also* Satellite imaging; Thematic Mapper
- Antarctica maps and, 68, 1284–85, 1544
- biogeographical cartography and, 1278
- Chen Shupeng's use of, 215
- conformal projections and, 272–73
- data handling/analysis and, 1289–90
- diazotype process and, 1306
- earth-from-space perspective and, 566
- feature extraction and, 1291
- GEOSPACE and, 548
- hydrography and, 628, 630
- images from, 756, 757
- instruments, 757
- land use maps and, 1289
- Large Area Crop Inventory Experiment, 1300
- map revision and, 1295
- meteorology and, 1280
- Multispectral Scanning System, 991–92, 1278, 1285
- NASA development of, 368, 754, 755, 756, 991–92, 1283
- National Geographic Society and, 997, 999
- photogrammetric mapping and, 1125
- photointerpretation and, 1120
- privatization, 756–57
- public access to cartographic information and, 1230
- resolution, 68, 368, 754, 1295
- Space Oblique Mercator Projection and, 1399
- systems overview, 755
- Landscape approach. *See* Land systems analysis
- Landscape architecture, 758–60, 759, 760
- Landscape metrics, 205
- Lang, Fritz (1890–1976), 226, 226
- Langage des géographes, Le* (Dainville), 610
- Lange, Friedrich, 542
- Lange, Henry (1821–1893), 1755
- Langevin, Paul (1872–1946), 1024
- Langhans, Paul (1867–1952), 1097
- Langran, Gail, 362
- Language maps. *See* Linguistic maps
- Lanier, Jaron (b. 1960), 1680
- Lanman, Jonathan T. (d. 1988), 247
- Lantmäteristyrelsen (Finland), 962
- Laos, 171. *See also* Southeast Asia
- Lapenta, Jorge César, entry by, 835–36
- Laplacian boundary delineation algorithm, 380
- Large Area Crop Inventory Experiment (LACIE), 1300
- Larsen, Jan Martin (b. 1938), 1044
- Larsgaard, Mary Lynette, entries by, 718–20, 765–71
- Laser printers, 507, 1325, 1429–30, 1434
- Laser technology. *See also* Lidar
- for electromagnetic distance measurement, 356, 460, 1222
 - for gravimetric surveys, 455
 - for hydrography, 625
 - laser printers, 507, 1325, 1429–30, 1434
 - for marine charting, 854
 - satellite laser ranging, 461, 477
- Laskowski, Piotr H., 1532
- Laslett, G. M., 734
- Latin America. *See also* Millionth Map; Pan American Institute of Geography and History; *specific countries*
- boundary surveying, 146–53, 148, 149, 618, 619, 664
- cadastral surveying, 1200–1205, 1202, 1203, 1204
- cartographic societies, 1408–9
- counter-mapping, 307, 307
- electronic cartography conferences, 387–89
- geodetic surveying, 147, 456, 468, 468–72, 470, 471, 662–66, 664, 665
- GIS adoption, 387–88, 388
- Global Positioning System, 468–70, 471, 472
- indigenous peoples, 641–42, 643
- political boundaries, 146–53, 151, 152
- political persuasive cartography and, 1162
- postcolonial cartography, 146, 301, 304, 1560
- road mapping, 1350–55, 1354, 1355
- topographic mapping, 1560–64, 1561, 1562, 1563, 1696
- Latitude/longitude. *See* Coordinate systems
- Lattice delineation, 381
- Laughlin, Harry Hamilton (1880–1943), 1233
- Lauría, Eduardo Andrés, entry by, 465–68
- Laurini, Robert (b. 1947), 634
- Laursen, Torkil (1920–2008), 1044
- Laussedad, Aimé (1819–1907), 1113, 1133
- Lautensach, Hermann, 723
- Lavrov, V. M., 982
- Law enforcement. *See* Crime mapping
- Law of the Sea, 760–62
- Arctic and, 76
 - boundary disputes and, 141
 - cartometry for, 203
 - geographical mapping and, 523
 - hydrography and, 629
 - marine charting and, 820–21, 828–29
- Lawnmower Man, The* (film), 1680
- Lawrence, David M., entries by, 393–96, 760–62, 1499–1500
- Laws, Frederick Charles Victor (1887–1975), 1117
- Layers. *See* Overlays
- LBS (location-based services), 369, 494–95, 816, 856, 1078, 1741
- Le Clerc, Jean (I) (d. 1544), 297
- Le Clerc, Jean (II) (d. 1581), 297
- Le Corbusier (Charles-Édouard Jeanneret-Gris) (1887–1965), 1159, 1161
- Le Gear, Clara Egli (1896–1994), 110, 772, 1759
- Le Guin, Ursula K. (b. 1929), 782
- Le Monnier, Franz von (1854–1925), 1675
- League of American Wheelmen (LAW), 1339
- League of Nations, 762–65, 764. *See also* Post–World War I settlement
- boundary surveying and, 155, 163, 169
 - International Hydrographic Organization and, 683
 - symbolic uses of cartography, 763, 764
- Leahy, Lamar R., 463
- Learmonth, A. T. A. (1916–2008), 404
- Learned societies. *See* Societies; *specific societies*
- Learning and Teaching with Maps* (Wiegand), 217
- Least-squares frameworks, 56, 1130, 1223
- Leavitt, Henrietta Swan (1868–1921), 84, 85
- Lebanon, 167. *See also* Middle East
- Lee, L. P. (1913–1985), 271, 271, 1185
- Lee, Willis T. (1864–1926), 1113, 1118, 1298
- Lees, Brian, 688
- Legal issues
- copyright traps, 285
 - intellectual property, 284–85, 654–59, 1228, 1230, 1754
 - marine charting and, 828. *See also* Law of the Sea
 - Russian Federation, 1377
- Legends. *See* Cartographic conventions; Symbolization
- Lehmann, Edgar (1905–1990), 97, 1412
- Leibniz, Gottfried Wilhelm (1646–1716), 55
- Leibniz-Institut für Länderkunde (Germany), 41
- Leica Photogrammetry Suite (LPS) (software), 1144
- Leighly, John (1895–1986), 1
- Leimer, Jude (b. 1955), 615
- Leisure Map Catalogue* (Ordnance Survey), 1450
- Leitner, Helga, 386
- Lelewel, Joachim (1786–1861), 335
- Lengagne, Guy (b. 1933), 650
- Lenin, Vladimir Il'ich (1870–1924), 101, 103, 240, 241, 935, 1766
- Lenox, James (1800–1880), 245
- Leonardo da Vinci (1452–1519), 1175
- Leppard, Henry M. (b. 1886), 568
- Less-developed countries (LDSc), 518, 641, 752, 1162. *See also* Postcolonial cartography
- Lettering. *See* Hand lettering; Labeling
- Letterists, 83
- Leuthner, Frederick, 50
- Leuzinger, Rudolf (1826–1896), 735, 736, 1267
- Levasseur, Émile (1828–1911), 194, 1516
- Leventhal, Norman B., 247
- Levertov, Denise (1923–1997), 785

Levine, Flora, 247
 Levine, John H., 247
 Levy, Louis Edward (1846–1919), 1150
 Levy, Max (1857–1926), 1150
 Lewis, A. D., 1576
 Lewis, Clinton (1885–1978), 1373
 Lewis, Dorothy Cornwell (b. 1899), 1759
 Lewis, G. J. (b. 1944), 811
 Lewis, G. Malcolm, 612, 615
 Lewis, Harold MacLean (1889–1973), 1159, 1160
 Lewis, Peirce F. (b. 1927), 311
 Lewis, Peter, entry by, 49–54
 Lewis, Philip H. (b. 1925), 397
 Lewontin, Richard C. (b. 1929), 1236
 Lewty, Simon (b. 1941), 814
Lexikon der Geographie (2001–2), 318
Lexikon der Geographie (Banske), 317
Lexikon der Geoinformatik, 318
Lexikon der Geowissenschaften, 318
Lexikon der Kartographie (Witt), 317
Lexikon der Kartographie und Geomatik, 318
Lexikon der Vermessungskunde (Werkmeister), 317
Lexikon zur Geschichte der Kartographie (Kretschmer, Dörflinger, & Wawrik), 317, 610
 Lexis-Nexis, 19
 Ley, David, 613, 811
 Li Deren, entry by, 1780–82
 Li Qinghai, 1780
 Liao Ke, 1784
 Libby, Orin Grant (1864–1952), 350
 Liben, Lynn S., 217
 entry by, 1074–80
 Libraries, map. *See* Map libraries; National map collections
 Library of Congress (United States), 72, 320, 766, 771, 1452
 Lidar (light detection and ranging), 625–26, 626, 774–76, 775
 for coastal mapping, 236, 237, 628
 development of, 774
 for emergency planning, 391
 for marine charting, 827
 for photogrammetric mapping, 1136
 Lidmar-Bergström, Karna (b. 1940), 1262, 1263
 Liebenberg, Elri, entries by, 472–75, 955–61, 1205–10, 1409–10, 1576–79
 Liechtenstern, Theodor von (1799–1848), 1755
 Lierz, Wolfgang, entries by, 1359–63, 1706–8
 Lietuvos kartografių draugija (Lithuania), 1414
 Lietuvos matininkų asociacija (LMA) (Lithuania), 1414
 Lifchez, Raymond, 1742
Life and Death of the Mayor of Casterbridge, The (Walker), 783
 Light, Richard Upjohn (1902–1994), 51
 Lighthill, Sir Michael James (1924–1998), 418

Ligue des Bibliothèques Européennes de Recherche (LIBER), 768, 772, 1423
 Likaglobe (Fisher), 582
Limits of Oceans and Seas (IHO), 514–15
 Lincoln Highway Association (LHA), 1343
 Lindbergh, Charles A. (1902–1974), 24, 1368
 Linden, J. A. van der, 609
 Lindgren, Carlos Ernesto S., 583, 868
 Lindop, Grevel (b. 1948), 785
 Line generalization. *See* Line simplification
 Line plotters. *See* Plotters
 Line simplification, 3, 59, 371–72, 385
Linguistic Atlas of New England, 102, 104, 780
 Linguistic maps, 776–82
 dialect, 778–81, 779, 780, 781
 ethnographic, 776–78, 778, 779
 in school atlases, 107
 Linguistics, 57
 Linked micromaps, 422, 422
 LINMAP, 1440
 Linné (Linnaeus), Carl von (1707–1778), 1232
 Linton, David L. (d. 1971), 1114
Lion of Boaz-Jachin and Jachin-Boaz, The (Hoban), 785
 Lippmann, Walter (1889–1974), 1049, 1234
 Lipskiy, Yu. N. (1909–1978), 793
 LIS (land information systems), 856, 1212
 Lis-maps (listserv), 1422
List of Geographical Atlases in the Library of Congress, with Bibliographical Notes, A (Phillips), 773
 Listing, Johann Benedict (1808–1882), 425
 Literacy rates. *See* Thematic mapping
 Literary cartography, 988, 989
 Literature and cartography, 782–86, 783. *See also* Narrative and cartography
 facsimile atlases and, 91
 literary cartography, 988, 989
 lunar and planetary mapping and, 792, 796
 narrative and, 986, 988
 orientation maps, 1727, 1727
 pedagogic role of cartography and, 216, 784, 784
 Lithography, 1308, 1311, 1314, 1316. *See also* Photolithography
 cartographic conventions and, 273–74, 275
 choropleth symbolization and, 221
 chromolithography, 258, 1151, 1316, 1322
 for colonial/imperial cartography, 255
 color reproduction and, 258, 1151, 1316, 1318, 1322
 in historical cartography, 599
 labeling and, 738, 744, 745
 map design implications, 1148
 for marine charting, 849
 pen-and-ink drafting and, 331, 332
 prepress techniques for, 1326
 for relief depictions, 1267

for Swiss topographic mapping, 180
 topographic mapping and, 1540
 visual perception and, 1057
 for wall maps, 1694
 Lithuania, 1414
 Little, Charles Henry, 1151–52
Little Red Caboose, The (Gergely), 217
 Liu Zhuo (544–610), 694
 Livingstone, David (1813–1873), 365, 1401
 Lizars, Daniel, 701
 Lizars, William Home (1788–1859), 701
 Lloyd, Malcolm, 327
 Lloyd, Robert, 223, 1080
 Lloyd, Trevor (1906–1995), 247
 LLR (lunar laser ranging), 461, 477
 Lo, C. P., 205
 Lobben, Amy, entry by, 343–47
 Lobeck, Armin K. (1886–1958), 787–88
 influence on Thrower, 1525
 perspective maps by, 1023
 physiographic diagrams, 788, 1153–54, 1154, 1155, 1244, 1269, 1500
 post-World War I settlement and, 701, 787, 788, 1050
 public transportation maps, 1729
 Local Emergency Planning Committees (LEPCs), 592
Local Planning Administration (Segoe), 752
 Location-allocation problems, 379–80, 499, 500
 Location-based services (LBS), 369, 494–95, 816, 856, 1078, 1741
 Location theory, 1158–59
Locational Analysis in Human Geography (Haggett, Cliff, & Frey), 1470
 Lock, C. B. Muriel (b. 1914), 1452
 Lockridge, Ross (1914–1948), 782
 Loeb-Larocque, Louis (1913–1996), 249
 LOEMI (Laboratory of Optronics, Electronics and Mechanics for Instrument Design), 650
 Logo-maps, 301, 1001
 Lois, Carla, entries by, 146–53, 1560–64
 London Underground Map (the Diagram) (Beck), 788–92, 1516
 administrative cartography and, 1651
 influence of, 788, 1239, 1731
 map design, 788–90, 790
 perception/cognition and, 1069
 predecessor of, 789
 sense of place and, 814
 social theory on, 1403
 Lonely Planet series, 1637
 Long, John H., entries by, 92–96, 788–92, 1375–76
Longitude (Sobel), 492
 Longman Geoinformation (company), 1144
Look at the World (Harrison), 33–34, 1505, 1506, 1507
Look of Maps, The (Robinson)
 academic cartography and, 2, 345, 346
 on color, 263–64
 communication paradigm and, 1366
 on labeling, 748

- on perception/cognition, 1056, 1058, 1063, 1068
 psychophysics and, 1083
 on subject testing, 1072
 on thematic mapping, 1505, 1509
- Loomis, Alfred L. (1887–1975), 492
- Loomis, J. M., 1718
- Loose-leaf format, 116
- Loper, Herbert B. (d. 1989). *See* Loper-Hotine Agreement
- Loper-Hotine Agreement (1942), 886–87, 899, 964–65, 971, 1778
- Lopez, Xavier R., 268
- López de Gómara, Francisco (1511–1566), 1175
- Loran (long-range navigation), 827, 843, 1014, 1015, 1015, 1024
 feature extraction and, 1292
 lattice overlays for, 830
 World War II and, 624, 819, 1014, 1699
- Lord of the Rings, The* (Tolkien), 91, 782
 “Losses” (Jarrell), 785
- Louis, Renee Pualani, 286
- Lovett, Robert W. (1913–1996), 1420
- Low-error projections, 1174, 1175, 1182–84, 1184
- Lowell, A. Lawrence (1856–1943), 1050
- Lowery, Woodbury (1853–1906), 246
- Lowry model, 499
- Loy, William G. (1936–2003), 105
- Lucas, Francis Robert, 626, 627
- Lucht, Roland (b. 1964), 200
- Ludi weixing yingxiang zhongguo dixue fenxi tuji* (Atlas of geoscience analyses of Landsat in China), 215
- Luftbild und Luftbildmessung* (journal), 1118
- Luftfahrtkarte Aeronautical Chart ICAO* (Institut für Angewandte Geodäsie), 27
- Lunar and planetary mapping, 792–96, 794
 geodetic surveying and, 485–88, 487
 geographical discovery and, 1389, 1390
 geographical mapping and, 522
 globes, 561, 563
 Hallwag Kümmerly+Frey AG, 573
 mass marketing and, 861
 satellite imaging and, 1283, 1285
- Lunar Astronautical Chart (LAC), 793
- Lunar laser ranging (LLR), 461, 477
- Lund Observatory Tables*, 85
- Lundqvist, Magnus, 97, 407
- Lycos Maps, 20
- Lynch, Kevin (1918–1984), 811, 1060, 1067, 1068, 1068, 1161, 1403
- Lyon, Thoburn C., 24
- Lyons, Henry George (1864–1944), 1207
- M (film) (Lang), 226, 226
- M&S Computing. *See* Intergraph Corporation
- Maanmittaushallitus (Finland), 117, 593
- MacChoro (software), 1431
- MacChoro II (software), 63
- MacDonald, Alexander E. (1892–1977), 247
 entry by, 1224–26
- MacDonald, Alistair, entries by, 153–58, 620–21, 1224–26
- MacEachren, Alan M. (b. 1952)
 academic cartography and, 4, 346
 animation and, 61
 on choropleth symbolization, 223
 on exploratory data analysis, 422
 on geovisualization, 1686
 psychology research and, 1080
 on subject testing, 1073
 virtual reality and, 1682
- Macedonia, 162
- Macek, John Brent, entry by, 830–35
- Macfarlane, Robert (b. 1976), 988
- MacGIS (software), 1442
- Mack, Pamela Etter (b. 1955), 755
- Mackay, Graham, 1372
- Mackay, J. R. (b. 1915), 525
- Mackinder, Halford John (1861–1947), 413, 415, 539, 540, 543–44, 715, 1181
- Maclean's* (magazine), 1749
- MacLeod, Malcolm (1882–1969), 620, 897, 1033, 1034–35
- Macmillan (company), 104, 105
- Macmillan's Atlas for South-East Asia*, 102
- Macrogeographic Systems Research Workshop, 1701
- Madagascar, 1572. *See also* Africa
- Maddrell, Avril (b. 1964), 1758, 1760
- Magazines. *See* Journalistic cartography
- MAGERT (Map and Geographic Round Table, American Library Association), 1407, 1423
- Maggs Brothers (London), 246, 248
- Magini, Giovanni Antonio (1555–1617), 42
- Magnetic declination, 1697
- Magnetic mapping, 530, 531, 1025, 1026
- Magnetic Maps 1975 of the Antarctic* (Kokudo chiriin), 68
- Magnitskiy, V. A. (1915–2005), 983
- Magnus, Olaus (1490–1557), 785
- Magsat, 537
- Maguire, D. J., 403
- Magyar Földmérési, Távérzékelési és Térképzési Társaság (Hungary), 1414
- Magyar Földrajzi Társaság (Hungary), 1414, 1418
- Magyar Tudományos Akadémia (Hungary), 1099
- Mahalangur Himal: Chomolongma–Mount Everest*, 595, 596
- Mahan, A. T. (1840–1914), 33, 539, 540
- Mair, Frank (b. 1969), 797, 1692
- Mair, Kurt (1902–1957), 797, 1692
- MairDumont (publisher), 798, 1338
- Mairs Geographischer Verlag (publisher) (Germany), 797–98, 1338, 1361, 1362, 1738
- Making of America, The* (National Geographic Society), 999
- Making of the English Landscape, The* (Hoskins), 598–99
- Maksimov, Ivan F. (1894–1939/40), 935
- Malawi, 156–57, 157. *See also* Africa
- Malaysia, 169, 172, 173
- Maling, D. H. (1923–1998), 798
 on accuracy, 14
Cartographic Journal and, 200
 on cartometry, 202–3, 204, 205, 798
 on projections, 1100, 1172, 1186
- Malinowski, Halina W., 1535
- Malle, Louis (1932–1995), 988
- Mallet, Robert (1810–1881), 530
- Mallory, George (1886–1924), 1418
- Malý politický atlas světa*, 731
- Man's Domain* (Thrower), 113, 1525
- Mandelbrot, Benoit B. (1924–2010), 59, 435, 438, 869
- Mangani, Giorgio, entry by, 42–43
- “Manhattan” (Horowitz), 783
- Mannerfelt, Carl M:son (1913–2009), 408–9, 667. *See also* Carl Mannerfelt Gold Medal
- Manni, Franz, entry by, 445–48
- Manning, John, entries by, 63–72, 483–85, 1217–19, 1612–15
- Manson, Steven M., entry by, 269–70
- Manual of Photographic Interpretation* (Colwell), 1114, 1120
- Map
 definitions of, 798–801, 806, 807, 1095, 1296–97, 1688, 1764
 as metaphor, 806–8
 typologies of, 801–2
- “Map, The” (Bishop), 785, 787
- “Map, The” (Oden), 785
- Map algebra, 496
- Map analysis. *See* Cartometry; Spatial analysis
- Map Analysis Package (software), 501
- Map and Geographic Round Table, American Library Association (MAGERT), 1407, 1423
- Map art. *See* Art and cartography
- Map availability, 1450–52, 1451
- Map collecting
 Europe, 248–51, 249, 250
 history of cartography and, 608, 613–14
Imago Mundi and, 636
 map theft and, 72
 North America, 245–48, 247
 prices, 247, 248, 250
- Map Collector (journal), 72, 608, 1535
- Map Collectors’ Circle (Tooley), 250, 608
- Map Collectors’ Circle (United Kingdom), 1420
- Map Communication Model (MCM). *See* Communication paradigm
- Map Curators Group (MCG), British Cartographic Society, 1421–22
- Map dealers, 317, 525, 608, 1420, 1535
 map availability and, 1450
 map collecting and, 245, 246, 247, 248, 249, 249, 250
- Map Descriptive of London Poverty, 1898–9 (Booth), 314, 315–16

Map design. *See also* Cartographic style; Color; Drafting; Labeling; Map design for photomechanical processes; Map design for topographic mapping; Projections; Relief depictions; Standards for cartographic information; Symbolization; Typography
 for airline maps, 22, 37, 38
 art and, 79
 Bertin on, 122–23, 123
 counter-mapping and, 286–87, 287
 democratization of cartography and, 1321, 1511, 1511
 drawing instruments and, 329
 electronic cartography development impacts, 808–9, 1064, 1333, 1335, 1509
 Experimental Cartography Unit and, 419
 geopolitical cartography and, 541–42, 544
 for hazard/risk mapping, 588–89
 for historical atlases, 92–93
 history of cartography and, 610
 IHO marine charting standards, 822, 836, 843, 844, 853, 1648
 indigenous cartography, 286–87, 287
 Justus Perthes, 721
 London Underground Map, 788–90, 790
 Maling on, 798
 for military mapping, 895–96, 945, 1032, 1033
 perception/cognition and, 1056–57, 1063–65, 1068, 1071–73, 1074, 1082–84, 1509
 proportional symbol mapping and, 1516
 for railroad maps, 1472, 1729
 for recreational maps, 1250
 Royal Geographical Society, 1372, 1372
 for school atlases, 107
 for television, 1489
 for thematic mapping, 345, 1505, 1507, 1507
 Woodward on, 1761
 Map design for photomechanical processes, 1146–53, 1308–10, 1321, 1331–35.
See also Color separation; Halftones; Mechanical lettering techniques; Photomechanical processes; Scribing
 base materials for, 330, 1150, 1310–11, 1328
 Ben Day tints, 334, 1148, 1149, 1309–10, 1314, 1327
 collage techniques, 1146–47, 1148
 drawing instruments and, 326, 1146, 1147, 1310
 geographic information systems and, 263, 504–10, 505, 506, 507, 508, 509, 527, 804, 1311
 guide images, 1148
 hand lettering, 739
 lithography and, 1148
 pen-and-ink drafting, 331–32, 333, 744, 804, 1148, 1150, 1308
 photolithography and, 1148, 1320, 1333

reduction strategies, 333–34, 745, 810, 1146, 1147, 1308–9
 sketch maps and, 802, 1146
 thematic mapping and, 1505
 typography, 745–49, 746, 747, 748, 1331
 Map design for topographic mapping, 1551
 colonial/imperial cartography and, 1547–48, 1572, 1573
 color in, 1540, 1541, 1542, 1547, 1587, 1589
 early twentieth century, 1540, 1541, 1547, 1550–51
 standardization and, 1472, 1547, 1579
 Western Europe, 647, 1579–81, 1580, 1585
 Map Finisher (software), 666
 MAP-for-the-PC (software), 388
Map Forum (Baynton-Williams), 1535
 Map Generalizer (software), 666
Map Guide to the U.S. Federal Censuses (Thorndale & Dollarhide), 94, 96
 Map History (website), 1419
 MAP III program, 1663, 1664
 “Map in, map out” (MIMO), 267–68
 Map keys. *See* Cartographic conventions; Symbolization
 Map-Labeling Bibliography, 375
 Map layers. *See* Overlays
 Map libraries, 765–71, 767. *See also* Cartobibliography
 American Geographical Society and, 49
 cartobibliography and, 190–91
 digital, 318–20, 319, 645
 history of cartography and, 613
 map availability and, 1450–52, 1451
 map theft and, 72–73
 public access to cartographic information and, 1229, 1230
 Ristow’s role, 1337–38
 societies for, 1421–23
 women in cartography and, 1759
 “Map Makers Are Human” (Wright), 1780
 Map matching, 1718, 1720
 “Map of . . . Essex in England, A” (Levertov), 785
Map of Hispanic America. *See* Millionth Map
Map of Interior Basin Drainage (Martonne), 865
Map of Radio Wave Emissions (Reber), 88
Map of the Antarctic (American Geographical Society), 51
Map of the Orient, 707, 707
Map of the Universe (Gott et al.), 84, 86–87, 89
 “Map of Verona, A” (Reed), 785
 Map pins, 288, 814–16, 815, 1151
 Map production. *See* Map design; Map reproduction
Map Projection Transformation: Principles and Applications (Snyder, Yang & Tobler), 1399–1400
Map Projections (Hinks), 597
Map Projections—A Working Manual (Snyder), 1399, 1431
 Map publishers. *See also* John Bartholomew & Son; Justus Perthes; Michelin Maps and Guides; Rand McNally & Company
 Artaria & Co., 439, 440
 Atlas Permanent, 1238
Cartografia (Kartográfiai Vállalat), 1238
 CartoTravel, 1250
 Cartur Mapas, 1353
 De Dion Bouton, 879
 de Dios Editores, 1353
 DeLorne Map Company, 1349, 1733
 Denoyer-Geppert, 1503, 1694
 Dorling Kindersley, 1628, 1629, 1634
 Editora Abril, 1353–54
 Ernst Klett Schulbuchverlag, 724, 1099
 Esselte Kartor AB, 407–9, 407–9, 667
 Falk-Verlagsgruppe, 797, 1336, 1337
 Freytag-Berndt und Artaria KG, 439–42, 1694
 G. F. Cram, 1702
 G. Philip & Son, 1694
 G. W. Bacon & Co., 738–39
 General Drafting Company, 36, 1246, 1345, 1348, 1351–52, 1353, 1354
 Geographers’ A-Z Map Company, 1054
 Geographia, 119
 Geographische Verlagsanstalt Justus Perthes Darmstadt, 723–24
 George F. Cram, 1503
 George H. Walker & Company, 1340
 George Philip & Son, 1147–48, 1252, 1733
 GEOSPACE, 548
 GEOSPACE Beckel Satellitenbilddaten GmbH, 548
 Guía Roji, 1353
 H. M. Gousha Company, 36, 616–18, 616–18, 617, 1246, 1345, 1346–47, 1348, 1349, 1351
 Hallwag Kümmerly+Frey AG, 573, 573, 574, 737, 797–98
 Hammond Map Company, 574–77, 574–77, 871, 1503, 1694
 Hema Maps, 1363
 Istituto Geografico De Agostini, 696–99, 696–99, 697, 698, 1616
 Karl Wenschow GmbH, 1694
 Kartographia Winterthur, 1041, 1042
 Klett-Perthes Verlag, 724
 Kümmerly+Frey AG, 573, 735, 735–37, 736, 737, 1260
 MairDumont, 798, 1338
 Mairs Geographischer Verlag, 797–98, 797–98, 1338, 1361, 1362, 1738
 MapStudio, 1358, 1359
 marketing, 856, 857, 859
 Nystrom, 1503
 Octavo, 91
 Orell Füssli Kartographie AG, 1040–43, 1040–43, 1041, 1042, 1043, 1318

- Poole Brothers, 1702
 Pressegeographie, 1238
 R. A. Broadbent, 1363
 R. R. Donnelley & Sons, 1095, 1375,
 1375–76, 1436
 Ravenstein Verlag, 1249–50, 1249–50,
 1362, 1707
 Robinson's, 1363
 Stanfords, 1694
 Survey Map Company, 46, 1340
 Taride, 878
 Thomas Brothers Maps, 1714
 Universal Press, 1363
 VanDam, 1714
 VEB Geographisch- Kartographische
 Anstalt Gotha, 723
 VEB Hermann Haack Geographisch-
 Kartographische Anstalt Gotha, 723,
 724
 Velhagen & Klasing, 721, 723, 1673–74,
 1674, 1690
 Verlag Ed. Hörlzel, 1674–76
 W. & A.K. Johnston, 701
 Wagner & Debes, 723, 1690–91, 1691,
 1692, 1693
 Westermann Verlag, 1694, 1695,
 1754–55
 Map reading. *See* Communication paradigm;
 Perception/cognition
 Map reproduction, 1305–37. *See also*
 Engraving; Lithography; Map design
 for photomechanical processes; Map
 reproduction for topographic map-
 ping; Map revision; Photomechanical
 processes; Printing; Scribing; Wax
 engraving
 atlases, 1690
 cartographic conventions and, 273–74,
 275, 278
 cartographic visualization and, 1684
 choropleth symbolization and, 221, 509,
 1511–13
 for coastal mapping, 237–38
 for colonial/imperial cartography,
 322–23, 1146
 for facsimile atlases, 91
 folding strategies, 24, 655, 879–80,
 1336–38, 1336–38, 1337, 1336, 1707
 geographic information systems and, 263,
 504–10, 505–6, 505, 506, 507, 508,
 509, 527, 804, 1311
 geologic mapping and, 527
 for globes, 563–65, 564, 565
 for historical atlases, 92
 John Bartholomew & Son, 703
 journalistic cartography and, 707, 716,
 1311, 1312
 Justus Perthes, 721
 mapping software and, 1427, 1428, 1429
 for marine charting, 827, 837, 838, 838,
 839, 847, 849, 851, 852
 mass marketing and, 860, 861
 for military mapping, 897–98, 925, 935
 National Geographic Society, 997
 one-off processes for, 330, 1146, 1305,
 1305–7, 1306, 1307, 1311
 for orienteering, 1043
 prepress techniques, 1326–30
 relief depictions and, 1267, 1268
 satellite imaging and, 1335, 1335
 steps in, 1152
 surfaces for, 13, 204, 1048–49, 1306,
 1310–11, 1712. *See also* Cloth maps
 SYMAP and, 506, 509, 1477, 1478
 tactile maps, 1723–24, 1725
 television and, 715
 visual perception and, 1056, 1057
 wall maps, 1694
 World War I, 1331, 1552
 World War II, 804, 1146, 1313, 1331,
 1698, 1779
 Map reproduction for topographic mapping,
 1540
 Eastern Europe, 1589
 Switzerland, 180–81
 United Kingdom, 1033–34, 1309, 1310–
 11, 1314, 1331, 1332, 1333, 1551
 United States, 1310, 1322
 Map revision
 animation for, 62, 62
 in British military mapping, 898
 cadastral mapping, 185
 cartographic visualization and, 1684
 electronic cartography development
 impacts, 270
 hydrography and, 629
 Internet and, 1753
 marine charting and, 1434
 photogrammetric mapping and, 1550
 railroad maps, 1728–29
 for road mapping, 1339, 1345
 satellite imaging for, 1294–98, 1295,
 1296, 1297
 in Swiss topographic mapping, 180–81
 temporal dynamics and, 1528
 weather maps, 1749
 World War I and, 1294, 1772–74, 1774
 Map societies, 1419–21
 Map Society of British Columbia, 1420
 Map surfaces, 13, 204, 1048–49, 1306,
 1310–11, 1712. *See also* Cloth maps;
 Drawing media
 Map theft, 72–73
 Map trade. *See* Map dealers; Map publishers
 Map-use skills, 217, 1074–80, 1075, 1077,
 1078, 1079, 1080
 Mapa Topográfico Nacional (Spain), 158,
 651–52, 652, 653
 MapAnalyst (software), 205
Mapas de grupos indígenas (Ecuador), 641
 Mapbacks, 783
MapForum (journal), 72
 MapInfo (company), 20, 378, 1431, 1442
 Maple (software), 869
 Maplex (software), 378, 706
Mapmaker, The (Slaughter), 785
Mapmaker's Dream, A (Cowan), 785
Mapmakers, The (Wilford), 609
*Mapmakers of the Sixteenth Century and
 Their Maps* (Karrow), 317
 "Mappa Mundi" (Lindop), 785
Mappamundi, 194
 Mappamundi (London) (dealer), 250
 "Mappemonde" (Birney), 785
Mapping Census 2000 (Brewer & Suchan),
 1437
Mapping Information (Fisher), 583, 800
 Mapping Project (Pennsylvania State University), 217
Mapping Sciences and Remote Sensing
 (journal), 719
 Mapping Sciences Institute, Australia
 (MSIA), 1414
 "Mapping the Postmodern" (Huyssen), 807
 MAPPLAN. *See* Inter-American Geodetic
 Survey
 MapPoint (software), 1433
 MapQuest (web-based wayfinding service),
 816–18, 817, 1376, 1739, 1753. *See
 also* Web-based wayfinding
 advertising and, 20
 census data and, 210, 810, 816
 customization and, 293
 geocoding and, 450
 in-vehicle navigation systems and, 1740
 mapping software and, 1434
 marketing and, 859, 861
 personalization and, 293
 public access to cartographic information
 and, 1231
Maps (Farah), 785
Maps & Civilization (Thrower), 1525
Maps & Man (Thrower), 610, 1525
Maps and Diagrams (Monkhouse & Wilkinson), 341, 344, 1466, 1513
Maps and Map-Makers (Tooley), 246, 249,
 1535
Maps and Prints for Pleasure and Investment
 (Gohm), 247
Maps and Survey (Hinks), 597
Maps and the Internet (Peterson), 1094
Maps and Their Makers (Crone), 609
 Maps in literature. *See* Literature and
 cartography
*Maps of the Imagination: The Writer as
 Cartographer* (Turchi), 785
 Mapsat (automated system), 1285
 Mapsellers (dealer), 250
 MapStudio (South Africa) (publisher), 1358,
 1359
 Maptext (company), 378
 Maptitude for Redistricting Software, 500
 MAPublisher (software), 1436
 MapViewer (software), 1515
 Marble, Duane F. (b. 1931), 4, 398, 493, 507
 entry by, 488–92
 Marbut, Curtis Fletcher (1863–1935), 1444
 Marchant, Frank, 1028
 Margerie, Emmanuel de (d. 1953), 444

- Marginalization. *See* Exclusionary politics
- Marine charting, 818–55, 821. *See also* Bathymetric mapping; Coastal mapping; Hydrography; IHO marine charting standards; Marine charting military development and applications
- Argentina, 835–36
- Australia, 854–55
- Canada, 829–30
- Chinese military mapping and, 943–44, 944, 945
- colonial/imperial cartography and, 842
- color in, 238, 821, 822, 823, 824, 826–27, 833, 834, 839, 841, 853
- coordinate systems for, 141, 236, 819
- electronic. *See* Electronic marine charting
- Europe, 843–46, 845
- France, 840, 842–43, 844
- geographical discovery and, 1392
- for geomorphology, 822, 826
- gravimetric surveys and, 839
- International Hydrographic Chart, 680–82, 681
- Japan, 849–54, 850, 851, 854
- map reproduction for, 827, 837, 838, 838, 839, 847, 849, 851, 852
- mass marketing and, 861
- military mapping and, 909, 912, 918, 943–44, 944, 945
- prime meridian and, 1167
- projections for, 820, 826, 833, 844, 871, 1190–91
- SOLAS, 632, 685, 828, 1017, 1433–34
- Soviet Union, 818, 818, 846–49, 849
- United Kingdom, 836–40, 837, 838, 839, 840, 841
- United States, 830–35, 833, 834, 835
- Marine charting military development and applications, 825
- Cold War, 842
- WECDIS, 823, 826
- World War I, 831, 833–34, 837, 846, 852
- World War II, 819, 830, 831, 832, 834, 838–39, 847, 852, 854
- Marine surveying. *See* Hydrography
- Marinelli, Olinto (1874–1926), 923, 1050, 1619
- Maritime and Coastguard Agency (United Kingdom), 628
- Mark, David M., 374
- Marketing of geospatial data, 369, 855–60, 857, 1037, 1039
- Markham, Clements R. (1830–1916), 1371
- Markov simulation, 497
- Marks, Adolf Fëdorovich (1838–1904), 1690
- Marks, Joe (b. 1961), 377–78
- MARPLOT (Mapping Applications for Response, Planning and Local Operational Tasks) (software), 592
- Mars, maps of, 793. *See also* Lunar and planetary mapping
- Marschner, Francis Joseph (1882–1966), 862–63, 863
- Marshall, George C. (1880–1959), 1030
- Marshall, Richard, 83
- Marston, James R., 1724
- Martel, E.-A. (1859–1938), 207
- Martin, Bernhard (1889–1983), 778
- Martin, C. G. C., 252
- Martin, Ellis (1881–1977), 1332, 1333
- Martin, Geoffrey J., entries by, 700–701, 1049–53, 1415–17
- Martin, Lawrence (1880–1955), 863–64
- Martin de Moussy, V. (1810–1869), 1560
- Martis, Kenneth C. (b. 1945), 94
- entry by, 349–55
- Martonne, Emmanuel de (1873–1955), 121–22, 411, 788, 864–67, 865, 866, 1050, 1418
- Marx, Robert W. (d. 2009), 450
- entry by, 207–12
- Marxism, 544, 1766
- Maryland Automation Geographic Information (MAGI) system, 398
- Maskelyne, Nevil (1732–1811), 454
- Mass marketing of maps, 860–62
- Massonnet, Didier, 537
- Mathematica (software), 869
- Mathematics and cartography, 867–70. *See also* Analytical cartography; Conformal projections; Coordinate systems; Interpolation; Statistical mapping; Statistics and cartography
- choropleth symbolization and, 223
- fractal representation, 435, 438–39, 438, 869, 1385
- geometry, 55, 59–60, 202, 496, 868
- projections and, 867, 869, 1172, 1399
- Mather, Alexander S., 436
- Matheron, Georges (1930–2000), 502, 694, 733, 734
- Mathews, W. F., 1050
- Mathisen [Mathisen], Hans Ragnar (b. 1945), 642
- Mattern, H. W., 1305
- Matthews, Drummond H. (1931–1997), 1025
- Mau Mau uprising (1952–60), 322, 323, 902, 1566
- Maud* (ship), 74
- Maunsell, Francis Richard (1861–1936), 895, 966–67, 1598, 1697
- MAUP (modifiable areal unit problem), 498–99, 1468, 1470
- Maure, F. Vázquez, 97
- Mauro, Fra (ca. 1400–1460), 785
- Maury, Matthew Fontaine (1806–1873), 870, 1392
- Mawson, Douglas (1882–1958), 64
- Maximum difference algorithm, 380, 381, 446
- Maximus Poems, The* (Olson), 783
- May, Jacques M. (1896–1975), 51, 404, 404, 405
- Mayakovskiy, Vladimir (1893–1930), 1767, 1769
- Mayer, René (b. 1925), 266
- Mayr, Georg von (1841–1925), 130, 130
- Mazamas (United States), 1416
- MBES (multibeam echo sounding), 627, 820, 843, 852, 853
- McArthur, Stuart, 415, 416
- McArthur's Universal Corrective Map of the World*, 415, 416
- McBryde, F. Webster (1908–1995), 1172, 1193
- McBryde-Thomas flat-polar quartic projection, 1193, 1503
- McCall, Nathan, 1177, 1178
- McCallum, William Charles, 72
- McCay, Winsor (1867/68–1934), 226
- McCleary, George F., 3, 4, 298
- McClure, Robert John Le Mesurier (1807–1873), 74
- McCue, Gerald M. (b. 1928), 584, 585
- McCune, Shannon [Boyd-Bailey] (1913–1993), 247, 1244
- McDermott, Paul D., 21
- entry by, 18–22
- McEvedy, Colin, 314
- McGrath, Gerald, 687
- entries by, 183–89, 321–25, 855–60, 1484–87
- McGregor, Tracy W. (1869–1936), 246
- McHaffie, Patrick H., entry by, 1659–66
- McHarg, Ian L. (1920–2001), 267, 397, 496, 758, 760, 1255, 1439
- McKay, Edward J., entry by, 452–53
- McKinzie, Robert S., 431
- McKinzie, Steven, entry by, 430–33
- McLaughlin, Donal (b. 1907), 582
- McLuhan, Marshall (1911–1980), 1389, 1750
- McMaster, Robert B. (b. 1956), 386
- entries by, 1–6, 371–75, 382–85, 524–26, 568
- analytical cartography and, 5, 55
- on generalization, 59, 371
- on geography and cartography, 525
- Jenks and, 3
- McMaster, Susanna A., 55
- entry by, 1–6
- MCM (Map Communication Model). *See* Communication paradigm
- McNally, Andrew (I) (1836–1904), 1244–45, 1246
- McNally, Andrew (II) (1886–1954), 1247
- McNally, Andrew (III) (1909–2001), 247, 1247
- McNally, Andrew (IV) (b. 1939), 1247
- Meacham, James E., entry by, 343–47
- Meade, Melinda S., 195
- Meadlock, Jim, 666
- Measurement. *See also* Electromagnetic distance measurement; Geodesy; Photogrammetric mapping
- accuracy and, 13, 14
- cartometry, 202–6, 203, 204, 205, 798
- drawing instruments and, 326–27
- tacheometric, 161, 187, 925, 1156, 1156, 1549
- Measurements from Maps: Principles and*

- Methods of Cartometry* (Maling), 202, 798
- Mechanical lettering techniques
dry transfer lettering, 334, 1150, 1333
hand lettering aids, 738–39, 740, 741
for military mapping, 886
photocomposition, 743, 744–45, 997
phototypesetting, 183, 742–43, 742, 743, 1150, 1314, 1333
scribing and, 739, 1396
stamping, 740–41, 742
stick-up lettering, 334, 742, 743, 744, 1146, 1148, 1149, 1150
topographic mapping and, 1551
typewriters, 741–42, 742
wax engraving, 739–40, 744, 745, 1245, 1331, 1436, 1472, 1702
- Mechanical pencils, 327–28
- Medallion World Atlas* (Hammond Map Company), 576
- MEDEA (Measurement of Earth Data for Environmental Analysis), 1670
- Media. *See* Journalistic cartography
- Medical cartography. *See* Epidemiological maps
- Medieval Maps* (Harvey), 613
- Mediterranean Cruise, The* (Jenkins), 1623
- Medvedev, E. M., 1216
- MEGRIN (Multipurpose European Ground-Related Information Network), 179, 266–67, 417, 1586
- Mehrsprachiges Wörterbuch für Photogrammetrie* (Deutsche Gesellschaft für Photogrammetrie), 317
- Meili, Carl (1871–1919), 1263
- Meinertshagen, Richard (1878–1967), 1774
- Meinesz, F. A. Vening, 455, 459, 463
- Meinig, D. W. (b. 1924), 604, 605, 758
- Meissl, Peter (1934–1982), 460
- Mellon, Paul (1907–1999), 247, 1678–79
- Mende, Aleksandr I. (1800–1868), 550, 935, 1380
- Mendenhall, Thomas C. (1841–1924), 455
- Meng, Liqiu (b. 1963), 344
entry by, 942–48
- Mennis, Jeremy L., 365
- Mental mapping, 811
- Mentzer, Thure Alexander von (1807–1892), 1515
- Mercator, Gerardus (1512–1594), 63–64, 90, 91
- Mercator projection, 870–72, 872, 1173, 1179. *See also* Universal Transverse Mercator (UTM) coordinate system
for aeronautical charts, 1189
air-age globalism and, 33, 243
boundary disputes and, 139
as cartogram, 193
Cold War and, 241, 242, 243, 870
Eurocentric bias and, 1088, 1100, 1179–80
for marine charting, 820, 826, 833, 844, 1191
for military mapping, 929
in National Geographic Society maps, 996–97
perception/cognition and, 1069
persuasive cartography and, 1088, 1089
Peters projection and, 871–72, 1099, 1180–81, 1181
for regional maps, 1182
Tissot's indicatrix and, 1532–33
World War II and, 1775–76
- Mercator's World* (journal), 72
- Meridian* (journal), 1423
- Merriam, Mylon (1904–1984), 1072
- Merrifield, Andy, 268
- Mersey, Janet E., 223, 1514
entry by, 220–25
- Messter, Oskar (1866–1943), 1127
- Metadata, 318, 1456–57, 1458
geographic information systems and, 510–11
- Meteor (satellites), 1285, 1301
- Meteor* expedition, 1024, 1025
- Meteorology, 872–77, 873. *See also* Weather maps
air mass theory, 873, 873
Bergen School theory, 873, 1743–44, 1745
electronic cartography and, 876
electronic cartography development and, 370
feature extraction and, 1291
geographical discovery and, 1392–93
geographical mapping and, 523
Global Mapping Project and, 1648–49
hazard/risk mapping and, 587, 590
navigation and, 1011
projections and, 870
radar for, 392, 874–76, 875, 1279–80, 1281, 1283, 1746
remote sensing for. *See* Remote sensing
for meteorology
terrain analysis and, 1490
- Meteorology Office (United Kingdom), 876
- Meteosat, 548
- Metes and bounds, 1194–95, 1194
- Méthodes de la cartographie de la végétation (France), 127
- Metodyka kartografii społeczno-gospodarczej* (Ratajski), 1249
- Metric system, 877–78
in International Map of the World, 689, 878
for marine charting, 822, 827, 839, 841, 843, 850–51
Soviet transition to, 550, 935, 1592
Survey of India, 1474, 1475
for topographic mapping, 1585
- Mexico. *See also* Latin America
boundary surveying, 144, 146–47, 150, 150, 1564
electronic cartography development, 358
road mapping, 1353
topographic mapping, 1561, 1563–64
- Meyer, Konrad (1901–1973), 41
- Meyer, Rudi, 1242
- Meynen, Emil (1902–1994), 317
- Mezes, Sidney Edward (1863–1931), 1049
- MGE (Modular GIS Environment), 1442
- MGRS (Military Grid Reference System), 281, 282, 283, 464, 1189
- Michaels, H. Sargent (b. 1861), 1342
- Michelin, André (1853–1931), 878, 879, 880
- Michelin, Edouard (1859–1940), 878
- Michelin fold, 24
- Michelin Maps and Guides (publisher)
(France), 878–83, 879, 1361, 1362
battlefield maps, 1627
exported maps, 880, 881, 882
illustration software and, 1436
nation-state formation/maintenance and, 1637
route maps, 1369, 1370
symbolization, 1736–37, 1737
topographic mapping and, 645
World War I and, 1627, 1628
- Michelson, Albert A. (1852–1931), 355
- Michigan Intra-university Community of Mathematical Geographers (MICMOG), 5, 55–56
- Michigan Land Economic Survey, 752
- MicroCAM (software), 1431
- Microcapsule paper, 1481–82, 1723–24, 1725
- MicroFix (software), 1431–32
- Microphotography, 1311
- MicroStation (software), 1442
- Middle East. *See also* Gulf War (1991); Military mapping of the Middle East
Arab-Israeli dispute, 930–31, 931, 969, 970, 1002, 1002, 1125, 1550
boundary disputes, 1645
boundary surveying, 163–68, 164, 165, 166, 167
Royal Geographical Society mapping, 1373
topographic mapping, 1597–1602, 1599, 1600, 1601
- Miele, Joshua A., 1724
- MIIGAiK (Moskovskiy institut inzhenerov geodezii, aerofotos”yémki i kartografii) (Soviet Union), 480, 793, 796, 847, 981–85, 983, 1288, 1378, 1640
- Mikšovský, Miroslav, entry by, 731–32
- Milione, Il, 698
- Militärgeographisches Institut (Austria), 43, 925, 926, 963, 1549, 1587, 1771
- Military development and applications, 1696–1700. *See also* Aerial photography military development and applications; Air-age globalism; Cold War; GPS military development and applications; Marine charting military development and applications; Military mapping; Satellite imaging military development and applications; Topographic mapping military development and applications; specific conflicts

Military development and applications
(continued)
 academic cartography, 2, 3, 341, 667
 accuracy and, 1454, 1699
 advertising, 19–20
 aeronautical charts, 22–23, 23, 24,
 26–27, 886, 888, 917, 920, 1189
 animation, 61
 astrophysics, 87
 biogeographical cartography, 124
 cadastral surveying, 1201
 cartobibliography, 191
 cartographic conventions, 274
 coastal mapping, 235, 236, 237
 color, 258, 263
 coordinate systems, 280–81, 282, 283,
 284, 1187
 cruise missiles, 290–91
 data capture, 1697
 drafting, 332
 electronic cartography development, 269,
 358
 emergency planning, 392
 escape/evasion maps, 233, 234, 703,
 1709–11, 1710, 1711
 figure of the earth, 426
 French topographic mapping, 645–46,
 647
 gazetteers, 519
 geodesy, 14, 463–65
 geodetic surveying, 453, 466, 662, 663
 geographic information systems, 358,
 493–94, 570
 geographic names, 134–35, 513, 1085
 geographical mapping, 522
 geographical societies, 1418
 geologic mapping, 526, 527
 geospatial data marketing and, 856
 gravimetric surveys, 455, 456, 463
 holographic maps, 619, 620
 hydrography, 623, 624, 628, 819–20,
 833–34, 843
 International Cartographic Association,
 667
 journalistic cartography, 707–8, 709, 710,
 712, 714, 714
 Law of the Sea, 761
 lidar, 775
 literature, 785
 lunar and planetary mapping, 793
 map collecting, 246
 map libraries, 766, 768, 1421
 map pins, 814–15
 map-use skills, 1074
 mass marketing, 860–61
 NASA and, 992–93
 national map collections, 772
 navigation, 1013, 1014, 1016, 1018
 oceanography, 1023
 orienteering, 1043
 orthophotography, 891
 pedagogic role of cartography, 347
 personalization, 292
 personalization and, 292
 perspective maps, 1022–23

persuasive cartography, 1091–92
 photogrammetric mapping, 892, 1104,
 1107–8, 1109, 1120–25, 1123, 1127,
 1667, 1697–98
 photointerpretation, 1117–18
 physiographic diagrams, 1154
 plate tectonics, 1025
 printing, 804, 1313
 projections, 871, 1186, 1188
 radar, 239–40, 368, 392, 460, 891, 917,
 1125, 1126, 1279, 1698
 relief depictions, 1264–65, 1265, 1266
 relief models, 1264–65, 1265, 1266
 road mapping, 880, 1245, 1734–35
 satellite geodesy, 240, 457, 458–59
 satellite imaging, 239, 572, 806, 890–91,
 908, 1291, 1299–1300, 1670
 school atlases, 107
 scribing, 1395, 1396
 social theory, 1400
 sonar, 237, 1024
 symbolization, 1697, 1734–35
 terrain analysis, 1490–96, 1491, 1492,
 1493, 1494, 1496, 1497, 1498
 thematic mapping, 1505, 1506, 1507
 Military Engineering Experimental Establishment (MEXE) (United Kingdom),
 1497–98
 Military Geology Unit (MGU) (United States), 1493–95
 Military Grid Reference System (MGRS),
 281, 282, 283, 464, 1189
 Military mapping, 883–977. *See also* Aerial photography; military development and applications; British military mapping; French military mapping; German military mapping; Military development and applications; Military mapping of Europe; Military mapping of the Middle East; Soviet military mapping; specific conflicts
 Australia, 974–77, 975
 Austro-Hungarian empire, 924, 924–27,
 926, 963, 1771, 1771
 of Canada, 951–52
 China, 942–48, 944, 945, 946, 947, 973
 coordinate systems for, 1186–89,
 1696–97, 1771
 International Map of the World and, 690,
 916, 935
 Israel, 929–31, 931
 Italy, 921–24, 922, 923, 952, 963
 Japan, 948–51, 971, 972–73, 974
 of Korea, 949, 972–74, 974
 national mapping agencies and,
 1546–47, 1552, 1553, 1560, 1696,
 1697
 Netherlands, 1536–37
 of North Africa, 899, 908, 952, 952–55,
 953, 954, 955, 955, 1776, 1776
 North Atlantic Treaty Organization, 888,
 893–94, 951, 955, 965, 966
 orthophotography for, 927, 930, 1112,
 1141, 1142
 Ottoman Empire, 927–28, 928, 1771
 photogrammetric mapping and, 887, 907,
 925, 927, 930, 942, 946, 1107–8
 projections for, 906, 911–12, 915, 925,
 929, 930, 935, 945, 1186–89, 1188
 Russian Empire, 931–34, 933, 934
 Russian Federation, 940–41
 scale in, 888, 896, 897, 911, 916, 935,
 964, 969, 1772, 1772, 1776–77
 Scandinavia, 961–62
 secrecy in, 931–32, 939, 940, 962, 973,
 1696
 of Southeast Asia, 891, 898–900, 950,
 970–72, 971, 972, 1777–78
 thematic mapping and, 908, 944–45,
 962–63, 969, 1778–79
 topographic mapping and, 1546, 1552,
 1553, 1560, 1579, 1592
 United States, 884, 884–93, 885, 887,
 969–70, 1777, 1778, 1779. *See also*
 U.S. Army Map Service
 urban mapping and, 915, 917, 1651,
 1652, 1653
 Military mapping of Europe, 962–66. *See*
 also World War I military mapping of
 Europe; World War II military map-
 ping of Europe
 Cold War, 888–90, 900, 919, 921,
 939–40, 941, 942, 965–66, 966, 967
 Franco-Prussian War, 905
 Soviet Cold War mapping, 939–40, 941,
 942, 965–66, 967
 Military mapping of the Middle East,
 966–70
 Arab-Israeli dispute and, 930–31, 931
 British, 896, 902, 904, 929–30, 966–67,
 968–69, 968, 969, 1598, 1599
 Gulf War (1991), 892, 903, 908, 970
 Suez Canal Crisis and, 902
 United States, 892
 World War I, 967–68, 968, 1598, 1773–74
 World War II, 899, 919, 929–30, 968–69,
 969, 970
Miljökartor, 409, 410
 Mill, Hugh Robert (1861–1950), 597, 799
 Millea, Nick, entry by, 1450–52
Millennium Star Atlas, 1461
 Miller, David Hunter (1875–1961), 1049
 Miller, David W., 605
 Miller, Edwin W. (1905–1942), 49
 Miller, George J. (1880–1973), 700
 Miller, O. M. (1897–1979), 51, 147, 977–78,
 1151
 on projections, 1179, 1182–83, 1184,
 1185, 1193
 Miller cylindrical projection, 871, 977, 977,
 1179, 1182, 1193
 Milleret-Raffort, Françoise, 634
 Millie the Mapper, 1662, 1758
Millionth Map (Map of Hispanic America)
 (American Geographical Society), 51,
 691, 764, 1418, 1539
 boundary surveying and, 147, 149
 International Map of the World and, 690
 Mark S. W. Jefferson and, 700
 provisional sheets for, 1560, 1561, 1562

- reliability diagrams, 147, 1697, 1780
surveying for, 50–51
Wright on, 1780
- Milne, A. A. (1882–1956), 216, 783, 812
- Milne, Henry F. (1876–1977), 1372
- Milošević, Slobodan (1941–2006), 1163
- MIMO (“map in, map out”), 267–68
- Minard, Charles Joseph (1781–1870)
cartogram by, 194
cartographic visualization and, 1683, 1684, 1685–86, 1686
centrography by, 212
flow mapping, 1464, 1518
Napoleon map, 1683, 1684, 1685–86, 1686, 1687, 1688
- Mindeleff, Cosmos (b. 1863), 1260, 1261
- Mines et minéraux à la carte*, 634
- Minimum bounding rectangles (MBRs), 362, 363
- Ministério da Marinha e Ultramar (Portugal), 474
- Ministry of Defence Map Catalogue* (United Kingdom), 1450
- Ministry of Land, Infrastructure and Transport (Japan), 321
- Minitrack Optical Tracking System (MOTS), 426, 665
- Minnesota Bike Atlas*, 1252
- Minnesota Bikeways, 1252
- Minnesota Land Management Information System, 496
- Minolta (microcapsule paper), 1481–82
- Minquiers et Ecrehos* boundary case (1953), 140
- Miró, Joan (1893–1983), 1251
- Miscellanea Cartographica*, 728
- MISR (Multiangle Imaging Spectroradiometer), 1280
- Misrepresentation in maps. *See also* Persuasive cartography
airline maps, 861
Cold War and, 1090
customization and, 293
dasymetric symbolization and, 298
geopolitical cartography and, 541
“GIS and society” debates, 386
- MIT Media Lab, 659, 1681
- Mitchell, Colin W. (b. 1927), 1490
- Mitchell, Lucy Sprague (1878–1967), 216
- Mitchell, Peta, 785
- Mitchell, Robert B., 752
- Mitchell, William “Billy” (1879–1936), 884
- Mitchell map, 233
- Mittelbach, Robert, 1706–7, 1707
- Mittelholzer, Walter (1894–1937), 76
- Mitzka, Walther (1888–1976), 778
- Miura-ori folding system, 1338
- Mobility maps, 1722–26, 1723, 1724. *See also* Tactile maps
- Modell, John, 605
- Modelska, Andrew M. (b. 1929), 91, 1732
- Modern Maps and Atlases* (Lock), 1452
- Modernism, 78, 1402
- Modes of cartographic practice, 978–80, 979, 980
- Modifiable areal unit problem (MAUP), 498–99, 1468, 1470
- MODIS (Moderate Resolution Imaging Spectroradiometer), 631, 1274, 1278, 1280
- Modular GIS Environment (MGE) (software), 496
- Moedebeck, Hermann W. L. (1857–1910), 22, 26
- Moellerling, Harold
entries by, 55–61, 1453–59
academic cartography and, 4
on accuracy standards, 1454, 1455
analytical cartography and, 5, 56–57, 57, 58–59
animation and, 61
Commission on Communication in Cartography and, 10
on definitions of “map,” 800
on Fourier analysis, 59
on Fourier domain analysis, 58
on numerical shape analysis and, 59
on real vs. virtual maps, 56–57, 57
on three-dimensional mapping, 1521
- Moetsukita chizu* (Abe), 784
- Moisel, Max (1864–1920), 155, 959, 1572
- Mokre, Jan, entry by, 558–65
- Moldofsky, Byron (b. 1953), 509
- Molina, Mario J. (b. 1943), 1274, 1275
- Mollweide (homolographic) projections, 88, 89, 568, 1192, 1192, 1503, 1504. *See also* Goode homolosine projection
- Molodenskiy, M. S. (1909–1991), 426, 980, 980–81, 981, 983
- MOMS (Modular Optoelectronic Multispectral [Stereo] Scanner), 1286
- Monachus, Franciscus (ca. 1490–1565), 1175
- Monahan, David, entry by, 829–30
- Monde des cartes: Revue du Comité français de cartographie, Le* (journal), 719
- Monk, Janice J. (b. 1937), 1760
- Monkhouse, Francis John (d. 1975), 341, 344, 1466, 1513, 1539
- Monmonier, Mark (b. 1943)
entries by, 30–31, 90–92, 189–90, 197–200, 207–12, 235–39, 370–71, 386–87, 424–25, 521–24, 758–60, 870–72, 877–78, 977–78, 1048–49, 1288–94, 1471–72
academic cartography and, 4
analytical cartography and, 5
animation and, 61
on boundary delineation, 381, 381
on choropleth symbolization, 223
on copyright traps, 284
on demographic mapping, 312
on digital filters, 58
on exploratory data analysis, 421
on genetic mapping, 446
on history of cartography, 610
History of Cartography Project and, 615
on journalistic cartography, 715, 717
on national atlases, 1501
- on persuasive cartography, 1088, 1089, 1094, 1181
on privacy issues, 1171
on statistical mapping, 525
visibility base map, 1193
- Monroe Doctrine, 241
- Montaner, Carme, entry by, 644–45
- Monte, Urbano (1544–1613), 1175
- Montello, Daniel R. (b. 1959), 1068, 1071, 1072, 1181, 1505
entries by, 418–19, 1055–59, 1070–74, 1080–85
- Montenegro, 1414
- Montessus de Ballore, Fernand de (1851–1923), 530
- Montfort (Wisconsin) land use map (Finch), 752, 753
- Montgomery, Bernard Law (1887–1976), 1163
- Montreal Protocol, 1274, 1275
- Monumenta cartographica Africæ et Aegypti* (Kamāl & Wieder), 91
- Monumenta cartographica Vaticana* (Almagià), 42
- Monumenta Italiae cartographica* (Almagià), 42
- Monumentation, 1224–26, 1225, 1226
- Monuments de la géographie, Les* (Jomard), 91
- Moon, maps of. *See* Lunar and planetary mapping
- Moor, Dmitriy (1883–1946), 1768, 1769
- Moore, Edwin (1874–1916), 814
- Moore, Eliakim Hastings (1862–1932), 460
- Moore, Marianne (1887–1972), 785
- Moore, Patricia A., 584
- Moore, William Charles, 348
- Moore, Willis L. (1856–1927), 876, 1744–45
- Moral rights, 655, 657
- Moral statistics, 221, 312, 1232, 1462
- Moran, P. A. P. “Pat” (1917–1988), 1469
- Moran’s I*, 498, 1469, 1470, 1471
- Morandi, Mario, 542, 545
- Moray, Robert (1608–1673), 1526
- Morazé, Charles (1913–2003), 122
- Morehouse, Scott, 398, 505, 583
- Moretti, Franco (b. 1950), 988
- Morison, Samuel Eliot (1887–1976), 598
- Moritz, Helmut (b. 1933), 426, 460, 980
entry by, 980–81
- Morley, Lawrence W. (b. 1920), 1025
- Morphologie der Erdoberfläche* (Penck), 1055
- Morrill, Richard L. (b. 1934), 525
- Morris, Roger, entry by, 836–40
- Morris, William George (1847–1935), 473
- Morrison, Joel L.
entries by, 278–84, 666–72, 1095
academic cartography and, 2, 3
on cartographic visualization, 1685
Chinese military mapping and, 945
Commission on Communication in Cartography and, 10
on definitions of “map,” 800
on temporal dynamics, 362

- Morrison, Russell, 247
 Morse, Jedidiah (1761–1826), 1415
 Morse, Samuel Finley Breese (1791–1872), 872
 Morse, Sidney E. (1794–1871), 744
 Morshead, Henry T., 595
Morskoy atlas, 848, 1382
Morskoy kartograficheskiy institut (MKI) (Soviet Union), 847, 848
 Mortality rates. *See* Thematic mapping
 Morton, Guy, 1439–40
 MOS (Marine Observation Satellite), 1286
 Mosaic (browser), 319, 1751
 Mosaic maps, 310, 1390–91. *See also* Photomosaics
 Moser, Gerhart, 594
 Moser, Jana, entry by, 1572–76
 Moskovskiy geodezicheskiy institut (MGI) (Soviet Union), 480, 982, 1592. *See also* Moskovskiy institut inzhenerov geodezii, aerofotos”yémki i kartografi
 Moskovskiy gosudarstvennyy universitet geodezii i kartografi (Russian Federation), 1378
 Moskovskiy institut inzhenerov geodezii, aerofotos”yémki i kartografi (MIIGAiK) (Soviet Union), 480, 793, 796, 847, 981–85, 983, 1288, 1378, 1640
 MOSS (Map Overlay and Statistical System), 1443
 Mota, A. Teixeira da (1920–1982), 91, 285
 MOTS (Minitrack Optical Tracking System), 426, 665
 Motta, Giuseppe, 698
 Mouchez, Ernest Amédée Barthélémy (1821–1892), 1459
 Mount Everest, 595–96, 596, 1418, 1473
Mount Everest (map), 596
 Mountains. *See* Alpine cartography; Hiking/trail maps; Himalaya cartography; Relief depictions
 Mourant, A. E. (1904–1994), 445
 Mouse-over techniques, 1687
 Mower, John E., 377
 entry by, 375–78
 Mozambique, 156, 157. *See also* Africa
 Muehrcke, Juliana O., 784
 Muehrcke, Phillip, 2, 5, 56, 784, 800, 1528
 Mueller, Ivan Istvan (b. 1930), 461
 Müffling projection, 935
 Muir, John (1838–1914), 1416
 Mulcahy, Karen A., entry by, 1532–34
 Muldoon, Paul (b. 1951), 783
 Mullen, Roy, entry by, 1555–59
 Muller, Frederik (1817–1881) (dealer), 245, 525
 Muller, J. C. (b. 1941), 3, 5, 7, 687
 Multiangle Imaging Spectroradiometer (MISR), 1280
 Multibeam echo sounding (MBES), 627, 820, 843, 852, 853
Multilingual Dictionary of Technical Terms in Cartography (ICA), 202, 317, 732, 798, 1412
 MultiMap, 655, 657
 Multimedia atlases. *See* Electronic atlases
 Multimedia maps, 311, 342, 1686, 1687, 1688. *See also* Interactive mapping
 Multinational Geospatial Co-Production Program (MGCP), 909
 Multinational Space-based Imaging System (MUSIS), 908
 Multiplex instruments for photogrammetric mapping, 1107, 1107, 1127–28, 1128, 1129, 1135, 1138, 1140, 1549
 Multipurpose European Ground-Related Information Network (MEGRIN), 266–67, 1586
 Multispectral Scanning System (MSS), 991–92, 1278, 1285
 Multivariate maps, 1521–22, 1521, 1522, 1523. *See also* Bivariate maps
 Munk, Walter H. (b. 1917), 629, 631
 Munro, David, 1086
 Munsell, A. E. O., 1056
 Murnane, Mike, 402
 Murphy, Alexander B., 138–39
 Murray, Alan, entry by, 693–96
 Murray, John (1841–1914), 701
 Murray, John III (1808–1892), 1620
 Mussolini, Benito (1883–1945), 697
 Mutzel, Petra, 378
 “My Story: Maps” (Gutteridge), 785
 Myanmar, 134. *See also* Burma
Mythologies (Barthes), 308
 Nabokov, Vladimir (1899–1977), 785, 989
 NACIS (North American Cartographic Information Society), 49, 1407, 1752, 1760
 NAD (North American Datum), 240, 426, 460, 463, 466, 467, 1135, 1553
 Nadal, Francesc, entry by, 650–54
 Nadar (Gaspard-Félix Tournachon) (1820–1910), 566
 Nadge, Dora, 542
 Nagarwalla, Neville, 498
 Nagel, Herman, 1050
 Nagurskiy, Yan Iosifovich (1888–1976), 75
 Name Database (NDB), 505
Name of the Rose, The (Eco), 782–83, 783
Names (journal), 520
Names on the Land (Stewart), 520
 Namibia, 157, 959, 1573, 1574, 1575. *See also* Africa
 Naming. *See* Geographic names
 Nansen, Fridtjof (1861–1930), 74
 Napoleon Bonaparte (I) (1769–1821), 194, 814–15, 904–5, 929, 1001, 1209
 Narrative and cartography, 986–91
 NASA. *See* National Aeronautics and Space Administration
 Nation-state formation/maintenance, 1000–1009. *See also* Administrative cartography
 counter-mapping and, 1006–7, 1007, 1008, 1009
 Eastern European boundary changes and, 335, 336, 1003
 ethnographic mapping and, 294, 409, 411, 776
 geographic names and, 304, 512
 national atlases and, 96, 117, 1001–2
 place promotion and, 1003, 1004, 1005, 1636–37, 1638, 1639, 1640
 political cartoons and, 1162–63
 political persuasive cartography and, 1002–3, 1003
 postcolonial cartography and, 304, 1003–6
 public transportation maps and, 1728
 social theory and, 1401
 travel mapping and, 1621
 world revolution theory and, 1768–69, 1769, 1770
 National Academy of Sciences (United States), 4, 5, 97, 993, 1415
 National Aeronautics and Space Administration (NASA) (United States), 991–93. *See also* Satellite imaging
 airline maps and, 1396
 astrophysics and, 88, 89
 coastal mapping, 1286
 Digital Chart of the World and, 320
 earth-from-space perspective and, 566
 figure of the earth and, 240, 426, 427
 founding of, 1273
 geographical mapping and, 522
 GEOSPACE and, 548
 Global Positioning System and, 557, 992
 Gravity Recovery and Climate Experiment, 427, 462, 469, 631, 1277, 1278
 hydrography and, 629–30, 631
 Landsat development, 368, 754, 755, 756, 991–92, 1283
 Large Area Crop Inventory Experiment, 1300
 lidar and, 774, 775
 lunar and planetary mapping and, 793, 1283
 lunar globes, 561, 563
 meteorology and, 873–74
 satellite geodesy and, 457, 477
 space shuttles, 1285
 thematic mapping in, 112
 topographic mapping, 1543
 virtual globes and, 662
 weather maps and, 1749, 1749
 National Association of Counties (United States), 494
 National Atlas and Thematic Mapping Organization (NATMO) (India), 97, 1476
National Atlas Information System, 90, 100
National Atlas of Canada, The, 90, 116. *See also* *Atlas of Canada*
National Atlas of Disease Mortality in the United Kingdom (Howe), 404
National Atlas of Egypt, The, 1003–4
National Atlas of Japan, The, 339, 729, 730–31
National Atlas of the United States of America, The (Gerlach), 97, 993–94
 color in, 1320, 1320

- electronic version, 90, 100
Richard E. Harrison's role in, 580, 580
projections in, 1192, 1192
- National atlases, 96–101, 98, 99
Canada, 18, 90, 90, 96, 100, 116, 314, 1501
China, 100, 215
Commission of National Atlases, 1382
demographic mapping in, 96, 98, 99, 311
Egypt, 1003–4
Finland, 18, 96, 112, 117–19, 117, 118, 131, 1465, 1501
nation-state formation/maintenance and, 96, 117, 1001–2
postcolonial, 301, 302, 304
statistical mapping and, 18
Sweden, 97, 407, 408, 410
Switzerland, 97, 640, 1465, 1465
thematic mapping and, 112, 1001, 1501, 1501, 1502, 1503
United States, 97, 100, 112, 580, 580, 992, 993–94
- National boundaries. *See* Political boundaries
- National Cartographic Centre (Iran), 1600
- National Center for Geographic Information and Analysis (NCGIA) (United States), 4, 268, 494, 994–95
- National Climatic Data Center (United States), 229
- National Commission for Cartography (NCC) (Canada), 1407
- National Conservation Commission (United States), 443
- National Council for Geographic Education (United States), 347, 1416–17
- National Defense Education Act Fellowships, 3
- National Digital Cartographic Data Base (NDCDB), 1229
- National Environment Research Council Unit for Thematic Information Systems (NUTIS) (United Kingdom), 419
- National Environmental Policy Act (NEPA) (United States), 389
- National Flood Insurance Program (NFIP) (United States), 389, 776
- National Geodetic Survey (United States), 453, 1198
- National Geodetic Vertical Datum (NGVD) (United States), 238, 467, 1135, 1556
- National Geographic Atlas of the Fifty United States*, 102, 105
- National Geographic Atlas of the World*, 401, 522, 1436
- National Geographic Magazine*, 996. *See also* National Geographic Society
color in, 257, 260
images as maps in, 804
mass marketing and, 861
nation-state formation/maintenance and, 1002
perspective maps in, 1020
weather maps, 1747, 1749
World War II and, 997
- National Geographic Satellite Atlas of the World*, 1286, 1288
- National Geographic Society (NGS) (United States), 996–1000, 1405
Antarctica maps, 64
Arctic expeditions and, 76
color, 257–58, 260, 997
Eckert projections and, 339, 1503
electronic atlases, 90
founding of, 1415
Gannett and, 443–44
Genographic Project, 1237
Goode homolosine projection and, 1193
Himalaya cartography and, 594
illustration software and, 1436
Internship in Geography, 342
labeling, 745, 746, 746, 996, 997, 1472, 1503
map publishers and, 1247
mass marketing and, 861
Mercator projection and, 996–97
nation-state formation/maintenance and, 1002
National Geography Standards and, 347
regional atlases, 104, 105
Robinson projection and, 244, 999, 1172, 1366, 1367, 1368
seafloor mapping and, 997, 999, 1022, 1025
thematic atlases, 114
Van der Grinten projection and, 997, 998, 999, 1179
wall maps, 1694
war atlases, 1503
Winkel tripel projection, 1368
- National Geographic Society–Palomar Observatory Sky Survey (POSS), 85, 1461, 1462
- National Geographical Institute (France). *See* Institut Géographique National
- National Geography Standards* (United States), 347, 349
- National Geophysical Data Center (United States), 464, 590
- National Geospatial Data Archive (NGDA), 318, 319
- National Geospatial Data Infrastructure (NGDI), 90, 401, 510, 592, 836, 1227
- National Geospatial-Intelligence Agency (NGA) (United States). *See also* Defense Mapping Agency; National Imagery and Mapping Agency
Board on Geographic Names and, 133
colonial/imperial cartography and, 255
Digital Nautical Charts and, 464
Earth Gravity Models and, 463
ESRI and, 401
geodesy and, 463, 464
geodetic surveying and, 468
geographic information systems and, 494
institutional role of, 1671
Latin America and, 468, 1353
marine charting and, 832
- National Grid (United Kingdom), 279, 280, 281, 283, 311, 1034, 1036, 1108
- National Height Datum (China), 1605–6
- National Highways Association (United States), 1343, 1344–45
- National historical geographic information systems (NHGIS), 95–96
- National Imagery and Mapping Agency (NIMA) (United States), 255, 427, 468, 832, 892, 974, 1432–33, 1671.
See also Defense Mapping Agency; National Geospatial-Intelligence Agency
- National Map Accuracy Standards (NMAS) (United States), 13–14, 204, 1386, 1454, 1642
- National map collections, 771–74
- National Map system (FGDC), 511
- National Map Viewer, 14, 15
- National mapping. *See* National mapping agencies; Topographic mapping
- National mapping agencies (NMAs). *See also* Topographic mapping accuracy standards and, 1454
Argentina (Instituto Geográfico Militar), 836, 1201, 1560
Australia, 1612–13
Austria (Militärgeographisches Institut), 43, 925, 926, 963, 1549, 1587, 1771
Belgium (Institut géographique militaire), 1584
Bolivia (Instituto Geográfico Militar), 1560
Chile (Instituto Geográfico Militar), 1560
China, 594, 942, 1602
Colombia (Instituto Geográfico Agustín Codazzi), 665, 687, 1561
Costa Rica (Instituto Geográfico Nacional), 1563, 1564
Denmark (Geodætisk Institut), 460, 961–62
Dominican Republic (Instituto Cartográfico Militar), 1560
East Germany, 199, 199, 200, 1589, 1589
Ecuador (Instituto Geográfico Militar), 147, 1560
electronic cartography development impacts, 177, 178, 180, 181
- European consortium (CERCO), 178, 266–67, 417, 478, 1455, 1585–86
- France. *See* Institut Géographique National; Service géographique de l'armée
generalization and, 385–86, 1036, 1037
geodetic surveying and, 453
Germany (Bundesamt für Kartographie und Geodäsie), 176–78, 179
- Guatemala (Instituto Geográfico Nacional), 1560–61
- Hungary (Állami Földmérési és Térképzőceti Hivatal), 1238
- Indonesia, 1608–10, 1610, 1611–12
- International Cartographic Association and, 670
- International Map of the World and, 689, 764

National mapping agencies (*continued*)
 Iran (National Cartographic Centre), 1600
 Italy (Istituto geografico militare), 921–24, 952, 1588, 1616, 1616, 1617
 Japan, 68, 729–31, 730, 948–49, 1606, 1607, 1608
 Latin America, 1560–61, 1563, 1564
 Mexico (Servicio Geográfico del Ejército and Departamento Cartográfico), 1561, 1563
 military mapping and, 1546–47, 1552, 1553, 1560, 1696, 1697
 Netherlands (Topografische Dienst), 1535–38, 1536, 1537, 1538, 1580
 Nicaragua (Instituto Geográfico Nacional), 1563
 Northern Ireland (Ordnance Survey of Northern Ireland), 1584, 1584
 Norway (Norges Geografiske Opmåling), 962
 Panama (Instituto Geográfico Nacional “Tommy Guardia”), 1563
 Paraguay (Dirección del Servicio Geográfico Militar), 1560
 Peru (Instituto Geográfico Nacional), 1560
 photogrammetric mapping, 1140
 Poland (Wojskowy Instytut Geograficzny), 1588
 Prussia (Preußische Landesaufnahme), 176, 474, 909, 914, 959, 1165–66, 1166, 1167, 1573
 Republic of Ireland (Ordnance Survey of Ireland), 1584, 1584
 Russian Federation (Roskartografiya), 551, 1213, 1377, 1378, 1596
 social theory on, 1401
 Soviet Union. *See* Glavnoye upravleniye geodezii i kartografi; Tsentral'nyy nauchno-issledovatel'skiy institut geodezii, aëros"yemki i kartografi; Vyssheye geodezicheskoye upravleniye
 Spain (Instituto Geográfico Nacional), 158, 650–54, 652, 653
 Switzerland. *See* Bundesamt für Landestopographie
 Syria (Service géographique de l'armée), 1600
 United Kingdom. *See* Ordnance Survey
 United States. *See* U.S. Geological Survey
 Uruguay (Servicio Geográfico Militar), 1560
 Venezuela (Instituto Geográfico de Venezuela Simón Bolívar), 1563
 National Mapping Council (Australia), 483, 484
 National Ocean Service (NOS) (United States), 236, 629, 831
 National Oceanic and Atmospheric Administration (NOAA) (United States)
 Antarctica maps and, 1544
 Corona and, 1294
 GEOSPACE and, 548

Geostationary Operational Environmental Satellites, 566, 874, 1746, 1747
 hazard/risk mapping, 590
 Lake Survey and, 831–32
 Large Area Crop Inventory Experiment, 1300
 meteorology and, 1274
 satellite imaging and, 630, 756, 1276, 1283, 1286
 National Oceanic and Atmospheric Administration (United States), 494
 National parks, 1636
 National Photographic Interpretation Center (United States), 1295, 1670
 National Remote Sensing Center of China (NRSCC) (Zhongguo guojia yaogan zhongxin), 1426
 National Science Foundation (United States), 3, 319, 341, 494, 583, 994, 1433
 National Snow and Ice Data Center (United States), 76
 National Society of Professional Surveyors (United States), 1406
 National Spatial Data Infrastructure (NSDI). *See* National Geospatial Data Infrastructure
 National Standard for Spatial Data Accuracy (United States), 1455
 National States Geographic Information Council (United States), 494
 National Television System Committee (NTSC), 260
 National Topographic Data Base (NTDB) (Canada), 1555
 National Topographic System (Canada), 466, 1552–53
 National Transfer Format (NTF) (United Kingdom), 1455
 National Weather Bureau (United States), 872, 875
 National Weather Service (NWS) (United States), 871, 875, 1279
 National Wetlands Inventory (United States), 320
Nationalatlas Bundesrepublik Deutschland, 97
 Nationalism. *See* Nation-state formation/maintenance
 Native Americans. *See also* Indigenous cartography; Indigenous peoples and Western cartography
 cadastral mapping and, 16
 counter-mapping, 286–87, 287
 ethnographic mapping, 411, 412
 geographic names and, 134, 512–13, 514, 515
 historical atlases, 92, 94
 history of cartography and, 612
 territorial claims, 641
 Native Lands, 643
 Nativism, 1076
Natsional'nyy atlas Rossii, 1378
 Natural-breaks classification, 374
 Natural Environment Research Council (NERC) (United Kingdom), 418
 Natural Resource Canada, 116, 278
 Natural resource management. *See also* Environmental protection
 colonial/imperial cartography and, 1565–66
 commercial applications and, 855
 data models for, 364
 forestry, 17, 433–34, 436, 437
 geographic information systems and, 1439
 Japan, 729
 National Conservation Commission, 443
 satellite imaging for, 1301
 terrain analysis and, 1497
Natural Seats of Power, The (Mackinder), 540, 715
Nature of Maps, The (Robinson & Petchenik), 2, 801, 1095, 1366
Nature's Metropolis (Cronon), 598
 Nauchno-issledovatel'skiy institut prikladnoy geodezii (NIIPG) (Soviet Union), 1595
 Nauchno-izdatel'skiy institut (Soviet Union), 135, 136
Nautical Almanac, 837, 1011, 1167, 1168
 Nautical surveying. *See* Hydrography; Marine charting
 Naval Oceanographic Office (United States), 456
 Naval Photographic Interpretation Center (United States), 1266
 Naval Space Command Surveillance (NAVSPASUR), 665
 Naval Surface Weapons Center (United States), 466
 NAVD (North American Vertical Datum), 467, 1135, 1556–57
 Navigation, 1009–19, 1023–24. *See also* Aeronautical charts; In-vehicle navigation systems; Loran; Marine charting; Satellite navigation systems
 cartometry and, 203, 204
 celestial, 1011, 1012, 1013, 1013, 1023
 dead reckoning, 1009–11, 1010, 1011, 1012, 1023
 Decca system, 819, 827, 843, 1014, 1015, 1016, 1023, 1698, 1699, 1775
 Digital Nautical Charts, 464–65
 electronic navigation charts, 819, 819, 823, 825, 846, 853, 1018, 1019
 Mercator projection for, 870, 1189
 piloting/pilotage, 1011, 1012
 radar for, 1016–18, 1017
 radio, 843, 902, 1013–16, 1014, 1015, 1016, 1024, 1699, 1775
 Shoran, 355–56, 466, 664
 Navigational charts. *See* Marine charting
 Navigator (in-vehicle navigation system), 1717–18
 Navsat. *See* Transit System
 Navstar GPS, 14, 241, 461, 474, 477, 552, 775, 1018, 1292. *See also* Global Positioning System

- Navteq (corporation), 234, 369, 450, 1717, 1721, 1739, 1740
- Navy-American Geophysical Union Expedition, 463
- Navy Navigation Satellite System (NNSS) (Transit System), 468, 482, 484, 552, 775, 930, 1018, 1024, 1292
- Nazi Germany. *See also* World War II
academic cartography and, 341
administrative cartography, 17, 176–77
cartographic duplicity, 200
Eastern European boundary changes and, 337
Eckert and, 339
ethnographic mapping, 411
Eurocentric bias and, 413
geographic names, 513
geopolitical cartography and, 542
military mapping, 915, 964
nation-state formation/maintenance and, 1003, 1003, 1637, 1639
national mapping agency, 176–77
persuasive cartography, 542, 987–88, 988, 1090, 1092, 1163, 1402
place promotion, 1637, 1639
race and, 1236
secrecy, 1692
spatial planning, 41
urban/regional planning, 1159
- NCGIA (National Center for Geographic Information and Analysis) (United States), 4, 268, 494, 994–95
- Nebenzahl, Kenneth (b. 1927) (dealer), 246, 250
- Nebenzahl Lectures, 1762, 1763
- Nebert, Douglas D., 859
- Nederlandse Vereniging voor Kartografie, 1423
- Neef, Ernst (1908–1984), 317
- Neisser, Ulric (b. 1928), 1060
- Nelder, John A. (1924–2010), 1470
- Nelson, A., 807
- Nelson, Thomas (1822–1892), 701
- Nenonen, V. P. (1883–1960), 1130
- Neocolonialism, 307
- Netherlands
boundary surveying, 162
cadastral mapping, 185
colonial/imperial cartography, 254, 1608–11, 1610
facsimile atlases, 91
geographic names, 512
International Institute for Geo-Information Science and Earth Observation and, 686, 687
national atlases, 96–97
road mapping, 1361, 1362
school atlases, 107
topographic mapping, 1535–38, 1536, 1537, 1538, 1580
- NETWORK (software), 1441
- Network analysis, 1403
- Network maps, 1368
- Network shortest path algorithm, 499–500
- Neue Kartographie, Die* (Peters), 1100
- Neuer methodischer Schulatlas*, 339
- Neumann, Joachim (b. 1916), 317
entries by, 16–18, 797–98, 909–21, 1249–50
- Neurath, Otto (1882–1945), 541
- New Deal (United States), 30–31, 31, 752, 1108, 1113, 1118. *See also* Tennessee Valley Authority
- New England Datum, 1135
- New Imperial Atlas of the World* (Rand McNally), 1503
- New Mexico State Highway and Transportation Department Bicycle Guideline Map*, 1252
- New World, The* (Bowman), 1235–36
- New York* (Bollmann), 1020, 1630, 1631
- New York Public Library, 72, 320, 766, 1667
- New Yorker's Idea of the United States of America, A* (Wallingford), 812–13
- New Zealand
cadastral mapping, 1487
cadastral surveying, 188, 1217–19
cartographic societies, 1414–15
road mapping, 1363, 1365
- New Zealand Cartographic Society, 1415
- New Zealand LandOnline, 1219
- Newberry Library (Chicago), 72, 604, 612
- Newcombe, Stewart Francis (1878–1956), 163, 967, 1598
- Newspapers, 715–16, 717. *See also* Journalistic cartography
color in, 260
perspective maps in, 1022
printing, 707, 1311, 1312
thematic mapping in, 1509, 1510, 1511
weather maps in, 876, 1509, 1510, 1511, 1746
- Newsweek*, 1747, 1749
- Newton, Isaac (1642–1727), 55, 454, 694, 1184, 1394
- NEXRAD (Next Generation Radar), 875, 1279–80
- NGA. *See* National Geospatial-Intelligence Agency
- NGDA (National Geospatial Data Archive), 318, 319
- NGDI (National Geospatial Data Infrastructure), 90, 401, 510, 592, 836, 1227
- NGS. *See* National Geographic Society
- Ngūgī wa Thiong'o (b. 1938), 301, 308
- NGVD (National Geodetic Vertical Datum) (United States), 238, 467, 1135, 1556
- Nicaragua, 663, 664, 664, 1563. *See also* Latin America
- Nicholson, T. R. (1930–2009), 1332, 1359, 1736
- Nicolaisen, W. F. H., entry by, 520–21
- Nicolet, Marcel (1912–1996), 679
- Niemelä, Osmo (b. 1926), 1044
- Niépce, Nicéphore (1765–1833), 1316
- Nietschmann, Bernard (1941–2000), 1237
- Niewodniczański, Tomasz (1933–2010), 248
- Nigeria, 155, 155, 156, 156. *See also* Africa
- Nighttime Map (*Population Distribution*,
- Urban and Rural, in the United States*), 1657, 1658
- Nihon Chizu Shiryo Kyōkai (Japanese Map Association), 1420
- Nihon Kotizu Gakkai (Antique Map Society of Japan), 1420
- Nihon suirobu (Japan Hydrographic Department) (JHD), 849–53
- Nikishov, M. I. (1903–1977), 983, 1641
- Nikolay I (Czar of Russia) (1796–1855), 981
- Nikolay II (Czar of Russia) (1868–1918), 982
- Nimbus (satellites), 630, 873
- Nivellement Général de la France, 1527
- NMAs. *See* National mapping agencies
- NNSS (Navy Navigation Satellite System) (Transit System), 468, 482, 484, 552, 775, 930, 1018, 1024, 1292
- NOAA. *See* National Oceanic and Atmospheric Administration
- Nobel, Alfred Bernhard (1833–1896), 1283
- Nobile, Umberto (1885–1978), 76
- Nokia, 1740
- Nolan, Mike, entries by, 894–904, 927–28, 970–72
- Nolen, John (1869–1937), 1158
- Nomad, 1482
- NOMAD system, 1724
- Non-European cartography. *See* Indigenous cartography
- Nondirectional beacons (NDBs), 1014
- Nonphoto blue pencils, 328
- Nopcsa, Ferenc (1877–1933), 1418
- Nordbeck, Stig (b. 1929), 56
- Nordberg, William (1930–1976), 1285
- Nordenskiöld, A. E. (1832–1901), 42, 91, 608
- Nordenskiöld, Otto (1869–1928), 1418
- Norgay, Tenzing. *See* Tenzing Norgay
- Norge (airship), 76
- Norges Geografiske Opmaling (Norway), 962
- Normaal Amsterdams Peil (NAP), 477, 1527
- NORMAP system, 56, 1440
- Noronha, Val, entry by, 1716–22
- North Africa. *See also* Africa; specific countries
cadastral surveying, 1207, 1209
French topographic mapping, 1568
military mapping of, 899, 908, 952, 952–55, 953–54, 953, 954, 955, 955, 1776, 1776
- North America. *See also* Canada; United States
academic cartography overview, 1–5, 5, 340
boundary surveying, 143–46, 143–46, 145, 146
cadastral surveying, 187, 188, 1194–1200, 1220, 1485–86
cartographic societies, 1405–8
forestry, 433, 436
geodetic surveying, 465, 465–68, 467
geographical societies, 1415–17
map collecting, 245–48, 247
road mapping overview, 1339–50

North American Cartographic Information Society (NACIS), 49, 1407, 1752, 1760
 North American Cultural Survey, 521
 North American Datum (NAD), 240, 426, 460, 463, 466, 467, 1135, 1553
 North American Free Trade Agreement (NAFTA), 656
 North American Vertical Datum (NAVD), 467, 1135, 1556–57
 North Atlantic Treaty Organization (NATO) accuracy standards and, 1454 coordinate systems and, 894, 908, 965, 1189, 1536, 1697
 Digital Geographic Information Working Group, 1455
 electromagnetic distance measurement and, 356
 European military mapping and, 902, 908, 918–19, 962
 geodesy and, 464
 geographic names and, 134
 metric system and, 878
 military mapping, 888, 893–94, 951, 955, 965, 966
 prime meridian and, 1168–69
 projections and, 241, 871, 1186
 spatial data transfer standards and, 1455
 terrain analysis and, 1495
 topographic mapping and, 647, 908, 1536, 1541, 1547, 1585
 North East Map Organization (NEMO) (United States), 1407
 North points (compass roses), 1697
North Pole, The (Peary), 74
 North Sea Hydrographic Commission, 843–44
 Northern Ireland, 1584, 1584
 Northwest Passage, 144, 146
 Norway, 73, 74, 162, 511–12, 962, 1585, 1585
Not-So-Soft Underside, The (Harrison), 708, 713
Notes on Statistical Mapping (Wright et al.), 311
Notes on the Care & Cataloguing of Old Maps (Brown), 246
Notes on the Geography of Europe (Jefferson), 700
Notes on the Interpretation of Aeroplane Photographs (British General Staff), 1117
Nouvelle carte de Belgique, La, 1584
Nouvelle carte de France, La, 645
Nouvelle triangulation de la France, 645
Novyy element rasseleniya (*The Ideal Communist City*) (Moscow University), 1159, 1161, 1161
 NSDI (National Spatial Data Infrastructure). *See* National Geospatial Data Infrastructure
 NSFNET, 1750
NUC: Cartographic Materials (Library of Congress), 1452

Nuclear accidents, 589–90
 Nuclear Regulatory Commission (United States), 589–90
Nuclear War Atlas (Bunge), 1088–89, 1088, 1094, 1403
 Nugent, W. V., 155
 Numerical shape analysis, 59
NY Atlas (VanDam), 1714
 Nyasaland. *See* Malawi
 Nyerges, Timothy L. (b. 1951), 5, 57
 Nystrom (publisher), 1503
 Nystuen, John D. (b. 1931), 56, 525, 1534
 O geodezii i kartografi (Russian Federation), 1377
 O-QTM data model, 362, 1388
 Oak Ridge National Laboratory (ORNL) (United States), 493–94
 OAS (Organization of American States), 150–51, 643, 1408
 OAU (Organization of African Unity), 156, 301
 Oberlcher, Paul (1859–1915), 1263
 Obermeyer, Nancy J., entries by, 267–69, 1227–31
 OBEUS (Object-Based Environment for Urban Systems) (software), 497
 Object-oriented data models, 365, 377, 497, 1441–42
Objets fractals: Forme, hasard et dimension, Les (Mandelbrot), 435
 Oblated stereographic projections, 1182–83, 1184
 Oblique projections, 51, 1173, 1174.
See also Space Oblique Mercator Projection
 Oblique views. *See* Perspective maps
Obras completas de D. João de Castro (Cortesão & Albuquerque), 285
 O'Brien, William J., 1014
 Obruchev, Vladimir (1863–1956), 1418
 Occupational Health and Safety Administration (OSHA) (United States), 592
 Ocean Drilling Program, 1025
 Oceania, 302, 305, 1363–65
 Oceanography, 1023–30. *See also* Bathymetric mapping; Hydrography; Marine charting; Navigation; Plate tectonics figure of the earth and, 426, 427
 geographical mapping and, 522
 geologic mapping and, 527
 satellite imaging for, 1276–77, 1278
 sea-surface altimetry, 536–37
 virtual reality for, 1682
Oceans, The (Sverdrup, Johnson, & Fleming), 1028
 Ockerson, J. A. (1848–1924), 741
 Octavo (publisher), 91
 O'Dea, Fabian (1918–2004), 247
 O'Dell, Andrew Charles, 314
 Oden, Gloria (b. 1923), 785
 ODN (Ordnance Datum Newlyn), 1527
 ODYSSEY (software), 398, 399, 496, 583, 584, 585, 1440, 1441
 Ōe, Kenzaburō (b. 1935), 787
 Oestergaard, Paul (1872–1956), 1690, 1692
 “Of Exactitude in Science” (Borges), 787
Of Plymouth Plantation (Bradford), 598, 598
 Offen, Karl, entry by, 640, 641–44
 Office of Naval Services (ONR) (United States), 456, 583
 Office of Strategic Services (OSS) (United States), 2, 1030–32, 1031, 1507, 1667, 1670
Offizielle Eisenbahnkarte der Schweiz 1:500,000, 736, 737
 Offset printing, 1323
 cartographic conventions and, 273, 274
 color reproduction and, 258, 1323–24, 1331, 1332
 for historical atlases, 92
 historical cartography and, 599
 John Bartholomew & Son, 703
 journalistic cartography and, 716
 labeling and, 745, 746
 map design implications, 1150, 1331
 map revision and, 1345
 for marine charting, 838
 prepress techniques for, 1327
 stereotyping for, 1311, 1312
 for topographic mapping, 180
 Oficina de Geodesia (Nicaragua), 663, 664
 OGC (Open Geospatial Consortium), 496, 992, 1443, 1456
 Ogilby, John (1600–1676), 785, 1733
 Ogilvie, Alan G. (1887–1954), 50, 147, 1050
 Ogrissek, Rudi (1926–1999), 317
 Oil company maps, 1375, 1541–42, 1621, 1633, 1635, 1636. *See also* Oil company road maps
 Oil company road maps, 804
 advertising in, 19
 Africa, 1356, 1357
 Australia/Oceania, 1363, 1365
 color in, 258, 261
 Europe, 1361
 Latin America, 1351–52, 1353
 nation-state formation/maintenance and, 1637
 North America, 1344–45, 1347–48, 1347 place promotion and, 1633, 1635
 road atlases and, 1733
 Okean (satellite), 1286
 O’Keefe, John A., 455
 Old Print Shop (New York City), 246, 250
 “Oldest Map with the Name America, The” (Perillo), 785
 Oliver, Margaret A., entry by, 733–35
 Oliver, Richard, entry by, 119–20
 Olmsted, Frederick Law (1822–1903), 603
 Olson, Ann, 1760
 Olson, Charles (1910–1970), 783
 Olson, Everett Claire (1910–1993), 274
 Olson, Judy M. (b. 1944)
 entries by, 49, 255, 257–66, 801–2, 1063–65, 1365–67
 ACA presidency, 1760

- academic cartography and, 3, 4
on bivariate maps, 131
on choropleth symbolization, 223
on color, 1057, 1074, 1084
on printing, 509
on statistical mapping, 1467
Olsoni-Nilsson, Tove, 1420
Olsson, Gunnar (b. 1935), 811, 1404
Oman, 1600. *See also* Middle East
Omega (radio navigation system), 1024, 1169
OmniTRACS (in-vehicle navigation system), 1718
Omre, Henning (b. 1951), 735
On-demand mapping, 278
Ondaatje, Michael (b. 1943), 782
One World (Wilkie), 33
One World, One War (Harrison), 32, 415
1:400 wan he 1:250 wan zhongguo weixing yingxiang tuji (1:4,000,000 and 1:2,500,000 scale satellite image atlas of China) (Chen), 215
Online cartography. *See* Internet
Online mapping services. *See* Web-based wayfinding
Onsrud, Harlan Joseph (b. 1951), 268, 1228, 1230
OnStar (General Motors), 1171
Oort, Jan Hendrik (1900–1992), 87
Open Geospatial Consortium (OGC), 496, 992, 1443, 1456
Open GIS Consortium. *See* Open Geospatial Consortium
Openshaw, Stan (b. 1946), 406, 498, 1470
OpenStreetMap, 275, 368, 369, 1739, 1740
Operation Deep Freeze, 66, 68
Operation Highjump, 66
Operational Geographer (journal), 1417
Operational Navigation Chart (ONC), 28, 320, 1766
Opie, Fitzhugh Lee, 72
Opisometers, 204
Opticon, 1725
Optimal conformal projection, 869, 1184
Optimization. *See* Geographic optimization
OPTINA (Optimierung der Nachführung) (Switzerland), 181–82
Oral maps, 990
Orbimage (company) (United States), 1286
Ord, J. K. (b. 1942), 498, 1469
Ordnance Datum Newlyn (ODN), 1527
Ordnance Survey (OS) (United Kingdom), 232, 1032–40, 1033
accuracy standards and, 1455
aerial photography, 897
Chorley Report and, 1305
colonial/imperial cartography and, 958
color, 1540–41, 1542, 1547
copyright traps and, 284
digitization, 1035–37, 1037, 1038, 1544–45
Experimental Cartography Unit and, 357, 418, 1036–37, 1036
folding strategies, 1337
generalization, 385–86, 1036, 1037
geographic names and, 512
geospatial data marketing and, 856, 1037, 1039
Harley on, 577
hiking/trail maps, 1712
historical research using, 598
Hotine and, 620
intellectual property and, 656
interactive mapping and, 278
labeling, 741, 746, 747
land use maps, 751
map catalog, 1450
map design, 1579–80, 1580, 1585
map reproduction, 1033–34, 1309, 1310–11, 1314, 1331, 1332, 1333, 1551
monumentation, 1225, 1225
national map collection and, 772
north points, 1697
orthophotography, 1141, 1144
photogrammetric mapping, 1035, 1104, 1106, 1108, 1122, 1140, 1550
place promotion and, 1548, 1637
recreational maps, 1253
relief depictions, 701, 1267, 1269
relief models, 1265
road mapping, 1361, 1637
symbolization, 1736–37, 1738
terrain analysis, 1491
travel mapping, 1620
women in cartography and, 1759
World War I and, 896, 898, 1032–33, 1034
World War II and, 964, 1035
Ordnance Survey of Ireland, 1584, 1584
Ordzhonikidze, G. K. (1886–1937), 847
Orel, Eduard von (1877–1941), 925, 1103–4, 1121, 1133, 1137, 1697
Orell Füssli Kartographie AG (publisher) (Switzerland), 1040–43, 1041, 1042, 1043, 1318
Organisation européenne d'études photogrammétriques expérimentales (OEEPE), 686, 1425. *See also* European Spatial Data Research
Organization of African Unity (OAU), 156, 301
Organization of American States (OAS), 150–51, 643, 1408
Orientalism (Said), 308
Orientation maps, 1066, 1080, 1081, 1724, 1726, 1726–27, 1727
Orienteering, 292, 1043–46, 1044, 1045, 1046, 1047
Original Survey and Land Subdivision (Thrower), 1525
Orleans, Peter, 811
Orlove, Benjamin S. (b. 1948), 286
Ormeling, Ferdinand J. (1912–2002), 1046–47
Indonesian topographic mapping, 1611
International Cartographic Association and, 670, 1047
International Institute for Geo-Information Science and Earth Observation and, 687, 1047
Ormeling, Ferjan (b. 1942), entries by, 6–13, 96–101, 106–10, 416–18, 511–16, 685–88, 776–82, 1410–13, 1608–12
Ormsby, Hilda Rodwell (1877–1973), 1758
Orographs, 1143
Orphism (art movement), 80
Ørsted satellite, 537
ORSTOM (Office de la recherche scientifique et technique d'Outre-Mer) (France), 255
Ortag, Felix, entry by, 1739–42
Ortelius, Abraham (1527–1598), 63–64, 523, 1697
Orth, Donald J., 134
Orthoapsidal projections, 270
Orthographic projections, 580, 714
Orthographical relief (inclined contour) method, 1269, 1271, 1483–84, 1484, 1485
Orthomorphism, 1186
Orthophotography, 805, 1111–12, 1141–46, 1145
for cadastral surveying, 184, 188
for coastal mapping, 236
color reproduction and, 1310, 1310
digital, 14, 1387
for disaster management, 1144
electronic cartography development and, 809–10
geographical discovery and, 1390–91
halftones and, 1151
in Himalaya cartography, 595
images as maps and, 805–6
Institut Cartogràfic de Catalunya and, 644
Kelsh plotter for, 1142, 1143
map design implications, 1333
for military mapping, 927, 930, 1112, 1141, 1142
vs. satellite imaging, 1282
Switzerland, 182
for topographic mapping, 1542, 1559
UNAMACE for, 891, 1111–12, 1144, 1698
Vietnam War and, 891
Orwell, George (1903–1950), 1170
OS. *See* Ordnance Survey
Osborne, John Walter (1828–1912), 1317
Osher, Harold L., 247
Oshiver, Albert, 630
Osnovnoy zakon o sotsializatsii zemli (Basic Law on the Socialization of Land) (Soviet Union), 16
Osnovnyye polozheniya o postroyenii gosudarstvennoy opornoy geodezicheskoy seti SSSR, 480, 481
OSS (Office of Strategic Services) (United States), 2, 1030–32, 1031, 1507, 1667, 1670
Østensen, Olaf (b. 1950), 1456
Österreichische Alpenverein (ÖAV), 45, 45, 594, 1549

Österreichische Geographische Gesellschaft, 726, 1102, 1417
Österreichische Luftbildkarte, 927
 Österreichischen Gesellschaft für Photogrammetrie, 1102
Österreichischer Karte, 926–27
Österreichischer Volkskundeaatlas, 732
 OSU MAP (software), 1442
 Ottoman Empire, 163, 927–28, 928, 1598, 1771. *See also* Turkey
Outline Map of the United States (U.S. Department of Agriculture), 94
 Outline maps, 94, 95, 809, 903, 911, 912, 1428, 1450, 1464
 Oval projections, 37, 38
 Ovenden, Mark, 791–92
 entry by, 1239–41
 Overhead imaging. *See* Aerial photography; Lidar; Remote sensing
 Overhead projectors, 1694–95
 Overlays
 in Arctic maps, 76
 for boundary surveying, 143
 for cadastral surveying, 184, 188
 in Canada Geographic Information System, 189, 1440
 in cinema maps, 226
 color and, 256, 257, 262
 in community mapping, 267
 data models and, 383
 in demographic mapping, 311
 for landscape architecture, 758, 760
 map algebra and, 496
 pen-and-ink drafting and, 334
 in postcolonial cartography, 305
 printing and, 1151, 1310–11
 scribing and, 1396
 spatial analysis and, 490, 495
 Overseas Development Ministry (ODM) (United Kingdom), 0
 Owens, Charles Hamilton (1881–1958)
 perspective maps, 708, 711, 1022
 persuasive cartography and, 1092
 pictorial maps, 79–80, 710, 712, 714, 1022
 social theory and, 1402
Oxford Australia Atlas, *The*, 102
Oxford Economic Atlas of the World, 1465–66
 Oxford projection, 1173
Oxford School Atlas for India, Pakistan & Burma & Ceylon, *The*, 102
 Oxford System of Automated Cartography, 357
 Oxford University Press, 104, 105
 Oz, Land of, 986, 987
 Ozone depletion, 1274–75, 1276

p-median problem, 500
 Pacific Institute of Cartographers Society (Canada), 1407
 Pacific Islands. *See* Oceania
 Pacific Ring of Fire, 523
 PAGEOS (Passive Geodetic Earth Orbiting Satellite), 477

PAIGH. *See* Pan American Institute of Geography and History
 Paine, David P., 204
 Painke, Werner, 724
 Paivio, Allan (b. 1941), 1060
 Palacios Roji Lara, Joaquín (1891–1962), 1353
 Palestine, 163, 166, 1598. *See also* Israel; Middle East; Palestinians
 Palestine Exploration Fund (PEF), 929, 967, 1597, 1598
 Palestinians, 167, 1006–7, 1008, 1009
 Palm, Christer, 1044
Palmas Island boundary case (1920), 140
 PALMS (software), 584
 Palsky, Gilles, entries by, 121–23, 212–15, 297–98, 864–67
 Pan-American Consultation on Cartography, 469
 Pan American–Grace Airways, 23
 Pan-American Highway, 1352
 Pan American Institute of Geography and History (PAIGH) (Instituto Panamericano de Geografía e Historia) (IPGH), 468, 469, 1408–9
 accuracy standards and, 1454
 American Congress on Surveying and Mapping and, 1405
 Board on Geographic Names and, 134
 Inter-American Geodetic Survey and, 662
 International Cartographic Association and, 670
 International Civil Aviation Organization and, 673
 UN Group of Experts on Geographical Names and, 517, 1647
 Pan American World Airways, 37
 Panama, 147, 1563. *See also* Latin America; Panama Canal
 Panama Canal, 539, 540, 1368, 1368, 1621, 1624
 Panizzi, Anthony (1797–1879), 190
 Pannekoek, A. J. (1905–2000), 1609
 Pannetier, Pascal, entry by, 878–83
 Panning, 523
 Panofsky, Erwin (1892–1968), 579
 Panopticon, 1170
 Panoramic maps. *See* Perspective maps
 Pantone Matching System (PMS), 1324
 Pápay, Gyula, 1696
 Paper
 as drawing media, 329–30, 333
 as map surface, 13, 204, 1048–49, 1310–11
 Papua New Guinea, 1365
 Paraguay, 1560. *See also* Latin America; Paraguay (Schroeter), 49–50
 Paramap, 1404
 PARC MapServer, 1752–53, 1752
 Parcel Mapping Project (United States), 1488
Paris et l'agglomération parisienne, 122, 122
 Paris Exposition Universelle, 561, 561
 Paris Peace Conference (1919). *See* Post-World War I settlement
 Parish Maps project (United Kingdom), 216, 275, 276, 277, 812, 813, 1307, 1307
 Park, Robert Ezra (1864–1944), 1254
 Parker, Edith Putnam (1886–1961), 1759
 Parker, George S. (1929–2004), 247
 Parkin, George R. (1846–1922), 1181
 Parkins, A. E. (1879–1940), 700
 Parkinson, Bradford W. (b. 1935), 553
 Parochialism. *See* Eurocentric bias
 Parry, Muriel H., 247
 Parry, Robert B. (b. 1943), 1452, 1586, 1589
 Parsons, Ed, 634
 Parsons, Stanley B., 94
 Paşa, Şevki, Mehmet, 927–28
 Pascal (programming language), 376
 Paslawski, Jacek, 223
 Passarge, Siegfried (1866–1958), 378, 1097
Passing of the Great Race, The (Grant), 1233, 1235
 Passonneau, Joseph (1921–2011), 105
 Patents, 654–55, 657, 658
 Paterson, Michael S. (b. 1942), 378
 Pathfinder project (in-vehicle navigation system), 1718
 Pathfinding, 46, 1342–43, 1368
 Pattern recognition, 1293–94
 Patterson, Tom, entries by, 34–35, 1396–97
 Patton, Jeffrey C., 782
 Pátzcuaro Convention, 641
 Paulet, N., 163
 Paullin, Charles Oscar (1869–1944), 92, 350–52, 354, 604, 1529
 Pavie, Auguste (1847–1925), 169
 Payne, Dennis, 431
 Payne, Roger L., 134
 entry by, 516–19
PC-Atlas, 90
 PCA (principal components analysis), 445–46, 448
 PCGN (Permanent Committee on Geographical Names) (United Kingdom), 134, 1085–87, 1086
 PCRaster (software), 497
 Pearce, Margaret W., 605, 607
 Pearl Harbor attack (1941), 31
 Pearsall, Phyllis (1906–1996), 1054, 1758
 Pearson, Alastair W., 275, 1453–54
 entries by, 662–66, 689–93, 1020–23, 1032–40, 1153–55, 1260–72, 1490–99, 1539–45, 1579–87
 Pearson, Joseph (1849–1939), 1363
 Pearson, Karl (1857–1936), 1468
 Peary, Robert E. (1856–1920), 74, 1389, 1416
 Peary Arctic Club, 1416
 Pecora, William T. (1913–1972), 754
 Pedagogic role of cartography, 216–20, 347–49. *See also* Academic cartography; School atlases; Textbooks
 Freytag-Berndt und Artaria KG maps and, 440
 historical geography and, 604
 literature and, 216, 784, 784
 mass marketing and, 861
 national atlases and, 100

- regional atlases and, 104
relief models in, 1262
thematic mapping and, 344, 348
wall maps, 1693–95
- Pedersen, R. N., 706
- Pedley, Mary Sponberg, 284–85, 615
- Pégrier, André, 1646
- Peirce, Charles Sanders (1839–1914), 455
- Pellet, Henri, 1306
- Pellet process, 1306
- Pelletier, Monique (b. 1934), 772
entry by, 771–74
- Peluso, Nancy Lee, 286, 643
- Pen-and-ink drafting, 331–34, 332, 333, 744, 804, 1148, 1150, 1308. *See also* Drawing instruments
- Pencils, 326, 326
- Penck, Albrecht (1858–1945), 50, 294, 340, 341, 1054–55, 1646. *See also* International Map of the World
- Pendleton, Thomas P. (b. 1885), 1660
- Penguin Atlas of the World*, 727
- Péninsule balkanique, géographie humaine, La* (Cvijić), 294
- Pennine Way Companion* (Wainwright), 1712, 1714
- Pennsylvania State University Maps Library, 320
- Penrose, Roger (b. 1931), 460
- Penzias, Arno A. (b. 1933), 88
- People in Durham—A Census Atlas*, 103, 105
- Perception/cognition, 1055–85. *See also* Communication paradigm
academic paradigms on, 12
accessibility and, 1742, 1742
Bertin on, 123
cartographic visualization and, 1683
children and, 217
cognition, 1065–70
data models and, 364, 365
map-use skills, 1074–80, 1075, 1077, 1078, 1079, 1080
maps in psychology research, 1080–82, 1081
perception studies, 1063–65
projections and, 1069, 1181
psychophysics, 1056, 1064, 1071, 1076, 1082–85
relief depictions and, 1262
Salishchev on, 7
scientific visualization and, 1685
spatial thinking, 1059–62, 1061, 1070
subject testing, 1063–64, 1070–74
in textbooks, 345, 346
thematic mapping and, 1509
uncertainty and, 1643
visual perception and, 1055–59
- Perception studies, 1063–65. *See also* Perception/cognition
- Perec, Georges (1936–1982), 787
“Perfection” (Nabokov), 785
- Performative nature of maps, 1404
- Perillo, Lucia Maria (b. 1958), 785
- Perimap, 1404
- Perkal, Julian (1913–1965), 372, 373
- Perkins, C. R., 1452, 1589
- Perkins School for the Blind (United States), 1480
- Permanent Committee for Geospatial Infrastructure in Asia and the Pacific (PCGIAP), 1648
- Permanent Committee for the Infrastructure of Geospatial Data of the Americas (PCIDEA), 1648
- Permanent Committee on Geographical Names (PCGN) (United Kingdom), 134, 1085–87, 1086
- Permanent Service for Mean Sea Level (PSMSL), 1526
- Perrier, Georges (1872–1946), 609
- Perring, Franklyn (1927–2003), 1440
- Perron, Charles Eugène (1837–1919), 1265
- Perry, Melvin Nelson, 72
- Perry, William (b. 1927), 892
- Persian Gulf, 514
- Persian Gulf War. *See* Gulf War (1991)
- Personal digital assistants (PDAs), 1719, 1725, 1740
- Personal Guidance System (PGS), 1725
- Personal Navigation Devices (PNDs), 359
- Personalization, 292, 293
- Perspective maps, 1020–23, 1021. *See also* Pictorial depictions
air-age globalism and, 33–34, 241–42, 1022, 1179, 1180
art and, 78
campus maps, 1704–5
in journalistic cartography, 708, 710, 711, 712, 713, 714, 1022
mass marketing and, 861
place promotion and, 1020, 1023, 1630, 1632
in urban mapping, 1652, 1654
- Persuasive cartography, 1087–95. *See also* Advertising; Counter-mapping; Journalistic cartography; Misrepresentation in maps; Place promotion; Political persuasive cartography
art and, 79–80
cartograms, 1089
choropleth symbolization in, 1090–91
for environmental protection, 392, 1088–89, 1088, 1092
“GIS and society” debates and, 386
projections and, 1088, 1089, 1181
vs. propaganda maps, 1088, 1089
for social activism, 1088–89, 1088, 1094
social activism for, 1088–89, 1088, 1094
symbolization for, 1090, 1090, 1091, 1092
- Perthes, Bernhard (1858–1919), 721
- Perthes, Joachim (1889–1954), 722
- Perthes, Stephan, 724
- Peru, 143, 151, 153, 892, 1560, 1563. *See also* Latin America
- Petchenik, Barbara Bartz (1939–1992), 1095, 1760
academic cartography and, 2, 3
- Children’s World Map Competition, 218–19, 672, 1095, 1375
on color, 1321
on definitions of “map,” 800, 1095
on map typologies, 801
on perception/cognition, 1064
R. R. Donnelley & Sons employment, 1095, 1375
- Robinson and, 1366
on subject testing, 1073, 1074
on typography, 1058
- Peter I, Czar (1672–1725), 1214
- Petermann, August (1822–1878), 1095, 1697
- Petermanns Geographische Mitteilungen* (journal), 718, 721, 722, 724, 1095–99, 1097, 1098
- Peters, Arno (1916–2002), 1099. *See also* Peters projection
- Peters Atlas of the World*, 1101
- Peters projection, 1099–1101, 1100
Cold War and, 244
Eurocentric bias and, 244, 415, 872, 1100
geographical mapping and, 522–23
Mercator projection and, 871–72, 1099, 1180–81, 1181
postcolonial cartography and, 244, 307
for statistical mapping, 1192–93
- Peterson, Michael P. (b. 1954), 61, 1094, 1431, 1740
entries by, 61–63, 816–18, 1750–54
- Petite histoire de la géodésie* (Perrier), 609
- Petri, Eduard Yul’evich (1854–1899), 1690
- Petrie, Gordon, 727
- Petrucelli, Antonio, 715
- Peucker, Karl (1859–1940), 1101–2
academic cartography and, 340, 341
aeronautical charts, 22, 23
on color, 107, 1101, 1102, 1262
on relief depictions, 1101, 1271
- Peucker, Thomas K. *See* Poiker (Peucker), Thomas K.
- Pequet, Donna J., 361, 365, 1529
entry by, 359–66
- Pexels, 1521, 1522
- Pezdek, Kathy (b. 1949), 1081
- Pfaltz, John L., 59
- Pfaltz graphs, 59
- Phaff, J. M., 680
- Phantom accessibility, 1742
- Phantom Tollbooth, The* (Juster), 783
- Philately, 138–39
- Philippines, 19, 53, 53, 411
- Philips’ Clear Print Half-Inch Cycling Map of England & Wales*, 1252
- Phillimore, R. H. (1879–1964), 1476
- Phillips, John C., entry by, 729–31
- Phillips, Philip Lee (1857–1924), 190, 772–73
- Phillips, Richard J., 1058
- Photo Interpretation* (Editions Technip), 1114
- Photocomposition, 715, 716, 743, 744–45, 997

Photocopying, 183, 1306–7, 1307, 1311, 1324
 Photoengraving, 707, 802, 804, 1309–10, 1317
Photogrammetric Engineering and Remote Sensing (journal), 1425
 Photogrammetric mapping, 367, 1102–46.
See also Orthophotography
 for administrative cartography, 16
 aerial triangulation by independent models, 324, 1109, 1111, 1111, 1130, 1131, 1140
 Agricultural Adjustment Administration, 30–31, 31
 for alpine cartography, 43–44
 analytical, 1125–32, 1127
 Antarctica, 68
 base-in, base-out method, 1110–11, 1110, 1129–30
 base-in, base-out method (universal instruments), 1110–11, 1110, 1129–30, 1140
 for boundary surveying, 147, 151
 for cadastral surveying, 184, 185, 188, 1486
 camera technology for, 236, 367, 834, 1116, 1121, 1122, 1123, 1133
 Canada, 1108–9
 cartometry and, 204
 for census mapping, 208
 for coastal mapping, 236
 Cold War and, 239, 1109, 1123–24, 1124
 for colonial/imperial cartography, 255, 323, 324, 325, 1568, 1570, 1570, 1571
 cruise missiles and, 290
 diapositive instruments for, 1140–41
 electronic cartography development impacts, 367–68, 1112, 1130–32, 1132, 1134, 1603
 environmental protection and, 393
 feature extraction, 1120, 1291–93, 1292
 Fourcade's measuring stereoscope for, 1103, 1126–27, 1137
 Gasser Projector for, 1127–28, 1128
 geodesy and, 1132–36
 geographical discovery and, 1390
 geospatial data marketing and, 856
 Global Positioning System and, 1132, 1136
 goniometers for, 1106
 graphical techniques for, 1104, 1106, 1110
 Gulf War (1991) and, 892
 for hiking/trail maps, 1712
 for hydrography, 625
 image correlation for, 1111
 images as maps and, 1108, 1550
 Institut Cartogràfic de Catalunya and, 644
 for marine charting, 826, 833–34, 836
 military development and applications, 892, 1104, 1107–8, 1109, 1120–25, 1123, 1127, 1667, 1697–98

military mapping and, 887, 907, 925, 927, 930, 942, 946, 1107–8
 Miller and, 977
 multiplex instruments for, 1107, 1107, 1127–28, 1128, 1129, 1135, 1138, 1140, 1549
 Ordnance Survey, 1035, 1104, 1106, 1108, 1122, 1140, 1550
 photointerpretation, 750, 1113–20, 1115, 1122
 photomaps and, 1108
 for postcolonial cartography, 325
 precursors of, 1102–3
 Pulfrich's stereocomparator for, 925, 1103, 1126–27, 1127, 1133, 1137
 radar and, 1125, 1126
 radial line plotting for, 1104, 1105, 1106, 1110, 1129, 1549–50
 relief depictions and, 43–44, 1264, 1271
 Royal Geographical Society, 1372
 Schut's strip adjustment method for, 1109
 societies for, 1423–26
 Soviet Union, 1109, 1124, 1124, 1592, 1595
 stereoplotters for, 367, 367, 1103–4, 1121, 1127, 1134, 1134, 1135, 1292
 Tennessee Valley Authority, 1299, 1549, 1661
 terrestrial, 43–44, 45, 646, 1103, 1121, 1126–27, 1133, 1264
 units of measurement, 878
 U.S. Army Corps of Engineers, 1655
 von Gruber points, 1128, 1128, 1138, 1139
 von Gruber's method, 44, 45, 1106, 1138–39
 von Orel's autostereograph for, 1103–4, 1121
Photogrammetric Record (journal), 1425
 Photogrammetric Society of South Africa, 1409–10
 Photogrammetry for topographic mapping, 1549–50
 Africa, 1568, 1570, 1570, 1571, 1576, 1578
 Austria, 1587
 China, 1602–3
 Eastern Europe, 1588
 France, 646, 1106, 1580, 1582, 1697
 Indonesia, 1610–11
 Japan, 731
 Netherlands, 1537
 radial line plotting for, 1549–50
 sequence diagram, 1662
 Soviet Union, 1109, 1124, 1124, 1592, 1595
 Spain, 652
 Switzerland, 180
 United States, 1140, 1549, 1558–59, 1660, 1661, 1662–63, 1662
 Western Europe overview, 1584–85
 Photography. *See* Aerial photography;
 Images as maps; Orthophotography; Photogrammetric mapping;

Photolithography; Photomechanical processes
 Photogravure, 1310, 1314, 1314, 1315, 1317
 Photointerpretation, 750, 1113–20, 1115, 1122. *See also* Remote sensing
 Photolithography, 804, 1309, 1310, 1314, 1316–17
 color reproduction and, 1320, 1320, 1333
 halftone screens for, 802, 1317–18
 for historical atlases, 92
 labeling and, 738, 744–45
 map design implications, 1148, 1320, 1331
 Photomaps. *See* Images as maps; Orthophotography; Photomosaics
 Photomechanical processes, 1316–22. *See also* Color separation; Halftones; Map design for photomechanical processes; Photolithography; Scribing
 collotype, 91, 1150, 1317, 1710
 for geologic mapping, 527
 photoengraving, 707, 802, 804, 1309–10, 1317
 photogravure, 1310, 1314, 1314, 1315, 1317
 prepress techniques, 1326–29, 1327, 1329, 1330
 rotogravure, 1314, 1317, 1319, 1331
 Photomosaics, 806, 997–98, 1110, 1486, 1542–43, 1543
 Photostatic process, 1306–7, 1306
 Phototypesetting, 183, 742–43, 742, 743, 1150, 1314, 1333
 Phylogeography, 447–48
Physical Geography of the Sea, The (Maury), 870
Physical Geography of Wisconsin, The (Martin), 864
Physical Map of the Arctic (American Geographical Society), 51
Physikalischer Wandatlas, 722
Physiographic Diagram of Europe (Lobeck), 788
Physiographic Diagram of South America (Smith), 788
Physiographic Diagram of the New York Region (Raisz), 1154
Physiographic Diagram of the United States (Lobeck), 1154
 Physiographic diagrams, 1153–55. *See also* Landform maps
 GEBCO and, 445
 Lobeck, 788, 1153–54, 1154, 1155, 1244, 1269, 1500
 perspective maps and, 1023
 Raisz, 598, 1154–55, 1155, 1244, 1269
 for seafloor mapping, 531, 532–33, 854, 997, 999, 1022, 1025, 1026–27
 for thematic mapping, 1505, 1505
 Piaget, Jean (1896–1980), 217, 1077
 Piazza, Alberto (b. 1941), 445, 448
 Piazza, Carlo, 1113

- Pick, Alfred J., 247
Pick, Frank (1878–1941), 791
Pickle, Linda Williams, 422
Pickles, John (b. 1960), 1094, 1163, 1170
entry by, 1400–1405
Pictorial Atlas of the World (Hammond Map Company), 1401, 1503
Pictorial depictions. *See also* Perspective maps
for advertising, 19, 21
in alpine cartography, 292, 292
art and, 79–80
child-created, 217, 218
in demographic mapping, 313
in journalistic cartography, 707, 708, 708, 712, 714, 715, 1093
in literature, 216
in multivariate maps, 1521, 1521
place promotion and, 1630, 1632–33, 1633, 1634
in railroad maps, 1240–41, 1729, 1730
sense of place and, 814
in Soviet cartography, 983, 984, 985
in thematic mapping, 1516, 1517
Pictorial Maps (Holmes), 1732
Picture Atlas of the World (National Geographic Society), 90, 114
Pie charts (sectored circles), 112, 113
Pieces of Map, Pieces of Music (Bringhurst), 783
Pierce, Todd, 138
Pierson, William, 3
Pike, Richard J., 264, 1430
Pilkey, Orrin H. (b. 1934), 1655
Pillewizer, Wolfgang (1911–1999), 342, 595, 726
Piloting/pilotage, 1011, 1012, 1368
Pilots, charts for. *See* Aeronautical charts
Pin maps. *See* Map pins
Pinch, Michael C., entry by, 465–68
Pinchot, Gifford (1865–1946), 436
Pinther, Miklos, 53, 92, 94
Pinto, John A. (b. 1948), 1157
PIOS (Polygon Information Overlay System) (software), 398
Pitt-Kethley, Fiona (b. 1954), 785
Pizzetti, Paolo (1860–1918), 425
PKO “Kartografiya” (Soviet Union), 136, 983
PLA (Preußische Landesaufnahme) (Prussia), 176, 474, 909, 914, 959, 1165–66, 1166, 1167, 1573
Place. *See* Sense of place
Place/Culture/Representation (Duncan & Ley), 613
Place-name studies, 520–21
Place Name Survey of the United States (PLANSUS), 520–21
Place names. *See* Geographic names
Place Perception Project (Clark University), 217
Place promotion, 1091, 1621, 1623, 1628–37
accessibility and, 1742
advertising and, 19, 1632, 1634
campus maps and, 1704, 1705
centrography and, 213–14
historic preservation maps, 601–3, 602
literature and, 988
nation-state formation/maintenance and, 1003, 1004, 1005, 1636–37, 1638, 1639, 1640
Panama Canal, 1621, 1624
perspective maps and, 1020, 1023, 1630, 1632
pictorial depictions and, 1630, 1632–33, 1633, 1634
railroad maps and, 1636, 1729, 1730
recreational maps and, 1636
road mapping and, 19, 47–48, 1345, 1348, 1349, 1352, 1356, 1627, 1627, 1633, 1635, 1636
route maps for, 1369–70, 1370
souvenir maps, 36, 37, 38–39, 39, 233–34, 310
topographic mapping and, 1548
urban mapping and, 1622, 1629–30, 1630, 1631, 1632, 1632, 1633, 1633, 1634, 1635, 1636
walking tour maps, 1628, 1629, 1633–34, 1636
walking tour maps and, 1633–34, 1636
Plagiarism, 284–85
Plan of Chicago, 1157–58, 1158, 1630, 1630
Plane tabling, 1155–57, 1156, 1157, 1556
for alpine cartography, 43
for boundary surveying, 154
for cadastral surveying, 183, 187
for coastal mapping, 235
for military mapping, 898
Ordnance Survey, 1033
for topographic mapping, 1548–49
U.S. Geological Survey, 1659
Planetary mapping. *See* Lunar and planetary mapping
Planimeters, 203, 204
Planning, urban and regional. *See* Urban/regional planning
Plant maps. *See* Biogeographical cartography
Plastic drawing media, 183, 330, 331, 333, 334, 1150, 1311, 1332, 1394
Plate carrée projection, 1189, 1192
Plate tectonics, 1025–27
geodetic surveying and, 467
geologic mapping and, 526
hydrography and, 631
magnetic mapping and, 1025, 1026
projections and, 1177
seafloor mapping and, 531, 532–33, 1025, 1499–1500
seismological mapping and, 532, 533–34, 533, 534, 1025
Wegener on, 523, 527, 531, 1025, 1392, 1500
Platt, Harriet Shanks (1900–1979), 805
Platt, Raye R. (1891–1973), 50, 147, 700, 1542, 1599
Platt, Robert S. (1891–1964), 805
Pleiades Project, 605
Plewe, Brandon (b. 1968), 1739
Plotters, 270, 357. *See also* Stereoplotters
for choropleth symbolization, 1511–12, 1513
in colonial/imperial cartography, 323, 324
color and, 260, 261, 261
electronic cartography development impacts, 334, 356
for epidemiological maps, 404, 406
for geologic mapping, 527
printing and, 506–7
for relief models, 1266
Pluto, maps of, 793–94, 795. *See also* Lunar and planetary mapping
Podell, Diane K., 113
Podobedov, N. S. (b. 1908), 983, 1640
Podręczny atlas świata (Ratajski), 1249
POES (Polar Orbiting Environmental Satellites), 1274, 1286
Poiker (Peucker), Thomas K. (b. 1938)
academic cartography and, 4, 6
on community mapping, 268
on generalization, 372
Geoprocessing and, 688
Harvard Laboratory for Computer Graphics and Spatial Analysis and, 583
POLYVRT, 361
TIN model, 56, 60
Point data, 288, 289
Point pattern analysis, 498, 1469–70
Poirier, Pascal (1852–1933), 73
Poitevin, Alphonse (1819–1882), 1150, 1306
Poivilliers, Georges (1892–1968), 646, 1106, 1122, 1568, 1697
Poland, 105–6, 162, 335, 337, 1414, 1588, 1590. *See also* Eastern Europe
Polar Orbiting Environmental Satellites (POES), 1274, 1286
Polar planimeters, 203
Polar projections
air-age globalism and, 34, 243, 415, 580, 1179
Cold War and, 243–44, 243, 1179
mass marketing and, 861
William-Olsson’s, 1756, 1757
Polar regions. *See* Antarctic maps and expeditions; Arctic maps and expeditions; Polar projections
Polar Regions: Atlas (CIA), 103, 105
Political activism. *See* Social activism
Political boundaries. *See also* Boundary surveying; Colonial/imperial cartography and political boundaries; Law of the Sea
Africa, 136, 138, 138, 153–58, 155, 302, 303, 321, 956
disputes, 136–43, 140, 142, 151, 892, 1645, 1645
Eastern Europe, 335–38, 336, 996, 1003, 1053
eliminating, 115

Political boundaries (*continued*)
 ethnographic mapping and, 411
 historical-boundaries atlases, 94–96
 Holdich on, 158, 618, 619
 Martin on, 864
 monumentation for, 1224
 nation-state formation/maintenance and,
 1000, 1001
 Russian Federation, 1377
Political Frontiers and Boundary Making
 (Holdich), 158, 619
 Political persuasive cartography. *See also*
 Cold War persuasive cartography;
 World War II persuasive cartography
 air-age globalism and, 542–43, 546
 animation in, 61, 987–88
 boundary disputes and, 136, 138–39
 cartograms, 194
 cartoons, 1092, 1093, 1162–65, 1164
 critical cartography on, 544
 critiques of, 1088
 cultural/social significance of, 544–45
 early twentieth century, 539, 540
 Eurocentric bias and, 413
 geographic names and, 513
 geopolitical cartography, 539–48
 interwar Germany, 539, 541–42, 541,
 542, 543, 544, 544, 547
 interwar Italy, 542, 545
 narrative and, 987–88, 988
 nation-state formation/maintenance and,
 1002–3, 1003
 Nazi Germany, 542, 987–88, 988, 1090,
 1092, 1163, 1402
 post–World War I settlement and, 1163
 pre–World War I, 539, 540
 projections and, 1088, 1181
 social theory on, 1402
 Soviet Union, 1092
 world revolution theory and, 1766–67,
 1767, 1768, 1769
 World War I, 513, 539, 541, 987
 Polk, Frank L. (1871–1943), 1053
 Pollack, H. N., 1427
 Pollution. *See* Environmental protection;
 Thematic mapping
Polnaya karta lunny, 793
Polski Przegląd Kartograficzny (journal), 49,
 1414
 Polskie Towarzystwo Geograficzne (PTG),
 1414
 Polyconic projections, 139, 140, 833,
 870–71, 1184, 1186, 1188, 1191
 Polyeder (polyhedral) projections, 925, 935,
 1175, 1176, 1177, 1193–94
 Polyester films. *See* Plastic drawing media
 Polygon boundaries. *See* Boundaries
 Polygon Information Overlay System (PIOS)
 (software), 398
 Polyhedral (polyeder) projections, 925, 935,
 1175, 1176, 1177, 1193–94
 POLYVRT (software), 361, 361, 584, 1441
 Poole Brothers (publisher) (United States),
 1702

Pop art, 83
 PopOut maps, 1337, 1338
 Popular cartography. *See* Journalistic
 cartography
Population Distribution, Urban and Rural,
 in the United States (Nighttime Map),
 1657, 1658
 Population genetics, 445
 Population mapping. *See* Demographic
 mapping
 Poracsky, Joseph, 3
 Porro, Ignazio (1801–1875), 1136
Portable Faulkner, The, 783
Portolan, The (journal), 72, 1421
 Portugal, 474, 542, 1579
Portugaliae monumenta cartographica
 (Cortesão & Mota), 91, 285
 Positions-Karte (Germany), 1579, 1587
 Positivism, 539
 POSS (National Geographic Society–
 Palomar Observatory Sky Survey), 85,
 1461, 1462
 Post, J. B. (b. 1937), 91, 309, 782, 783, 796
 “Post-roads” (Slessor), 785
 Post–World War I settlement, 1049–53. *See*
 also League of Nations
 administrative cartography and, 17
 American Geographical Society and, 50,
 963, 1053, 1418
 Austria and, 924, 924
 Black Book, 701, 1050, 1051, 1052, 1053
 boundary surveying and, 158–61, 160,
 161, 163, 165, 619, 701, 1235
 Eastern European boundary changes and,
 335–37, 996, 1053
 ethnographic mapping and, 294, 335,
 411, 776, 777, 865, 866, 963,
 1234–35, 1236
 geographical societies and, 1418
 German military mapping and, 914
 Hinks and, 597, 1373
 The Inquiry, 158, 1234–35
 International Map of the World and, 690
 Mark S. W. Jefferson’s role, 700–701
 journalistic cartography and, 708
 League of Nations and, 762
 Lobeck’s role, 701, 787, 788
 National Geographic Society and, 996
 political persuasive cartography and,
 1163
 race and, 1234–35
 secrecy and, 1169
 topographic mapping and, 1588, 1598
 world atlases and, 115
 Postcard maps, 1250–51, 1251, 1318
 Postcolonial cartography, 300–309
 accuracy standards and, 1454
 administrative cartography and, 17
 airline maps and, 1624, 1626
 colonial/imperial cartography and, 146,
 252, 255, 300, 301, 303, 307, 323–24,
 1003
 exclusionary politics and, 304–7, 305,
 306
 geographic names and, 301–2, 304,
 513–14
 indigenous peoples and, 642
 Latin America, 146, 301, 304, 1560
 nation-state formation/maintenance and,
 304, 1003–6
 Peters projection and, 244, 307
 political boundaries and, 136, 146, 156,
 157, 168–69, 171, 301
 regional atlases and, 105
 Survey of India, 1473–74, 1474, 1476
 topographic mapping, 1547–48, 1550,
 1611–12
 Postmodernism, 79, 83, 416, 612, 807–8
 Postnikov, Alexey V. (b. 1941), 938, 1213,
 1591, 1641
 entries by, 135–36, 549–51, 981–85,
 1379–81, 1639–41
 PostScript (formatting language), 1325,
 1434–35, 1436, 1513
 Pos’yet, Konstantin N. (1819–1899), 1380
Potential Natural Vegetation of the Con-
terminous United States (American
 Geographical Society), 53
 Potsdam Conference (1945), 162
 Powell, Colin, 569
 Powell, John Wesley (1834–1902), 443, 689,
 1260, 1444
 Power Law (psychophysics), 184, 1083
Power of Maps, The (Wood), 1180
 Powers, Francis Gary (1929–1977), 890,
 1123, 1273
Powers of Ten (film) (Eames & Eames), 227
 PPGIS (public participation GIS), 268–69,
 386, 1403
Practical Air Navigation and the Use of the
Aeronautical Charts of the U.S. Coast
and Geodetic Survey (Lyon), 24
Practical Treatise on Mapping and Lettering
 (Lloyd), 327
PrairieErth: (a deep map) (Heat Moon),
 785–86
 Pramono, Albertus Hadi, 286
 Pratt, Dallas (1914–1994), 247
 Pratt, John Henry (1809–1871), 593
 Pratt, Lee, 189, 1439
Pratt’s Road Atlas of England and Wales,
 1733, 1734
 Precipitation. *See* Meteorology
 Predator (unmanned aerial vehicle), 1670
 Preliminary Plots, 322, 1566, 1567
 Premodern cartography. *See also* Map
 collecting
 Antarctica maps, 63–64
 cartograms and, 194
 Cortesão on, 285
 digitization, 90
 facsimile atlases, 90–91
 globes, 562
 History of Cartography Project and, 615
 Imago Mundi and, 636
 in literature, 785
 map theft, 72–73
 projections in, 1175

- thematic atlases, 112
uncertainty in, 1642
Vinland Map, 1678–80, 1679
Wolfgang Castle collection, 1757
Woodward on, 1764
John Kirtland Wright on, 1779–80
Preobrazhenskiy, A. I. (1907–1994), 341, 983
Prescott, Dorothy F. (b. 1931), 1613
entries by, 1363–65, 1414–15
Prescott, J. R. V., 138, 139
entry by, 168–76
Pressegeographie (publisher), 1238
Pressure pattern navigation, 1018
Pretzman, George F., 1117, 1666
Preußische Landesaufnahme (PLA) (Prussia), 176, 474, 909, 914, 959, 1165–66, 1166, 1167, 1573
Prewitt boundary delineation operator, 380
Prikryl, I., 583, 619
Primary Geography (Frye), 1260
Prime meridian, 1167–69, 1168
Primitivism, 1159
Primo de Rivera, Miguel (1870–1930), 653
Principal components analysis (PCA), 445–46, 448
Principles of Cartography (Raisz), 259, 1244
Principles of Geographical Information Systems for Land Resources Assessment (Burrough), 688, 994
Principles of Thematic Map Design (Dent), 345
Printed maps. *See* Printing
Printing, 802–4, 1308–12. *See also* Lithography; Map reproduction; Offset printing
cartographic conventions and, 273, 275, 278
for choropleth symbolization, 509, 1511–13
for coastal mapping, 238
dot matrix printers, 1325, 1429, 1429
geographic information systems and, 505–6, 804
inkjet printers, 507, 1325, 1325, 1335
journalistic cartography and, 707, 716, 1311, 1312
laser printers, 507, 1325, 1429–30, 1434
mapping software and, 1427, 1428, 1429
for marine charting, 838, 838, 839, 847, 851
for military mapping, 897, 898
PDF format, 1727
raster printers, 1325
relief depictions and, 1267, 1268
stereotyping, 1311, 1312
SYMAP and, 506, 509, 1477, 1478
Privacy issues, 1169–71
administrative cartography and, 18
census data and, 1656
geographic information systems and, 1169, 1170, 1656
Global Positioning System and, 18, 368, 494–95, 557, 1170–71
satellite imaging and, 1171, 1301
thematic data capture, 369
Probability theory, 1013
Processual paradigm history of cartography, 614
Producción de Cartas Náuticas Digitales (IGM), 836
Professional practices. *See also* Societies
cadastral surveying, 1198, 1199, 1204, 1209, 1220–21
Professional Society of Forensic Mapping, 432
Programme de données numériques géographiques en trois dimensions (DNG3D) (France), 909
Progressive transmission, 1387
Progressivism, 1636
Prohibitive cartography, 18
Project-level GIS, 493
Project Seascan (U.S. Navy), 1025
Project Vanguard, 664
Project Varenius, 995
Projections, 1172–94. *See also* Conformal projections; Conic projections; Gauss-Krüger coordinate system; Goode homolosine projection; Peters projection; Polar projections; Pseudo-cylindrical projections; Space Oblique Mercator Projection
academic training in, 1
accuracy and, 34, 241, 243, 1188
advertising and, 19, 20, 20, 21
for aeronautical charts, 24, 871, 1189–90, 1764
air-age globalism and, 33, 34, 243, 415, 580, 1179
for airline maps, 37, 38, 39
Aitoff-Wagner, 1172
Albers, 1192
American Geographical Society, 51
astrophysics and, 85, 86, 88, 89
Atlantis, 1174
for atlases, 108, 115, 871, 1183
azimuthal, 34, 243, 543, 546, 997, 1179.
See also Polar projections
Bertin on, 123
Boggs eumorphic, 1177, 1179, 1193, 1503
Bonne, 1182, 1184, 1188, 1192
boundary disputes and, 139
Briesemeister, 51, 1174
for cartographic duplicity, 1641
Cold War and, 239, 241, 242, 243–44, 243, 870, 1179, 1181, 1186
Conformal Space projection, 1453
vs. coordinate systems, 1187
cultural/social significance of, 1177, 1179–82
Dymaxion, 20, 21, 582, 1175, 1176, 1177, 1394
Eckert, 339, 339, 1172, 1193, 1503
electronic cartography development impacts, 1172, 1174, 1183
ellipsoidal, 1184–85, 1185
Eurocentric bias and, 415
flat-polar, 1172, 1193, 1503. *See also* Robinson projection
fractal representation and, 869
Gauss-Schreiber Transverse Mercator, 1606
geographical discovery and, 1393–94
geographical mapping and, 522–23
geopolitical cartography and, 543
gnomonic, 39, 1177, 1191
graphics software and, 1333
Richard E. Harrison on, 580
International Map of the World, 689
interrupted, 1174–77, 1176, 1178
in journalistic cartography, 33, 243–44, 415, 580, 714, 1088, 1173, 1179
Lambert conformal conic, 24, 871, 906, 1184–85, 1186, 1190, 1192
for marine charting, 820, 826, 833, 844, 871, 1190–91
mass marketing and, 861
mathematics and, 867, 869, 1172, 1399
McBryde-Thomas flat-polar quartic, 1193, 1503
for military mapping, 906, 911–12, 915, 925, 929, 930, 935, 945, 1186–89, 1188
Mollweide (homographic), 88, 89, 568, 1192, 1192, 1503, 1504
oblique, 51, 1173, 1174. *See also* Space Oblique Mercator Projection
optimal conformal, 869, 1184
orthapsidal, 270
orthographic, 580, 714
oval, 37, 38
Oxford, 1173
patents for, 655, 658
perception/cognition and, 1069, 1181
persuasive cartography and, 1088, 1089, 1181
for planetary mapping, 486
plate carrée, 1189, 1192
polyconic, 139, 140, 833, 870–71, 1184, 1186, 1188, 1191
polyeder (polyhedral), 925, 935, 1175, 1176, 1177, 1193–94
Putnjaš, 1503
regional, 1182–84, 1183
satellite imaging and, 270, 272–73, 992, 1656
scale and, 51, 1383, 1385
Snyder's working notes on, 1398
for statistical mapping, 1191–94
for thematic mapping, 112, 1101, 1179, 1191–94, 1503, 1504
Tissot's indicatrix, 55, 1385, 1532, 1532–34, 1533
Tobler on, 869, 1184, 1534
for topographic mapping, 1101, 1185–86, 1589–90
U.S. Geological Survey, 1186, 1193
Van der Grinten, 244, 871, 997, 998, 1179, 1193
virtual globes and, 1385

- Projections (*continued*)
- Wagner, 1503
 - for wall maps, 871, 1173, 1694
 - Waterman, 1177
 - William-Olsson's polar, 1756, 1757
 - Winkel tripel, 999, 1172, 1173, 1193, 1368
 - world projection overview, 1172–74
 - World War I and, 871, 1186, 1188
 - World War II and, 33, 871, 1186, 1775–76
 - Promotion. *See* Advertising; Place promotion
 - Propaganda maps, 1088, 1089. *See also* Political persuasive cartography
 - Property mapping. *See* Cadastral mapping; Cadastral surveying
 - Proportional symbol mapping, 1515–16, 1516
 - Prosperity Map*, 707, 708
 - Provisorische Ausgabe der Österreichische Karte*, 1582
 - Proximity Peace Talks. *See* Dayton peace accords (Bosnia-Herzegovina) (1995)
 - Pruett, Nancy Jones, 1450
 - Pruitt, Evelyn Lord (1918–2000), 1759
 - Prussia. *See also* Germany
 - Franco-Prussian War, 281, 905
 - military mapping, 909
 - national atlases, 96
 - topographic mapping, 176, 474, 909, 914, 959, 1165–66, 1166, 1167, 1573, 1587
 - urban/regional planning, 1165, 1166, 1167
 - Pseudocylindrical projections, 339, 339, 1172, 1182, 1367
 - Boggs eumorphic projection, 1177, 1179, 1193, 1503
 - McBryde-Thomas flat-polar quartic projection, 1193, 1503
 - Pseudolites, 462
 - Psychogeography, 83, 1161
 - Psychology research, 1080–82
 - Psychophysics, 1056, 1064, 1071, 1076, 1082–85
 - “[Ptolemy]” (Muldoon), 783
 - Ptolemy, Claudius (ca. 90–168), 378, 694, 1167
 - Public access to cartographic information, 1227–31, 1228, 1230
 - Public Land Survey System (PLSS) (United States), 279, 280, 1195, 1485
 - Public participation GIS (PPGIS), 268–69, 386, 1403
 - Public Sector Mapping Agency (PSMA) (Australia), 1219
 - Public transportation maps, 1727–33. *See also* Railroad maps
 - cultural/social significance of, 1732
 - recreational maps, 1251, 1251
 - urban, 1239, 1242, 1729–32, 1730. *See also* London Underground Map
 - Public utilities, 424–25, 1210
 - Pugsley, William H. (1912–1993), 247
 - Pulfrich, Carl (1858–1927), 925, 1103, 1126, 1127, 1133, 1137
 - Pulkovo Datum, 477
 - Pulsifer, Peter L., entry by, 366–70
 - Pumain, Denise, entry by, 212–15
 - Pumpelly, Raphael (1837–1923), 443, 1415
 - Punch cards, 209, 1656
 - Purdue University, 494
 - Purism (art movement), 80
 - Pus'kov, V. V., 984
 - Putnam, Claude George, 1352
 - Putniň projections, 1503
 - Putz, Steve, 1752
 - Putzger, Friedrich Wilhelm (1849–1913), 1673
 - PVC. *See* Plastic drawing media
 - Pycnophylactic interpolation, 59, 695, 695, 696, 1514, 1534
 - Pyle, Gerald F. (b. 1938), 404
 - Pynchon, Thomas (b. 1937), 785
 - Pyramid framework, 365
 - Qian, Liujian, 365
 - Quackenbush, Robert S., 1117
 - Quadtree data model, 361–62, 362, 1387, 1440
 - Qualcomm (company), 1718
 - Qualitative generalization, 371
 - Quam, Louis Otto (1906–2001), 1085, 1402
 - Quantitative analysis
 - analytical cartography and, 55–56, 59
 - electoral mapping and, 352
 - ethnographic mapping and, 777
 - geographic information systems and, 494
 - perception/cognition and, 1064
 - statistics and, 1469–70
 - Quantitative generalization, 371
 - Quaritch (company), 248
 - Quartic authalic projection, 1503
 - QuickBird (satellite), 188, 369, 567, 1120
 - Quinn, David B. (1909–2002), 598
 - R. A. Broadbent (Australia) (publisher), 1363
 - R. R. Donnelley & Sons (United States) (publisher), 1095, 1375, 1375–76, 1436
 - R-tree data model, 362, 363
 - Rabenhorst, Thomas D. (b. 1944), 94
 - Race, 1232–37, 1234, 1235, 1236. *See also* Ethnographic mapping
 - choropleth symbolization and, 1091
 - persuasive cartography and, 1091, 1092, 1093
 - redlining, 1235, 1254–59, 1256, 1257, 1258, 1259, 1260
 - social theory on, 1401
 - Races of Europe, *The* (Ripley), 1233, 1234
 - Racons, 1017–18
 - Radar. *See also* Remote sensing
 - for emergency planning, 392
 - for environmental protection, 395
 - for feature extraction, 1291
 - for geodesy, 454, 460
 - for marine charting, 839, 854
 - for meteorology, 392, 874–76, 875, 1279–80, 1281, 1283, 1746
 - military development and applications, 239–40, 368, 392, 460, 891, 917, 1125, 1126, 1279, 1698
 - for navigation, 1016–18, 1017
 - photogrammetric mapping and, 1125, 1126
 - synthetic aperture radar, 537, 538, 992–93, 1024–25, 1286, 1293, 1301
 - trilateration and, 454
 - Radar interferometry, 645
 - Radarsat (satellite) (Canada), 76, 77, 368, 548, 566, 1277, 1286
 - Radarsat Antarctic Mapping Project (RAMP), 70
 - RADARSAT International (corporation), 369
 - Radial line plotting, 1104, 1105, 1106, 1110, 1129, 1549–50
 - Radio
 - for hydrographic surveying, 623–24, 624
 - Milky Way emissions, 86–87, 88
 - for navigation, 843, 902, 1013–16, 1014, 1015, 1016, 1024, 1699, 1775
 - Radio acoustic ranging (RAR), 623–24, 624
 - Radio direction finding (RDF), 1013
 - Radlinski, W. A., 1659
 - Radó, Sándor (Alexander Rado) (1899–1981), 547, 1238–39
 - Raffestin, Claude, 544
 - Rageau, Jean-Pierre, 544
 - Railroad maps, 1239–41. *See also* Public transportation maps
 - advertising and, 19, 1240, 1243, 1621–22, 1623, 1626, 1729
 - evocation of meaning in, 1621, 1623
 - Freytag-Berndt und Artaria KG, 440
 - map design, 1472, 1729
 - persuasive cartography and, 1089
 - pictorial depictions in, 1240–41, 1729, 1730
 - place promotion and, 1636, 1729, 1730
 - Rand McNally & Company, 1245, 1339, 1729
 - revision, 1728–29
 - road mapping and, 1339
 - Railroad Maps of North America: The First Hundred Years (Modelska), 91, 1732
 - Railway junction diagrams (RJDs), 1239
 - Raintree County (Lockridge), 782
 - Raisz, Erwin (Josephus) (1893–1968), 1241–42, 1244
 - academic cartography and, 1–2, 3, 340, 344
 - on accuracy, 1402
 - air-age globalism and, 33
 - on cartograms, 1503, 1516, 1518
 - cartographic dictionaries and, 317
 - on choropleth symbolization, 221, 1515
 - on color, 259
 - on definitions of “map,” 799
 - on demographic mapping, 311, 314
 - on drafting, 330, 333, 1148

- on drawing instruments, 327–28
on drawing media, 330
on generalization, 371
on geography and cartography, 524–25
Richard E. Harrison's influence on, 582
historical cartography and, 598, 598
history of cartography and, 610, 611
influence on Thrower, 1525
journalistic cartography and, 714
on labeling, 738
map societies and, 1419, 1420
perspective maps by, 1023
physiographic diagrams, 598, 1154–55, 1155, 1244, 1269
on projections, 270, 871
on proportional symbol mapping, 1516, 1516
signature style, 1472
on statistical mapping, 1465
on temporal dynamics, 1529
on thematic mapping, 1505, 1507
on three-dimensional mapping, 1520
- Ralphs, Howland D., 1050
Ramaswamy, Sumathi, 304
Rand, W. R., 1372
Rand, William (d. 1905), 1244
RAND Corporation, 5
Rand McNally & Co.'s Commercial Atlas of America, 1729
Rand McNally & Company (publisher) (United States), 1244–48
advertising, 260, 1245, 1246–47
aeronautical charts, 24, 1245
airline maps, 36
Auto Trails maps, 618, 1344, 1346, 1737
cloth maps, 234, 234
color, 260
cycling maps, 1736
electronic cartography development impacts, 358, 1247
geographic information systems and, 1436
globes, 33
Goode's School Atlas, 104, 108, 115, 340, 568, 1245–46, 1401, 1503
H. M. Gousha Company and, 616, 618, 1348
indexed street maps, 1716
map pins, 815, 815
map reproduction, 1245, 1318, 1322, 1401, 1702, 1703
military mapping and, 886
oil company maps, 260, 1345, 1351
railroad maps, 1245, 1339, 1729
regional atlases, 104, 105
road atlases, 1348, 1733, 1735
Robinson projection and, 1366, 1367–68
route guides, 1342, 1343
symbolization, 1737
thematic mapping, 1503
wall maps, 1694
women in cartography and, 1760
world atlases, 108, 115–16, 568, 1177, 1247, 1248, 1249, 1503
World War II and, 1247
- Randall, Richard R. (b. 1925), 134
entry by, 133–35
Randall, Robert H., 1405
Rankin, William J., entry by, 551–58
Raper, Jonathan, 365
Rapidograph, 1150
Rapkin, Chester, 752
Rapp, Richard H. (b. 1937), 427, 461, 536–37
RAR (radio acoustic ranging), 623–24, 624
Raster data model. *See* Grid/raster date models; Tesselation data models
Raster printers, 1325
Ratajski, Lech (1921–1977), 9, 9, 371, 1249
Ratzel, Friedrich (1844–1904), 340, 539
Raumforschung und Raumordnung (ARL), 41
Rauschenberg, Robert (1925–2008), 82, 83
Raven Maps series, 1436
Ravenstein, Ernst (1891–1953), 1249–50
Ravenstein, Hans (1866–1934), 1249
Ravenstein, Helga (1919–1995), 1250
Ravenstein, Helmut, 1250
Ravenstein-Liebenous Rad(fahrer)- und Automobilkarte von Mittel-Europa, 1250, 1362
Ravenstein Verlag (publisher) (Germany), 1249–50, 1362, 1707
Ravensteins Deutsche Kriegskarte, 1249
Raymor, Keith, 432
Rayner, John N., 59
RDF (radio direction finding), 1013
Reader's Digest, 703, 1747
Reading maps. *See* Communication paradigm; Perception/cognition
Readymade objects in art, 80, 80
Real estate. *See* Cadastral mapping; Cadastral surveying
Real Sociedad Geográfica de Madrid, 1418
Real-time data, 227
Real-Time Kinematic Differential GPS, 628
Real vs. virtual maps, 56–57, 57
Reaney, James (1926–2008), 785
Reber, Grote (1911–2002), 86–87, 88
Recreational maps, 1250–54, 1253. *See also* Cycling maps; Hiking/trail maps; Place promotion; Road mapping
art and, 1251, 1251, 1332, 1333
cloth, 234, 235
governmental agencies and, 1345, 1348
images as maps, 1251, 1252
mass marketing and, 861–62
place promotion and, 1636
postcard maps, 1250–51, 1251
scale in, 43
Rectangular mesh data model, 361
Recurrent landscape patterns (RLPs), 1497, 1499
Red Argentina de Monitoreo Satelital Continuo (RAMSAC), 469
Red Book (Harvard Laboratory for Computer Graphics and Spatial Analysis), 583
Red Book (Paris Peace Conference), 701
- Red Geodésica Nacional Activa (RGNA) (Mexico), 469
Red Guides. *See* Michelin Maps and Guides
Red Record (Wallum Olum), 287
Rede Brasileira de Monitoramento Contínuo dos Sistemas GNSS (Global Navigation Satellite System) (RBMC), 469
Redistricting, 210
Redlining, 1235, 1254–60, 1256, 1257, 1258, 1259, 1260
Redshifts, 85–86, 88
Reed, Henry (1914–1986), 785
Reed, Henry A. (1844–1930), 326
Reeves, Edward Ayearst (1862–1945), 1372
Reference atlases
Andree, 721, 1531, 1673, 1674, 1690
Debes, 1690, 1691, 1692
demographic mapping in, 311
Stieler, 115, 721, 723, 723, 1690
Teleki, 1690–91
Reference datums. *See* Geodetic datums
Reference ellipsoids, 465. *See also* Ellipsoidal projections; Geodetic reference systems
Australia, 485
Bessel ellipsoid, 836, 927, 1589
Clarke ellipsoid, 473
defined, 425, 1187
geodesics and, 166
geoidal undulations and, 425–26
gravimetric surveys and, 455, 459, 460
International (Hayford) ellipsoid, 425, 475, 593, 651, 836
Krasovskiy ellipsoid, 477, 481, 981, 982, 1589, 1604, 1639
Latin America, 469, 836
for lunar and planetary mapping, 486
for Napoleonic military mapping, 905
secrecy and, 199
Struve ellipsoid, 651
for World Geodetic System, 463, 473, 891
Reference spheroids, 465, 479, 483, 484, 935
Référentiel à grande échelle (RGE) (France), 650
Reformation der Kartographie um 1700, Die (Sandler), 609
Regional atlases, 18, 101–6, 102–3, 104, 106
Regional Atlases (IGU Commission on National Atlases), 97, 1382
Regional Centre for Training in Aerial Surveys (RECTAS) (Nigeria), 687
Regional Income Atlas of Madhya Pradesh, 102, 105
Regional Plan of New York and Its Environs, 1158–59
Regional projections, 1182–84, 1183
Regional Survey of New York and Its Environs, 752
Regionalization, 379–80. *See also* Boundary delineation
Reichsamt für Landesaufnahme (RfL) (Germany), 17, 176–77, 474, 914, 915, 916, 1166

- Reichsarbeitsgemeinschaft für Raumforschung (RAGfR) (Germany), 41
- Reichsstelle für Raumordnung (Germany), 17
- Reilly, James, entry by, 1132–36
- Reilly, W. I., 1185
- Reinhartz, Dennis, entries by, 860–62, 1250–54
- Reitz, F. H., 37
- Relational databases, 1441
- Reliability diagrams, 147, 1642, 1643, 1697, 1780. *See also* Uncertainty
- Relief depictions, 1260–72, 1547. *See also* Alpine cartography; Imhof's cartographic style; Physiographic diagrams; Relief models
- aerial photography and, 1262, 1264, 1265, 1271, 1299
- in aeronautical charts, 22, 24
- airbrush for, 35, 35
- in airline maps, 37
- in Austrian military mapping, 925
- automation and, 1484
- in colonial/imperial cartography, 1566, 1568, 1573
- color for, 22, 1262, 1267, 1268–69, 1270, 1271
- Eckert on, 338
- electronic cartography development impacts, 1262, 1263, 1266, 1269, 1271
- in globes, 564
- Richard E. Harrison, 580, 580, 581
- in Himalaya cartography, 594, 595
- International Map of the World, 689
- John Bartholomew & Son, 701
- mapping software and, 1430
- military development and applications, 1264–65, 1265, 1266
- for military mapping, 911
- Ordnance Survey, 1579–80
- orthographical relief method, 1269, 1271, 1483–84, 1484, 1485
- Karl Peucker on, 1101, 1271
- relief maps, 1260–63
- shading, 345, 1267–72
- Swiss style, 1261–62, 1267. *See also* Imhof's cartographic style
- in textbooks, 345
- in thematic atlases, 113
- in world atlases, 115
- Relief maps, 1260–63. *See also* Relief depictions
- Relief models, 1260, 1261, 1263–67
- color photographs of, 1333, 1334
- halftone photographs of, 1151, 1309, 1309, 1317, 1318, 1332
- limitations of, 1269
- military development and applications, 1264–65, 1265, 1266
- pedagogic role of cartography and, 1262
- Religion, 113
- Ralph, E. C., 811, 812
- Remote sensing, 1273–1303. *See also* Lidar; Satellite geodesy; Satellite imaging
- for administrative cartography, 16, 1294–95
- art and, 83
- biogeographical cartography and, 128
- boundary delineation and, 380–81
- boundary disputes and, 138
- cartometry and, 203, 204
- Chen Shupeng on, 215, 216
- for Chinese military mapping, 946, 948
- Cold War and, 239, 368
- in colonial/imperial cartography, 255
- color and, 263
- cruise missiles and, 290
- data models and, 361, 372, 992
- defined, 1273–74, 1298
- development of, 368, 1273, 1298–1303
- earth observation uses of, 1274–80
- emergency planning and, 392
- environmental protection and, 394
- forestry and, 436
- fractal representation and, 438
- geographical mapping and, 522
- geologic mapping and, 526
- GEOSPACE, 548
- hazard/risk mapping and, 592
- for Himalaya cartography, 595
- hydrography and, 630
- intellectual property and, 656
- for land systems analysis, 750
- land use maps and, 752
- map libraries and, 768
- for marine charting, 827
- mass marketing and, 861
- mathematics and, 869
- for meteorology. *See* Remote sensing for meteorology
- metric system in, 878
- ozone depletion measurement, 1274–75, 1276
- pedagogic role of cartography and, 348
- photointerpretation and, 1120
- public access to cartographic information and, 1227–28
- societies for, 1423–26
- spatial analysis and, 489
- Remote Sensing and Photogrammetry Society (RSPoc) (United Kingdom), 1425
- Remote sensing for meteorology, 874, 1275, 1279–80, 1281
- television and, 1744, 1746, 1747
- TIROS, 370, 566, 630, 806, 873, 991, 1274, 1283, 1291
- Rémur, Tanguy de, 1025
- Renaud, Joseph (1854–1921), 680, 682
- Rennell, James (1742–1830), 1473
- Reordering, 62
- Repast (software), 497
- Report of the Committee of Enquiry into the Handling of Geographic Information (Chorley Report) (1987) (United Kingdom), 1304–5, 1455
- Report of the Federal Mapping Task Force on Mapping, Charting, Geodesy and Surveying (United States), 1299
- Representative fraction, 1383, 1385–86. *See also* Scale
- Reps, John William, 603
- Republic of the Congo (Brazzaville), 136, 138, 138. *See also* Africa
- Research. *See* Academic cartography
- Réseau Européen, 475, 476
- Réseau Européen Trigonométrique (RETrig), 460, 476–77, 478
- Réseau Européen Unifié de Nivellement (REUN), 477, 478
- Resource surveys. *See* Natural resource management
- Resurs (satellite), 1286, 1301
- RETrig (Réseau Européen Trigonométrique), 460, 476–77, 478
- Return of the Native, The* (Hardy), 783
- Reuben, Walter, 246
- Reuter, D. Dayton, 758
- Revision of maps. *See* Map revision
- Revista Brasileira de Cartografia, 1408
- Revue de Carto-Québec (journal), 1407
- Rey, Paul (b. 1918), 125
- Reynolds, John H. (1877–1937), 1085
- RfL (Reichsamt für Landesaufnahme) (Germany), 17, 176–77, 474, 914, 915, 916, 1166
- RGO (Russkoye geograficheskoye obshchestvo), 549, 1213, 1379, 1379–81, 1417, 1591
- RGS. *See* Royal Geographical Society
- Rhein-Mainischer Atlas für Wirtschaft, Verwaltung und Unterricht, 102, 103
- Rheingold, Howard (b. 1947), 1680
- Rhind, David (b. 1943)
- analytical cartography and, 56, 59
- on cartographic conventions, 276–77
- Chorley Report and, 1304
- Experimental Cartography Unit and, 418
- on geographic information systems, 1438, 1440
- on geospatial data marketing, 858
- Ordnance Survey and, 1039
- on public access to cartographic information, 1227
- urban atlases, 105
- Rice, Alexander Hamilton (1875–1956), 1242
- Rice, Matthew T., 1724–25
- entries by, 284–85, 1722–26
- Richardson, Lewis Fry (1881–1953), 205, 876
- Richer, Jean (d. 1696), 454
- Richter, Charles (1900–1985), 530
- Riddiford, Charles E., 997
- Riddley Walker (Hoban), 787
- Riemann, Bernhard (1826–1866), 867
- Riemann mapping theorem, 867
- Rikets allmänna kartverk (RAK) (Sweden), 409, 961
- Rinker, J. N., 1656
- Rinner, Karl (1912–1991), 1130
- Rio Grande river, 144
- Rio Protocol (1942), 151

- Ríos, Rolando O., entry by, 835–36
Ripley, William Zebina (1867–1941), 1233, 1234, 1401
Ripley's K, 498
Rishel, W. D. (1869–1947), 1342, 1343
Rishel's Routes, 1343
Risk mapping. *See* Hazard/risk mapping
Ristow, Walter W. (1908–2006), 715, 1088, 1337–39, 1402, 1422, 1732
Ritter, Carl (1779–1859), 378, 1415
Ritzlin, George, 247
River maps, 1368, 1370, 1370, 1633
Road Atlas and Touring Guide of Southern Africa, 1358
Road Atlas of Britain, The, 703
Road atlases, 119–20, 120, 1348, 1733–34, 1734, 1735
Road mapping, 1245, 1339–65, 1340, 1626–27. *See also* American Automobile Association
administrative cartography and, 1345, 1348, 1348, 1351, 1356, 1356, 1361
advertising and, 19, 617, 618, 1345, 1348–49
Africa, 1355–59, 1356, 1357, 1358, 1359
Australia/Oceania, 1363–65, 1364
automobile advocacy and, 1339–40, 1342–43, 1344–45, 1347, 1350
Automobile Association (United Kingdom), 119–20
color in, 120, 258, 260, 261, 618, 1361, 1736, 1737, 1738
customization in, 292–93, 618
cycling maps and, 1339–40, 1341, 1359, 1361, 1361, 1363, 1364, 1733
Europe overview, 1359–63, 1360, 1361, 1362
folding strategies, 24, 879–80, 1336
Freytag-Berndt und Artaria KG, 440, 441, 442
geographical discovery and, 1392
H. M. Gousha Company, 36, 616–18, 617
Hallwag Kümmerly+Frey AG, 573, 574
Institut Géographique National, 650
Latin America, 1350–55, 1354, 1355
limitations of, 1716–17
map revision for, 1339, 1345
mass marketing and, 861
as metaphor, 807

- Roszak, Theodore (b. 1933), 613
 Rothaug, Johann Georg (1850–1924), 440, 441
 Rothaug, Rudolf, 440
Roths skolatlas, 408
 Rotogravure, 1314, 1317, 1319, 1331
 Rough sets, 15
 Route guides, 1342, 1342, 1343, 1343
 Route maps, 1368–71. *See also* Web-based wayfinding
 in colonial/imperial cartography, 1357, 1358
 as decoration, 310
 early, 47, 47
 in in-vehicle navigation systems, 1719
 Panama Canal and, 1368, 1369
 river routes, 1368, 1370, 1370
 TripTiks, 48, 48, 292–93, 1346, 1368–69, 1738
 Rowell, Jonathan, entry by, 1480–83
 Rowland, F. S. (b. 1927), 1274, 1275
 Rowling, J. K. (b. 1965), 216
 Royal Association for Disability and Rehabilitation (RADAR), 1742
 Royal Australian Navy Hydrographic Service (RANHS), 854
 Royal Australian Survey Corps, 483, 974–76
 Royal Automobile Club (United Kingdom), 1737
 Royal Colonial Institute (United Kingdom), 321
 Royal Engineers (United Kingdom), 1490
 Royal Geographical Society (RGS) (United Kingdom), 1371–75
 Africa and, 1409
 Antarctica maps, 65, 1371
 biogeographical cartography and, 124
 colonial/imperial cartography and, 321, 1565
 demographic mapping and, 311
 Eastern European boundary changes and, 336
 founding of, 1417
 geographic names and, 1085
 Himalaya cartography and, 594
 Hinks' role in, 597, 1372, 1373
 Holdich and, 619, 1371
 International Map of the World role, 689, 763, 1373, 1374
 map design, 1372, 1372
 mass marketing and, 861
 pen-and-ink drafting, 331–32
 post–World War I settlement and, 1373
 Victoria Medal, 43
 World War I and, 1373, 1539, 1540, 1666
 World War II and, 1373, 1419
 Royal Library (Dresden), 191
 Royal Naval Hydrographic Office (United Kingdom), 836
 Royal Scottish Geographical Society, 703
Royal Scottish Geographical Society's Atlas of Scotland, The, 96
 Royal Thai Survey Department, 169
 Rub-down lettering. *See* Dry transfer lettering; Mechanical lettering techniques
 Rubel, Ira W. (d. 1908), 1323, 1331
 Rubin, Claire B., 389
 Rubin, Tryggve (1874–1946), 473
 Ruddell, Albert H. (d. 2008), 247
 Rüeger, J. M. (b. 1944), 1222
 Rüegger, Hans (d. 1517), 1041
 Ruger, Albert (1829–1899), 1020
Rules for a Dictionary Catalog (Cutter), 190–91
 Ruling pens, 326, 327, 1146, 1147
 Rumsey, David (b. 1944), 91, 247
Rundschrift, 738
 Rundstrom, Robert, entry by, 640, 641–44
Rural Population Density in the Southern Appalachians (Marschner), 862
 Rushton, Gerard, 500
 Russia. *See* Russian Empire; Russian Federation; Soviet Union
 Russian Arctic Ocean Hydrographic Expedition, 74
 Russian Civil War (1917–1923), 934–35, 949, 1592, 1768
 Russian Empire
 academic cartography, 981–82
 Arctic expeditions, 74
 cadastral surveying, 1212–13, 1212–13, 1214
 general land survey, 1379–80
 geodetic surveying, 479, 1380
 marine charting, 846
 military mapping, 931–34, 933, 934, 967
 national atlases, 96
 political boundaries, 139
 regional atlases, 101, 104
 Russian Geographical Society, 1379–80
 topographic mapping, 1213, 1587, 1591, 1591–92
 U.S. maritime boundary dispute, 139–40, 140
 Russian Federation, 1377–79
 academic cartography, 1378–79
 Arctic territorial claims, 76
 cadastral surveying, 1378
 digital databases, 1377–78
 founding of, 1377
 geodetic surveying, 1377
 marine charting, 848, 849
 military mapping, 940–41
 national atlases, 100
 topographic mapping, 551, 1377–78, 1596, 1597
 Russian Revolution, 16
 Russkoye geograficheskoye obshchestvo (RGO), 549, 1213, 1379, 1379–81, 1417, 1591
 Russo-Japanese War (1904–1905), 932, 949
 Ruth, Charles H. (1889–1949), 886
 Ryckman, Nancy B., 782
 Rymill, John (1905–1968), 64
 Rystedt, Bengt, 56
 entries by, 117–19, 1644–49, 1755–56
 Saalfeld, Alan, 60
Saar-Atlas, 102, 103
 Saarinen, Thomas F. (b. 1934), 415, 1069
 Saastamoinen, Jouko H., 424
 SAD (South American Datum), 469
 Šafárik, Pavel Jozef (1795–1861), 776
 Sagarmatha National Park, 595–96
 SAGE (Semi-Automatic Ground Environment), 1534, 1668, 1681
 Said, Edward W. (1935–2003), 308
 Sale, Randall D., 2, 341
 Salem State University, 343
 Salishchev, Konstantin Alekseyevich (1905–1988), 1382–83
 academic cartography and, 7–8, 10, 342
 Bol'shoy sovetskiy atlas mira and, 135, 1382
 on cartographic journals, 719
 Chinese military mapping and, 945
 ICA conferences, 1641
 MIIGAiK and, 983
 on national atlases, 96, 97
 regional atlases by, 101
 Salt, John Scarlett Alexander (b. 1905), 899
 Salyut-6 (space station), 1284
 SAMOS (satellite), 1123–24, 1669
 Sampling theorem, 58, 59, 60
 Sanborn Map Company, 428
 Sanborn maps, 428, 429, 430, 601
 Sandler, C. (1858–1912), 609, 609
 Sandwell, David T., 537, 631, 1026, 1028
 Sandwich theorem, 868
 Sandy Hook Datum, 1135
 Sansò, Fernando (b. 1945), 460–61, 980
 Santarém, Manuel Francisco de Barros e Sousa, Visconde de (1791–1856), 91, 285, 335
 Santoni, Ermenegildo (1896–1970), 922, 1130
 SAR (synthetic aperture radar), 537, 538, 992–93, 1024–25, 1286, 1293, 1301
 SARA (Superfund Amendments and Re-authorization Act). *See* Emergency Planning and Community Right-to-Know Act
 Satellite altimetry, 70, 461, 628, 628, 630, 631
 Satellite geodesy, 456–59, 461. *See also* Doppler positioning; Global Positioning System; GLONASS; World Geodetic System
 accuracy, 14, 456, 457, 459
 Antarctica, 69–70
 boundary surveying and, 156
 Cold War and, 239, 240
 comparison chart, 457
 computations for, 461
 Europe, 477–78, 477
 figure of the earth and, 426, 427
 gravimetric surveys and, 455
 International Geophysical Year and, 536, 679, 679
 Latin America, 468
 lunar laser ranging, 461, 477

- for marine charting, 820, 821, 854
satellite laser ranging, 461, 477
SECOR, 457, 458–59, 458
stellar triangulation, 426, 457, 457, 458
very long baseline interferometry, 461, 477
- Satellite image maps, 1282
- Satellite imaging. *See also* Global Positioning Systems; Landsat; Remote sensing; Satellite geodesy
accuracy, 1283
Antarctica maps and, 68, 71, 1277, 1283–85, 1544
Arctic maps and, 76, 77
astrophysics and, 88
for bathymetric mapping, 819, 1026, 1027
for biogeographical cartography, 1278–79, 1279
cadastral surveying and, 188, 1216
cartographic applications overview, 1282, 1282–88, 1287
in cartographic journals, 718
for Chinese military mapping, 946
cinema maps and, 227
for coastal mapping, 236, 1286
Cold War and, 239, 806, 890–91, 1291, 1299–1300. *See also* Corona
commercial applications, 369, 1301, 1302, 1303
coordinate systems and, 284, 291
dasymetric symbolization and, 298, 300
data handling/analysis, 1288–94, 1289, 1290
data models and, 361, 992
development of, 368, 1273, 1283
earth-from-space perspective and, 566–67
earth's radiation budget measurement, 1275–76, 1277
emergency planning and, 390–92
environmental protection and, 394
European Union, 418
feature extraction and, 1120, 1291–93, 1292
geographic information systems and, 992
geographical discovery and, 1391–92, 1391
geographical mapping and, 522
geophysics and, 536, 537
hydrography and, 626, 628, 628, 629–32, 1024–25
for ice sheet observation, 1277, 1278
image processing software and, 501
images as maps and, 806, 1335, 1336
indigenous peoples and, 642
Inter-American Geodetic Survey and, 664–65
for Israeli military mapping, 930
land use maps and, 752
for map revision, 1294–98, 1295, 1296, 1297
mapping software and, 1430
for marine charting, 819, 839, 854
for meteorology. See Remote sensing for meteorology
- military development and applications, 239, 572, 806, 890–91, 908, 1291, 1299–1300, 1670
for military mapping of the Middle East, 970
NASA development of, 991–92
national atlases and, 215
National Geographic Society and, 997, 999
for oceanography, 1276–77, 1278
ozone depletion measurement, 1274–75, 1276
pattern recognition, 1293–94
photogrammetric mapping and, 68, 1124–25
photointerpretation and, 1120
photomaps and, 1335, 1336
privacy issues, 1171, 1301
projections and, 270, 272–73, 992, 1656
public access to cartographic information and, 1227–28, 1229, 1230–31
relief depictions and, 1262
for Soviet military mapping, 940
for topographic mapping, 649, 1543, 1550, 1595, 1600
UN Committee on the Peaceful Uses of Outer Space and, 1648
urban mapping and, 1652, 1655
weather maps and, 293
- Satellite laser ranging (SLR), 461, 477
- Satellite navigation systems, 1018–19, 1024. *See also* Global Positioning System; GLONASS; Transit System
for cadastral surveying, 1226
Cicada (Tskikada), 1018
Compass, 284, 551, 843
Galileo, 284, 418, 462, 551, 556, 843
- Satellite Pour l'Observation de la Terre. *See* SPOT
- Satellite radar altimetry, 70, 628, 628
- Satire, 812, 813
- Saudi Arabia, 167, 970, 1161, 1162, 1600. *See also* Middle East
- Sauer, Carl Ortwin (1889–1975), 603, 752, 811
- Saxton, Christopher (1542/44–1610/11), 1001–2
- Saxton, Joseph, 1526
- Sayre v. Moore, 655
- Scalarization, 500
- Scale, 1383–89, 1384. *See also* Cartograms; Generalization; Zoom
accuracy and, 13–14, 1386
in administrative cartography, 17
aerial photography and, 1386
in aeronautical charts, 22, 26
in alpine cartography, 43
in anaglyph maps, 55
astrophysics and, 89
in boundary surveying, 136, 147, 154, 158, 161, 162, 163, 169, 171
British colonial/imperial cartography maps, 322, 324, 325
in cadastral mapping, 184–85
- in cadastral surveying, 1214
cartograms, 193–97
in climate maps, 228
coordinate systems and, 281
in cycling maps, 1709
electronic cartography development impacts, 810, 1386–87
Global Positioning System and, 555
in hazard/risk mapping, 589, 589, 590
in historic preservation maps, 601
International Map of the World, 523
in marine charting, 822
mathematics and, 869
metric system and, 877–78
in military mapping, 888, 896, 897, 911, 916, 935, 964, 969, 1772, 1772, 1776–77
multiple representations, 1387–88, 1387, 1388
- in national atlases, 116, 119
in Ordnance Survey maps, 1032, 1034–35
- in photogrammetric mapping, 1140–41
photomechanical processes and, 1317
projections and, 51, 1383, 1385
in railroad maps, 1239
remote sensing and, 368
in road atlases, 119, 1733
in school atlases, 108
scientific definitions of, 1385–86
in subscription atlases, 110
in SYMAP, 1478, 1478
Tissot's indicatrix, 55, 1385, 1532–34, 1532, 1533
- in topographic mapping, 180, 181, 1383, 1539, 1546, 1572
- in wall maps, 1694
- in world atlases, 115
- Scale bars, 1697
- Scandinavia, 56, 1043. *See also specific countries*
military mapping of, 961–62
- Scanning, 18–19, 189–90, 357, 367, 382, 489, 661, 1266. *See also* Data capture; Digitization
- Scanning Hydrographic Operational Airborne Lidar Survey (SHOALS), 625
- SCAR (Scientific Committee on Antarctic Research), 68, 69, 70, 1543
- Scarborough Company (United States), 1733
- Scatterplots, 421–22
- SceneWorks (software), 433
- Schäfer, Wolf, 1180
- Schattenplastik und Farbenplastik* (Poiker), 6
- Schaubel, Earl, entry by, 951–52
- Schawlow, Arthur L. (1921–1999), 774
- Schee, L. H. van der, 1681
- Scheimpflug, Theodor (1865–1911), 367, 925, 1104, 1133, 1136, 1137, 1142
- Scheller, Otto (1876–1948), 1013
- Schenkel, Robert, 55, 619
- Schermerhorn, Willem (1894–1977), 342, 685–86, 1611
- Schier, Wilhelm (1880–1956), 1675

- Schlüter, Otto (1872–1959), 341
 Schmid, Calvin F., 288
 Schmid, Hellmut H. (1914–1998), 1130
 Schmid, Stanton E., 288
 Schmid, Walter, 573
 Schmidt, Allan H., 583, 584, 1440
 entries by, 582–85, 1477–79
 Schmidt, Manuela, entry by, 1739–42
 Schmidt, Warren E., 1664
 Schneider, Erwin (1906–1987), 45, 595
 Schnell, George A., 312
 Schodek, Daniel L. (b. 1941), 584
School Atlas of English History, A (Rawson), 93
 School atlases, 106–10, 108
 Freytag-Berndt und Artaria KG, 440, 441
 Goode's, 104, 108, 115, 340, 568, 1245–46, 1401, 1503
 historical, 92
 interwar period, 107–8
 Japan, 110
 Justus Perthes, 107, 721, 722
 nation-state formation/maintenance and, 1002
 Orell Füssli Kartographie AG, 1041, 1042, 1043
 persuasive cartography in, 987
 Karl Peucker, 1101
 Soviet Union, 108, 109
 Velhagen & Klasing, 1673
 Verlag Ed. Hözel, 1676, 1676
 Wagner & Debes, 1690, 1691, 1693
 Westermann Verlag, 1755
 School for Photogrammetric and Cartographic Operators (Pusat Pendidikan Fotogrametri dan Kartografi) (PPFK) (Indonesia), 687
 “School Globe, The” (Reaney), 785
 Schools. *See* Pedagogic role of cartography; School atlases
 Schroeder, Paul, 268
 Schroeter, George, 49–50
 Schrutka-Rechtenstamm, G. (1910–1995), 486
Schulatlas (Sydow), 721
 Schulman, Irving I., 1663
 Schulten, Susan, 415, 1002
 entries by, 115–16, 706–18, 996–1000, 1244–47
 Schumacher, Rupert von (b. 1908), 541–42, 544, 1003
 Schut, Gerhardus H., 1109, 1130
 Schut, H., 1553
 Schutzler, Herwig, 1376
 Schwartz, Seymour I. (b. 1928), 247
 Schwartzberg, Joseph E., 53
 Schwarz, Hermann Amandus (1843–1921), 271
 Schwarzkopf, Norman (b. 1934), 569
 Schweizer Alpen-Club (SAC) (Switzerland), 179, 736, 1267
 Schweizerische Gesellschaft für Kartographie, 726
 Schweizerische Naturforschende Gesellschaft, 179
Schweizerischen Mittelschulatlas, 640, 1268
Schweizerischer Sekundarschulatlas, 640
 Schwind, Hans-Dieter, 288
 Science fiction. *See* Literature and cartography
 Scientific Committee on Antarctic Research (SCAR), 68, 69, 70, 1543
 Scientific Committee on Oceanic Research, 445
 Scientific discovery. *See* Geographical discovery
 Scientific visualization, 1685
 Scotland, 96. *See also* United Kingdom
 Scott, Effie Davidson, entry by, 862–63
 Scott, James C., 1000
 Scott, Robert Falcon (1868–1912), 64, 1418
 Scott Polar Research Institute, 68
 Scribing, 804, 1153, 1320–21, 1332, 1333, 1394–96, 1395
 drawing instruments and, 328–29, 1395
 drawing media and, 330, 1151–52, 1394
 for geologic mapping, 527
 labeling and, 739
 pen-and-ink drafting and, 334
 prepress techniques and, 1328
 printing and, 804, 1310
 thematic mapping and, 1505
 U.S. Geological Survey, 1661, 1663
 Scrope, George Poulett (1797–1876), 298
 Scudéry, Madeleine de (1607–1701), 782
 SDIs. *See* Spatial data infrastructures
 SDTS (Spatial Data Transfer Standard), 1431, 1455, 1642
Sea Ice Climatic Atlas, Northern Canadian Waters, 1971–2000 (Environment Canada), 76
 Sea of Japan, 514–15
 Sea-surface altimetry, 536–37, 630
 “Sea Unicorns and Land Unicorns” (Moore), 785
 Seafloor mapping. *See also* Bathymetric mapping; Oceanography
 geographical discovery and, 1392, 1393
 National Geographic Society, 997, 999, 1022, 1025
 physiographic diagrams for, 531, 532–33, 854, 997, 999, 1022, 1025, 1026–27, 1392, 1393
 plate tectonics and, 531, 532–33, 1025, 1392, 1499–1500
 sonar for, 848
 Tharp and Heezen, 531, 532, 1022, 1025, 1392, 1393, 1499–1500
 Seager, Joni, 1760
 Seamless Administrative Boundaries of Europe (SABE), 267, 417, 1586
 Seasat (satellite), 536, 631, 992, 1024, 1286
 Seaver, Kirsten A., entries by, 1678–80, 1756–57
 SeaWiFS (Sea-viewing Wide Field-of-view Sensor), 630–31
 SECOR (sequential collation of range) geodetic satellite system, 457, 458–59, 458
 Secrecy. *See also* Cartographic duplicity; Selective Availability policy
 Cold War and, 239, 241, 244–45, 667, 669, 1696, 1698
 cruise missiles and, 291
 East Germany, 198, 245, 1735
 Eastern Europe, 241, 245, 1589, 1590
 facilities maps and, 424, 425
 geodetic surveying and, 199
 Global Positioning System and, 244, 284, 553, 557
 gravimetric surveys and, 456
 in military mapping, 931–32, 939, 940, 962, 973, 1696
 Nazi Germany, 1692
 road mapping symbolization and, 1735
 Russian Federation, 1377
 Soviet Union, 136, 244–45, 550, 1213–14, 1641, 1698
 topographic mapping, 1587, 1589, 1590
 world atlases and, 136
 World War II and, 1169
Secret Ladder, The (Harris), 785
Secrets of Crewe House (Stuart), 539
Section and Party (Archer & Taylor), 352
 Section géographique militaire (France), 646–47
 Sector principle for territorial claims, 73–74, 76
 Sectored circles (pie charts), 112, 113
 Segal, Ronald (b. 1932), 116, 1516, 1517
 Segments. *See* Boundary delineation
 Segoe, Ladislas, 752
 Seismological mapping, 535–36, 537
 gravimetric surveys and, 530
 hazard/risk mapping and, 585, 586, 590, 592
 Japan, 731
 plate tectonics and, 532, 533–34, 533, 534, 1025
Selected Map and Book Accessions (Bodleian Library), 1450
 Selective Availability policy (U.S. Department of Defense), 284, 553
 augmentation systems and, 557
 cadastral surveying and, 1226
 Gulf War (1991) and, 572, 892
 hydrography and, 632
 in-vehicle navigation systems and, 661, 1717
 public access to cartographic information and, 1229
 web-based wayfinding and, 1740
 Semana Cartográfica de América Central, 1563
 Semana Geomática, 388
 Semantics, 7
 Seménov-Tyan-Shanskiy, V. P. (Benjamin) (1870–1942), 214, 214, 298, 1503
Sémiologie graphique (Semiology of Graphics) (Bertin), 6, 7, 122–23, 345, 1466, 1509

- Semiology, 6–7, 8, 122–23, 123
Semiotics, 612
Semivariogram, 1291
Semple, Ellen Churchill (1863–1932), 1050
Senefelder, Alois (1771–1834), 738
Senegal, 305. *See also* Africa
Sensai Fukkōin (War Rehabilitation Commission) (Japan), 1608
Sense of place, 811, 811–14
September 11, 2001 terrorist attacks, 391, 391, 587, 1670, 1671
Serial Atlas of the Marine Environment (American Geographical Society), 53
Series of County Outline Maps of the South-eastern United States for the Period 1790–1860, A (Birdsall & Florin), 94
Serpell, David, 1039, 1304
Servants of the Map (Barrett), 785
Service de la carte phytogéographique (France), 125, 127
Service géographique de l'armée (SGA) (France). *See also* Institut Géographique National
aeronautical charts, 22
colonial/imperial cartography, 255, 956
creation of, 281, 905
geodetic surveying, 474
Middle East, 1598
organization chart, 906
photogrammetric mapping, 1106, 1108, 1580, 1582, 1697
relief models, 1265
terrain analysis, 1490, 1492
topographic mapping, 1568
World War I and, 645–46, 906, 907, 1490, 1770
World War II and, 964, 1584
Service géographique de l'armée (Syria), 1600
Service hydrographique et océanographique de la Marine (SHOM) (France), 621, 623, 629, 842
Servicio Geográfico del Ejército and Departamento Cartográfico (Mexico), 1561, 1563
Servicio Geográfico Militar (Uruguay), 1560
Settling of North America, The (Tanner), 92
Seward, William Henry (1801–1872), 139
Seymour, Charles (1885–1963), 1049–50
SGA. *See* Service géographique de l'armée
SGN (Space Geodetic Network) (Soviet Union), 481, 482, 1596
Shabanova, A. I., 1641
Shackleton, Ernest Henry (1874–1922), 64, 701, 1418
Shading, 345, 1267–72. *See also* Grayscale; Relief depictions
Shadow hachures. *See* Hachures
Shadows on the North Sea: A Hitler-Eye View of Britain, 712, 714
Shaler, Nathaniel Southgate (1841–1906), 700
Shalikashvili, John M. (1936–2011), 892
Shand, M. C., 728
Shane, C. D. (1895–1983), 85
Shantz, Homer L. (1876–1958), 434, 436
Shapefiles (data format), 1431
Shapley, Harlow (1885–1972), 84–85
Sharbau, Henry (1822–1904), 1372
Sharp, John, 1131, 1439
Shattuck, George Burbank (b. 1869), 1416
Shaw, Mary Alison (b. 1932), 1440
Shea, K. Stuart (b. 1957), 59, 371
Sheffield Research Program, 217
Sheffner, Edwin J., entry by, 754–58
Shelberg, Mark C., 59
Shell, Jacob, entries by, 806–8, 1157–62
Shelton, Hal (1916–2004), 1396–97, 1397
airbrush use, 35, 1396
airline maps, 37, 38, 38, 1396
Richard E. Harrison's influence on, 582
relief depictions, 1262, 1268–69, 1270, 1271
Shepard, Donald, 585, 1479
Shepard, Ernest H. (1879–1976), 216, 783, 812
Shepard, Roger N. (b. 1929), 1060
Sheppard, Eric, 386
Sheppard, V. L. O., 183
Sherbrooke Institute of Cartography (Canada), 1555
Sherman, John Clinton (1916–1996)
academic cartography and, 2, 3–4, 340, 341, 342
on geography and cartography, 525
influence on Tobler, 1534
National Institute of Cartography proposal, 4
on thematic mapping, 868, 1507
Shieber, Stuart M., 377–78
Shipton, Eric (1907–1977), 1418
Shirley, Rodney W., 250, 1535
Shiryayev, A., 982
SHOALS (Scanning Hydrographic Operational Airborne Lidar Survey), 625
Shoemaker, Eugene M. (1928–1997), 793
Shokal'skiy, Yuliy Mikhaylovich (1856–1940), 1690
Shoran (short range navigation), 355–56, 466, 664
Short range navigation (Shoran), 355–56, 466, 664
Shortest path algorithm, 499–500
Shortridge, Barbara Gimla (b. 1943), 3
Shotwell, James Thomson (1874–1965), 1049
Shultz, Melvin E., 1454
Shupe, John F., 260
Shuttle Radar Topography Mission (SRTM), 992–93, 1028, 1293, 1430
Siam. *See* Thailand
Siam Mapped (Winichakul), 613
Siberskoy gosurarfvennoy geodezicheskoy akademii (SGGA) (Russian Federation), 1379
Side-looking airborne radar (SLAR), 240, 891
Sieg im Westen (film) (Noldan), 987–88, 988
Siegfried, André (1875–1959), 350, 352
Siegfried, Hermann (1819–1879), 43, 179–80
Siegfriedkarte (*Topographische Atlas der Schweiz*) (Siegfried), 180, 180, 182, 332, 640
Siekiarska, Eva, entry by, 89–90
Sierra Club (United States), 1415–16
Signature styles, 1472
Significance of Sections in American History (Turner), 350
Significance of the Frontier in American History (Turner), 350, 598
Sigurður Stefánsson (d. 1594 or 1595), 1679
Silent maps, 440
Silent Spring (Carson), 389
Silk, 232, 703
Sillitoe, Alan (b. 1928), 785
Silver bromide paper, 331
Simms, Alexander, 473
Simposio Argentino de Sistemas de Información Geográfica, 388
Simposio Brasileiro de Geoprocessamento, 388
Simulation, 496–97, 498
Simultaneous autoregression (SAR) model, 1469
Simultaneous contrast, 1056–57
Sines, Bonnie R., 1436
Sinko, Peggy Tuck, 95
Sino-Japanese War (1894–1895), 949
Sinton, David F., 364, 585, 1441, 1529
Sinusoidal projections, 568, 1182, 1193
Sion, Jules (1879–1940), 297
SIRGAS (Sistema de Referencia Geocéntrico para Las Américas), 150, 468, 469–70, 471, 472
Sistemade Referencia Geocéntrico para Las Américas (SIRGAS), 150, 468, 469–70, 471, 472
Six-Day War (1967), 930
Skálholt Map, 1679
Skelton, R. A. (1906–1970), 191, 249, 773, 1535
Sketch maps
for geography education, 216, 217, 218, 218, 219
photomechanical processes and, 802, 1146
in urban/regional planning, 1159, 1161, 1161
Ski route maps, 440
Skvortsov, Petr Alekseyevich (1895–1975), 983, 984, 985
Skylab (satellite), 426, 566, 631, 1283
SkyView (website), 89
Slanar atlases, 107
Slaner, Hans (Sr.) (1890–1955), 1676
SLAR (side-looking airborne radar), 240, 891
Slaughter, Frank G. (1908–2001), 247, 785
Slessor, Kenneth (1901–1971), 785
Slider model of labeling, 378
Sloan Digital Sky Survey, 85–86

- Slocum, Terry A., 3, 5, 259, 525, 1516
entry by, 1500–1525
- SLOSH (Sea, Lake, and Overland Surge from Hurricanes) simulations, 590
- Slotted-templet method, 1104, 1105, 1106, 1110, 1129, 1549–50. *See also* Radial line plotting
- Slovakia, 1414. *See also* Eastern Europe
- Slovic, Paul (b. 1938), 585
- Smallman-Raynor, Matthew, 406
- Smartphones. *See* Personal digital assistants
- Smiley, E. Forbes, III, 72
- Smith, A. G., 531
- Smith, Dan, 97
- Smith, Eleanor Houston (1910–1987), 247
- Smith, George Otis (1871–1944), 1660
- Smith, Guy-Harold (1895–1976), 1, 340, 524, 525, 788, 1154, 1505
- Smith, Hermon Dunlap (1900–1983), 247
- Smith, J. R., entry by, 453–54
- Smith, L. Elden, 1257, 1259
- Smith, Lawrence M. C. (1902–1975), 247
- Smith, Richard M., 223
- Smith, Thomas R., 3
- Smith, Walter, 858, 1304
- Smith, Walter H. F., 535, 537, 631, 1026
- Smith-Mundt Act (1948) (United States), 715
- Smithson, Robert (1938–1973), 83
- Smoothing, 372, 373, 1293
- Snider-Pellegrini, Antonio (1802–1885), 523
- Snow, John (1813–1858), 393, 403, 497, 587, 1070
- Snow Crash* (Stephenson), 1680
- Snyder, John Parr (1926–1997), 1397–1400.
See also Space Oblique Mercator Projection
- on conformal projections, 272, 272, 273
- historical-boundaries atlas by, 94
- on low-error projections, 1184
- on mapping software, 1431
- on Mercator projection, 871
- on Peters projection, 1100
- on polyhedral projections, 1194
- projection working notes, 1398
- on pseudocylindrical projections, 1172
- on regional projections, 1182
- Sobalik, Franz, 440
- Sobel, Dava (b. 1947), 492
- Sochava, V. B. (1905–1978), 127
- Social activism. *See also* Counter-mapping; Critical cartography
- cartograms and, 197, 198
- community mapping and, 267–69
- counter-mapping, 275, 276, 277, 286–87
- geographic names and, 294
- GIS and, 268–69, 386, 386
- “GIS and society” debates, 386
- Global Positioning System for, 556
- persuasive cartography for, 1088–89, 1088, 1094
- postcolonial cartography and, 308
- public participation GIS, 268–69, 386, 1403
- social network cartography and, 1403
- social theory and, 1403–4
- Social network cartography, 1403
- Social physics, 56
- Social theory and cartography, 1400–1405
- Sociedade Brasileira de Cartografia, Geodésia, Fotogrametria e Sensoriamento Remoto (SBC) (Brazil), 1408
- Società Geografica Italiana, 42, 1418
- Société de géographie de Paris, 1417, 1418
- Société Géographique de Québec, La, 1417
- Societies. *See also* Cartographic societies; Geographical societies; specific societies
- for map librarianship, 1421–23
- map societies, 1419–21
- for photogrammetric mapping/remote sensing, 1423–26
- for surveying, 670, 671, 827, 828
- Society of Cartographers (United Kingdom), 1412
- Society of Jesus. *See* Jesuits
- Society of Women Geographers (United States), 1417
- Sociocultural paradigm in history of cartography, 612–13, 615, 1762, 1763, 1764
- Soemarno, Soerjo, 1611
- Soennecken, Friedrich (1848–1909), 738
- Soennecken lettering system, 738, 739
- Software, 1426–43. *See also* Electronic cartography development impacts; ESRI; Geographic information systems; Graphics software; Image processing software; SYMAP; specific software programs
- airbrush and, 35
- for animation, 63
- for cartometry, 205, 206
- for color, 262–63
- definitions of “map” and, 802
- for digital libraries, 319–20
- for forensic mapping, 433
- free and open-source, 657
- for geocoding, 450, 451
- GIS overview, 1438–43, 1442, 1443
- illustration software overview, 1434–37
- image processing, 141, 364, 501, 522, 1120, 1437, 1437–38
- for interpolation, 384, 502, 694
- journals, 1430
- for labeling, 378
- mapping software overview, 1426–34, 1427, 1429, 1431, 1432, 1433
- for marine charting, 830
- for orienteering maps, 1045
- for orthophotography, 1144
- for perspective maps, 1023
- Soil Conservation Service (SCS) (United States), 1447
- Soils maps, 1443–50, 1444, 1445
- bivariate maps, 132, 132
- in colonial/imperial cartography, 256, 257
- digital databases for, 751, 1448, 1449
- dot maps, 1446, 1446
- surveying for, 1446–48, 1447, 1448
- Sokal, Robert R. (1926–2012), 446
- SOLAS (International Convention on Safety of Life at Sea), 632, 685, 828, 1017, 1433–34
- SOLAS (International Coronelli Society for the Study of), 632, 685, 828, 1017, 1433–34
- Solid Terrain Modeling, Inc. (United States), 1262
- Solov'yev, M. D. (1887–1965), 1641
- Solov'yev, S. M. (1862–1923), 982, 984
- SOM. *See* Space Oblique Mercator Projection
- Somerville, Henry Boyle Townshend (1863–1936), 626
- Somigliana, Carlo, 425
- Sommer, Shelly, entry by, 397–403
- Sommers, Montrose S., 854
- Sonar (sound navigation and ranging), 843, 1024
- for Arctic maps, 76
- for coastal mapping, 236–37
- development of, 623, 626–27
- for environmental protection, 395
- for marine charting, 819–20, 820, 827
- multibeam echo sounding, 627, 820, 843, 852, 853
- for seafloor mapping, 848, 1025, 1392, 1499–1500
- Sonenberg, Maya (b. 1960), 784
- Songlines* (Chatwin), 787
- “Songs of Education; II. Geography” (Chertton), 785
- SOTER (soils and terrain) digital database, 751
- Sotheby's, 248, 251
- Sound, 62, 90, 226. *See also* Multimedia maps
- Sounding, 623, 625, 626, 626–29, 627, 819–20, 820, 827, 843. *See also* Sonar
- Sources of cartographic information, 1450–52, 1451
- South Africa. *See also* Africa
- Anglo-Boer War, 19, 473, 894–95, 957–58, 957, 958, 1565, 1735
- cadastral surveying, 1207–8, 1208, 1226–27
- colonial/imperial cartography, 253–54
- ethnographic mapping, 305
- exclusionary politics, 306
- road mapping, 1356–57, 1358
- topographic mapping, 1576–79, 1577, 1578, 1579
- South African Hartebeesthoek Datum, 473
- South African Photogrammetry and Geo-information Society (SAPGIS), 1410
- South America. *See* Latin America
- South American Datum (SAD), 469
- South American Gravity Project (SAGP), 469
- South American Gravity Studies (SAGS), 469
- South Asia. *See* Asia; India; Survey of India
- Southall, Humphrey, 95, 96

- Southeast Asia, 891, 898–900, 950, 970–72, 971, 972, 1777–78. *See also* Vietnam War
- Souvenir maps, 36, 37, 38–39, 39, 233–34, 310
- Sovereignty. *See* Territorial claims
- Soviet Antarctic Expedition (1955–1956), 68
- Soviet Bloc. *See* Eastern Europe
- Soviet collapse, 1376–77
- boundary surveying and, 162
 - Eastern European boundary changes and, 338
 - military mapping and, 892
 - political cartoons and, 1162, 1163, 1164
 - topographic mapping and, 1596
- Soviet geodetic surveying, 479–83, 481, 549, 550–51, 980, 1592, 1594, 1639–40
- Cold War and, 240–41
- Krasovskiy ellipsoid, 981, 982, 1639
- military mapping and, 937, 940
 - Moskovskiy geodezicheskiy institut and, 1592
 - secrecy and, 244–45
 - world revolution theory and, 1767–68
- Soviet military mapping, 934–40
- Cold War, 938, 939–40, 941, 942, 965–66, 967
 - coordinate systems for, 935, 937, 940
 - Europe, 965–66, 967
 - Korea, 973
 - Middle East, 970
 - post–World War II surveying, 938, 939
 - postwar world mapping project, 939–40, 941, 942
 - Russian Civil War, 934–35
 - verst scales in, 935, 936
 - world maps, 939–40
 - World War I, 932, 933, 934
 - World War II, 480, 935–37, 938, 939, 940, 965, 966
- Soviet topographic mapping, 549–51, 549, 983, 1592–96, 1593, 1594
- cadastral mapping and, 1216
 - cartographic conventions in, 275
 - geodetic surveying for, 479, 480, 482, 1592, 1594
 - hydrography and, 1595–96
 - International Map of the World and, 1540
 - military mapping and, 935
 - photogrammetry for, 1109, 1124, 1124, 1592, 1595
 - satellite imaging for, 1595
 - secrecy and, 240–41, 244–45, 550, 1213–14, 1641
 - standardization, 1547, 1548, 1594–95
 - World War II and, 1592, 1593, 1594
- Soviet Union. *See also* Cold War; Russia;
- Soviet collapse; Soviet geodetic surveying; Soviet military mapping; Soviet topographic mapping
 - academic cartography, 7–8, 10, 340–41, 982–85, 1640
 - accuracy standards, 1454
 - administrative cartography, 17
 - analytical cartography, 56
 - Antarctica maps and expeditions, 68, 1595
 - Arctic maps and expeditions, 74, 76
 - Asia boundary surveying, 172–73
 - cadastral mapping, 16
 - cadastral surveying, 1213–17, 1215, 1216, 1217, 1218
 - cartographic conventions and, 275
 - cartographic duplicity and, 198, 200, 1641
 - centrography, 212, 214, 214
 - collapse of, 134, 162, 338
 - Eastern European boundary changes and, 337, 338
 - geographic names, 513
 - International Cartographic Association and, 667, 669–70
 - International Map of the World and, 691, 935, 1540
 - lunar and planetary mapping, 793, 795
 - marine charting, 818, 818, 846–49, 849
 - misrepresentation in maps, 1090
 - national atlases, 97
 - persuasive cartography, 1092
 - photogrammetric mapping, 1109, 1124, 1124
 - political boundaries, 139, 161, 162
 - political persuasive cartography, 1163
 - regional atlases, 101, 103
 - Russian Geographical Society, 1380
 - school atlases, 108, 109
 - secrecy, 136, 244–45, 550, 1213–14, 1641, 1698
 - U.S. maritime boundary dispute, 139–40
 - U.S. military mapping of, 889–91, 891
 - world atlases, 135–36, 137, 550
 - world revolution theory, 1766–70, 1767, 1768, 1769, 1770
- Sowton, Michael, 1035
- Space. *See* Astrophysics and cartography; Lunar and planetary mapping; Satellite imaging
- Space and Place* (Tuan), 613
- Space Geodetic Network (SGN) (Soviet Union), 481, 482, 1596
- Space Imaging (company), 369, 567, 1286
- Space Oblique Mercator Projection (SOM), 270, 1185, 1452–53
- accuracy, 1283
 - data handling/analysis and, 1289–90
 - geographic information systems and, 992
 - geographical discovery and, 1394
 - graticule for, 1453, 1453
 - invention of, 1399, 1399
 - U.S. Army Corps of Engineers and, 1656
- Space-time matrix, 1529, 1529
- Spade & Archer's 50 Maps of L.A.*, 813
- Spaghetti data model, 360, 360, 382
- Spain, 158, 159, 512, 644–45, 650–54, 652, 653. *See also* Europe
- Spanish-American War, 832, 884, 884, 996
- Spanish Civil War (1936–39), 653
- SPANS (GIS), 362
- Sparhawk, William N. (b. 1888), 436
- Sparke, Matthew, 286, 301
- Spatial analysis. *See also* Analytical cartography; Geographic information systems
- cartometry and, 205
 - cave maps and, 207
 - crime mapping and, 288
 - electoral mapping and, 352
 - electronic cartography development impacts, 489, 489
 - environmental protection and, 395
 - exploratory data analysis and, 421
 - overlays and, 490, 495
 - TIGER and, 369
- Spatial clustering algorithms, 379–80, 381
- Spatial data infrastructures (SDIs)
- Australia, 1219, 1613
 - cadastral surveying and, 188–89, 1219
 - cartographic conventions and, 278
 - Germany, 178
 - INSPIRE, 278, 645
 - National Geospatial Data Infrastructure, 90, 401, 510, 592, 836, 1227
 - Russian Federation, 1596
 - standards for cartographic information and, 1457
- Spatial Data Needs: The Future of the National Mapping Program* (Petcenik), 0
- Spatial Data Transfer Standard (SDTS), 1431, 1455, 1642
- Spatial Imaging Group, 619
- Spatial interaction, 499
- Spatial interpolation. *See* Interpolation
- Spatial modeling, 352, 396, 497, 1291
- Spatial Organization: The Geographer's View of the World* (Abler, Adams, & Gould), 525
- Spatial planning. *See* Urban/regional planning
- Spatial Processes: Models & Applications* (Cliff & Ord), 1470
- Spatial statistics, 212, 289, 352, 394, 406, 498–99, 1471
- Spatial thinking, 1059–62, 1061, 1070
- Spatial-trend animations, 62
- Spatially Oriented Referencing Systems Association (SORSA), 1212
- Spaziocarta*, 923
- Special Libraries Association (SLA), 772, 1407, 1421
- Special Mapping Centers (United States), 1295
- Special-purpose mapping. *See* Thematic mapping
- Special Relationship, A* (Gentleman), 1163–64, 1164
- Special Sensor Microwave/Imager (SSM/I), 1280
- Spectra-Physics, 356
- Speer, Albert (1905–1981), 1159
- Speier, Hans (1905–1990), 1085–86, 1402
- Spencer, Herbert (1820–1903), 539

- Spender, Stephen (1909–1995), 785
 Sperry, Elmer Ambrose (1860–1930), 1009, 1010
Spezialkarte der Österreichisch-ungarischen Monarchie, 925, 926, 1582, 1587, 1588
 Spherical harmonic expansions, 427
 Spheroids. *See* Reference spheroids
 Spicer-Simson, Geoffrey Basil (1876–1947), 623
 Spiegelman, Daniel, 72
 Spier, Peter (b. 1927), 217
 Spiess, Ernst (b. 1930), 1041, 1044
 Spilhaus, Athelstan (1911–1998), 1177, 1178
 Spooner, C. S., 1266
 SPOT (Système Probatoire d'Observation de la Terre), 566, 1285
 Antarctica maps and, 68, 71
 biogeographical cartography and, 1278
 feature extraction and, 1291
 GEOSPACE and, 548
 Gulf War (1991) and, 908
 hydrography and, 626, 628
 Landsat and, 1300–1301
 military mapping of the Middle East and, 930
 revisioning and, 1297
 topographic mapping and, 649, 1600
 Spot colors, 1324
Sprach- und Sachatlas Italiens und der Südschweiz (Jud & Jaberg), 779
 Sprigade, Paul (1863–1928), 959, 1572
 Sputnik, 368, 566, 1273
 International Geophysical Year and, 679
 meteorology and, 873
 navigation and, 1024
 photogrammetric mapping and, 1123
 satellite geodesy and, 240, 456, 464
 World Geodetic System and, 463
 Srebro, Haim, entries by, 163–68, 929–31, 966–70
 SRTM (Shuttle Radar Topography Mission), 992–93, 1028, 1293, 1430
 SSST (stationary sea surface topography), 426, 427
Stachka (film), 1767
 Stafford, Barbara Maria, 597
 Stalin, Joseph (1878–1953)
 administrative cartography and, 17
 geodetic surveying and, 550
 geographic names and, 513
 globes and, 565
 military mapping and, 935, 938
 nation-state formation/maintenance and, 1768
 political boundaries and, 1401
 secrecy and, 136
 Stallman, Tim, entry by, 1400–1405
 Stamp, L. Dudley (1898–1966), 751
 Stams, Werner, 101, 1694
Standard Indexed Map Series with Air Trails (Rand McNally), 24
 Standard Metropolitan Statistical Areas (SMSAs), 211, 1466
 Standardization. *See* Standards for cartographic information
 Standards for cartographic information, 1453–59. *See also* IHO marine charting standards
 accuracy, 13–14, 204, 1386, 1453–55, 1642, 1699
 cartographic conventions, 274–75
 cartographic style and, 1472
 data transfer, 419, 684, 810, 844, 846, 853, 1304, 1431, 1455–56, 1456, 1457
 geographic names, 134, 514, 515, 516–17, 518, 520, 1047, 1644, 1646–47, 1646
 hydrographic surveying, 627, 628, 684
 ICA Commission on Spatial Data Standards, 1455–56
 International Map of the World and, 1453–54, 1541
 ISO/TC 211, 1456, 1457, 1457
 metadata, 1456–57, 1458
 military mapping and, 894, 1188
 prime meridian, 1168–69
 Russian Federation, 1378
 SOLAS, 632, 685, 828, 1017, 1433–34
 symbolization, 822
 terrain analysis, 1497, 1499
 topographic mapping, 1541, 1547–48, 1585
 UN role, 1648
 Stanfords (publisher) (United Kingdom), 1694
 Stankievich, John P., 411
 Stanley, Roy M., 1117, 1118
 Stanton, William J. (1919–2009), 854
 Star charts, 1459–62, 1460, 1461
 Starr, Lowell E., 800
State of the World Atlas, The (Kidron & Segal), 116, 197, 311, 1516, 1517
 State Plane Coordinate (SPC) system, 279–80, 280, 281
 Statens reproduktions anstalt (Sweden), 409
 Stationary sea surface topography (SSST), 426, 427
Statistical Analysis of Spatial Patterns, The (Bartlett), 1470
Statistical Analysis of Spatial Point Patterns (Diggle), 1470
Statistical Atlas of the Madras Province, A, 102, 105
Statistical Atlas of the United States (1874), 96, 112, 212
Statistical Atlas Rajasthan, 102, 105
 Statistical atlases, 96, 112, 212, 1463, 1463, 1657
 Statistical graphics. *See* Statistical mapping
 Statistical mapping, 1462–68. *See also*
 Choropleth symbolization; Demographic mapping; Electoral mapping;
 Spatial statistics; Thematic mapping
 administrative cartography and, 17–18
 analytical cartography and, 55
 biogeographical cartography and, 128
 cartometry and, 205–6
 centrography, 212–15, 213, 214
 crime mapping and, 288–89, 289
 Dainville on, 297
 geography and, 525
 historical-boundaries atlases for, 94, 95
 perspective maps and, 1023
 projections for, 1191–94
 regional atlases and, 101
 software for, 1433
 statistical atlases, 96, 112, 212, 1463, 1463, 1657
Statistical Mapping (Dickinson), 1466
Statistical Year-Book (League of Nations), 763
 Statistics and cartography, 1468–71. *See also*
 Geostatistics; Spatial statistics; Statistical mapping
Statistics for Spatial Data (Cressie), 1471
 STATLAS project, 417
 Stea, David, 1076, 1403
 Stefansson, Vilhjalmur (1879–1962), 33, 74
 Steichen, Edward (1879–1973), 884
 Steinberg, Saul (1914–1999), 812, 1067, 1067
 Steiner, Erik B., 600
 Steinhaus, Hugo (1887–1972), 203, 435
 Steinhaus longimeter, 203, 204
 Steinitz, Carl, 585
 Steinke, Theodore R., 3, 223, 1509
 Stellar triangulation, 426, 457, 457, 458
 Stencils, 739, 740
 Stephan, Walter G. (b. 1877), 327
 Stephens, John D., 719
 Stephenson, Neal (b. 1959), 1680
 Stereoplotters, 43, 367, 367, 647, 1103–4, 1127, 1134, 1134, 1136, 1292
 Stereotyping, 1311, 1312
 Stevens, Henry (1819–1886), 245, 248
 Stevens, S. S. (1906–1973), 1064, 1083
 Stevenson, Robert Louis (1850–1894), 91, 782, 784, 812
 Steward, Henry J., entries by, 1185–89, 1190–91
 Stewart, George A., 1114, 1119
 Stewart, George Ripley (1895–1980), 520
 Stibbe, Hugo L. P. (1934–2003), 773
 Stick-up lettering, 334, 742, 743, 744, 1146, 1148, 1149, 1150. *See also* Mechanical lettering techniques
 Stieler, Adolf (1775–1836), 115, 701, 721, 723
Stieler Handatlas, 115, 721, 723, 723, 1690
 Stilling-wells, 1526
 Stingemore, F. H. (1890–1954), 789
 Stobnicza, Johannes de, 1175
 Stock, Robert F., 404
 Stocks, Percy (1889–1974), 404
 Stocks, Theodor, 726
 Stoeckl, Edouard de (ca. 1805–1892), 139
 Stoker, Jason M., entry by, 774–76

- Stokes, George Gabriel (1819–1903), 426, 459
Stoll, Joseph W., entries by, 1704–6, 1711–13, 1726–27
Stollt, Oskar (b. 1909), 726
Stolze, Franz (1836–1910), 925, 1133
Stone, Jeffrey P., entry by, 239–45
Stoned Moon (Rauschenberg), 82
Stooke, Philip J., 486
entry by, 792–96
“Stopwatch and an Ordnance Map, A” (Spender), 785
Storck, John, 1049
Storms. *See* Disaster management; Meteorology
Story of Maps, The (Brown), 609
Story of New Jersey’s Civil Boundaries, 1606–1968, The (Snyder), 94
Storytelling. *See* Narrative and cartography
Stowarzyszenie Kartografów Polskich, 1414
Strahler, Arthur Newell (1918–2002), 1495
Strategic needs. *See* Military development and applications
Stratigraphy, 526
Stratton, Charles G., 701, 1050
Strebe, Daniel “Daan,” entries by, 1174–82, 1184–85
Street atlases, 1714
StreetFinder (software), 1247
StreetTalk, 1725
Strip maps
aeronautical, 22–23, 23, 28, 29, 30, 1766
airline maps, 36, 37
cycling maps, 1707, 1708, 1710
railroad maps, 1729, 1730
river maps, 1370
in road mapping, 47, 47, 48, 48, 292–93, 1346, 1357, 1358, 1362, 1368–69, 1370, 1738
tactile, 1722–26, 1723
Strip-tree data model, 364
Struve, F. G. W. (V. Ya. Struve) (1793–1864), 472, 983
Struve ellipsoid, 651
Stuart, Campbell, 539
Stuart, Edwin R. (1874–1920), 332
“Studies in Spatial Planning” (ARL), 42
Stumme Karten für den geographischen und geschichtlichen Unterricht (Sobalik), 440
Stummer Studienatlas für das Kartenzeichnen (Rothaug), 440
Styles. *See* Cartographic style
Stylianou, Andreas, 250
Stylianou, Judith A., 250
Štrzský, Jindřich, 80
Suarez, Thomas, 247
Sub-Saharan Africa, 1207–9. *See also* Africa
military mapping of, 894–95, 898, 902, 955–59, 957, 958, 960, 961
Subject testing, 1063–64, 1070–74
Submarine Signal Company, 622–23
Subscription atlases, 91, 110–12, 111
Suchan, Trudy A. (b. 1955), 504, 1437
entry by, 311–17
Sudakov, Aleksandr (d. 2013), entry by, 479–83
Sudan, 305, 306. *See also* Africa; North Africa; Suez Canal Crisis (1956)
Suez Canal, 163, 1598
Suez Canal Crisis (1956), 902, 955, 956
Suggestive maps. *See* Political persuasive cartography
Sukarno (Kusnu Sosradihardjo) (1901–1970), 1611
Sukhov, V. I. (1914–1974?), 983, 1640
Sullivan, Jeff, 735
Suma Oriental of Tomé Pires . . . and the Book of Francisco Rodrigues . . . , The (Cortesão), 285
Summer Institutes for College Teachers (National Science Foundation), 3
Sumner, Charles (1811–1874), 139
Suomen maantieteellinen seura (Finland), 18, 96, 117
Supan, Alexander (1847–1920), 1096–97
SuperCard (software), 660
Superimposition. *See* Overlays
SURFACE II (software), 1023, 1508
Surface vs. deep structure, 57, 59
Surfer (software), 694, 735
Surrealism, 80
Surveillance. *See* Privacy issues
Surveiller et punir (Foucault), 1170
Survey Atlas of Scotland, 701, 702, 1501
Survey Gazetteer of the British Isles, The (Bartholomew), 403–4
Survey Map Company (publisher), 46, 1340
Survey of India, 1473–77
Australia geodetic surveying and, 483
boundary surveying, 618, 1476
cartographic style, 1548
Close and, 232
crests, 1477
Himalaya cartography and, 594
International Map of the World and, 1389, 1473
map reproduction, 1146, 1551
metric system adoption, 1474, 1475
military mapping and, 896, 898–99, 967, 968, 969, 971
plane tabling, 1156
postcolonial cartography, 1473–74, 1474, 1476
topographic mapping and, 1549, 1598
World War II and, 898–99, 1473
Survey of the Coast (United States), 465

Sykes, L. R. (b. 1937), 534
 Sykes-Picot Agreement (1916), 163, 164
 Symanzik, Jürgen, 421
 SYMAP (software), 582, 585, 1428, 1477–79
 choropleth symbolization and, 221, 1508, 1509
 conferences on, 387
 for crime mapping, 288
 customization and, 293
 Dangermond and, 397
 data models and, 359
 definitions of “map” and, 800
 epidemiological maps and, 406
 geographic information systems and, 1439, 1440, 1441
 geographical discovery and, 1394
 illustration software and, 1436
 image processing software and, 501
 for interpolation, 384, 502, 694
 printing and, 359–60, 506, 509, 1477, 1478
 statistical mapping and, 1466
 for thematic mapping, 1508, 1509
 Symbolic uses of cartography, 34, 763, 764
 Symbolization. *See also* Cartographic conventions; Choropleth symbolization; Dasymetric symbolization; Pictorial depictions
 for academic cartography, 2, 342
 for aeronautical charts, 26, 26, 27
 Bertin on, 345
 cartographic style and, 1472
 cartographic visualization and, 1686
 for cave maps, 206, 206
 for census mapping, 211
 children’s understanding of, 217
 for Chinese military mapping, 945
 color and, 263, 264, 265, 1540–41
 conventions for, 273–78, 274, 275
 customization of, 293
 for cycling maps, 1709, 1736
 Dainville on, 297
 for demographic mapping, 311–14
 electronic cartography development
 impacts, 358, 384
 emergency planning and, 391
 generalization and, 371
 geopolitical cartography and, 541–42
 for hazard/risk mapping, 588
 interactive mapping and, 1686
 isopleth, 113, 311, 312–13, 314, 872
 for marine charting, 822, 836, 843, 846, 853
 Martonne on, 865
 military development and applications, 1697, 1734–35
 for military mapping, 906–7
 for orientation maps, 1726
 pen-and-ink drafting and, 332
 for persuasive cartography, 1090, 1090, 1091, 1092
 proportional symbol mapping, 1515–16, 1516

psychophysics and, 1082, 1083–84, 1084
 for railroad maps, 1239
 for recreational maps, 1250
 for road mapping, 1361, 1734–39, 1736, 1737, 1738
 stereotypes in, 1743
 subject testing, 1072
 for tactile maps, 1481, 1482, 1723, 1724, 1725
 thematic mapping overview, 112, 113, 1511–22, 1512
 for topographic mapping, 1540
 uncertainty and, 1643, 1644
 visual perception and, 1055–56
 Symposium of Location Based Services and TeleCartography, 1741
 Symposium on Geographical Information Systems, 398
 Symposium on the Influence of the Map User on Map Design, 1072
 SYMVU (software), 582, 582, 1023, 1441, 1521
 Synthesizer (software), 229
 Synthetic aperture radar (SAR), 537, 538, 992–93, 1024–25, 1286, 1293, 1301
 Syracuse University, 1, 2
 Syria, 166, 167, 1600. *See also* Middle East
Systema Naturae (Linnaeus), 1232
 Szántai, Lajos (d. 2005), 250
 Szegő, Janos, 312
 t-shirt maps, 310
Tableau politique de la France (Siegfried), 350
 Tablet digitizers, 203
 Tabor, Joel (d. 1997), 249
 Tacheometric measurement, 161, 187, 925, 1156, 1156, 1549
 Tactical Ocean Data, 465
 Tactile maps, 1480–83, 1480–83, 1481, 1482, 1722–26, 1723, 1724
 Taidor, Everett K., 1050
Taihu dongxi dongtingshan jingguan tuji (Atlas of Taihu Lake landscape) (Chen), 215
 Tait, Alex, entry by, 744–49
 Takahashi, Shigeo (b. 1968), 59
 Taketa, Richard, 4
 Talbert, Richard J. A. (b. 1947), 605, 615
 Talbot, William Henry Fox (1800–1877), 1150, 1316, 1317
 Talking Kiosk, 1482
 Talking Tactile Tablet, 1482
 Tanaka, Kitirō (1895–1973), 1269, 1483–84, 1484, 1485
 Tanimoto, Steven L., 378
 Tanner, Helen Hornbeck (b. 1916), 92, 94
 Tanzania, 156–57. *See also* Africa
 Tardivo, Cesare (1870–1953), 1133
 Target perspective charts, 1022–23
 TargetPro, 20
 Taride (publisher) (France), 878
 Tarr, Ralph S. (1864–1912), 863, 864
 Tax maps, 1484–88, 1485, 1487
 Taxation
 cadastral mapping for, 16–17, 183, 1484–88, 1485, 1487
 cadastral surveying for, 1201, 1485–86
 statistical mapping and, 1462
 Taylor, D. R. F. (b. 1937), 4, 504, 507, 800, 1094
 Taylor, E. G. R. (1879–1966), 746, 1759
 Taylor, Frank B. (1860–1938), 527
 Taylor, Peter J. (b. 1944), 1470
 Taylor, Thomas Griffith (1880–1963), 1233
 TD (Tokyo Datum), 463, 1606
Teaching of Geography in Elementary Schools, The (Dodge & Kirchwey), 347
 Teaching with maps. *See* Pedagogic role of cartography
Technical Drawing (Goetsch et al.), 329
 Technical pens, 328, 328, 1150
 Technische Universität Dresden, 342
 Technological protection measures (TPM), 655
Technological Transition in Cartography (Monmonier), 610
 Teicholz, Eric, 583
 Teitz and Barr (TAB) heuristics, 500
 Tele Atlas (corporation), 369, 1717, 1721, 1739, 1740
 Teleki, Geza (Count) (1911–1983), 1244
 Teleki, Pál (Count) (1879–1941), 411, 777, 1418, 1690–91
 Telephone directory maps, 1375–76
 Television, 1488–90, 1489. *See also* Journalistic cartography
 advertising, 18
 chroma key, 225, 225, 226, 1489
 color maps in, 260
 electoral mapping on, 352, 354, 1489
 electronic cartography development and, 370
 geographic information systems and, 492
 Gulf War (1991) coverage, 570
 journalistic cartography and, 715, 717
 privacy issues and, 1170
 weather maps, 225, 225, 226, 293, 876–77, 1489, 1743–44, 1746–47
 Tellurometer, 323, 356, 454, 460, 483, 1196, 1222, 1223
 Temple Act (1925) (United States), 1227
Temple of Preah Vihear boundary case (1962), 140–41
 Temporal dynamics, 1528–31
 animation and, 61–62, 1531
 centrography and, 213
 in coastal mapping, 238–39, 238
 data models and, 362–63
 geographic information systems and, 490
 in geologic mapping, 529
 in historical cartography, 600
 Time Geography, 362, 1530, 1530
 virtual reality and, 1681
Tengchong hangkong yaogan shiyan tuji (Atlas of environmental quality of Tianjin City) (Chen), 215

- Tennessee Valley Authority (TVA)
 administrative cartography and, 17
 aerial photography and, 754, 1113, 1118, 1299, 1503
 cadastral surveying and, 1486
 hiking/trail maps, 1711
 land use maps and, 752
 photogrammetric mapping, 1299, 1549, 1661
- Tennyson, Alfred, Lord (1809–1892), 114
- Tenzing Norgay (1914–1986), 595, 1389
- TERCOM (Terrain Contour Modeling), 291, 891
- Terminal maps, 39
- Terra (satellite), 1286
- TerraBase (software), 1432
- Terrain analysis, 1490–99
 analytical cartography on, 59
 geographic information systems and, 501–2
 land systems analysis and, 1497
 mapping software and, 1431–32
 meteorology and, 1490
 military development and applications, 1490–96, 1491, 1492, 1493, 1494, 1496, 1497, 1498
 Warntz networks, 56, 59
 World War II and, 1491–95, 1491, 1492, 1493, 1494, 1496, 1497, 1498
- Terrain Contour Matching (TERCOM), 1292
- Terrain evaluation. *See* Terrain analysis
- Terrain modeling, 141, 892
- Terrain visualization. *See* Fly-through technology
- Terrestrial photogrammetry, 43–44, 45, 646, 1103, 1121, 1126–27, 1133, 1264. *See also* Photogrammetric mapping
- Territorial claims. *See also* Boundary disputes; Boundary surveying
 Antarctica, 64–65, 67, 244, 1564
 Arctic, 73–74, 75, 76
 ethnographic mapping and, 409
 indigenous peoples, 641, 643
 nation-state formation/maintenance and, 1001, 1002, 1006
 post–World War I settlement and, 335
 topographic mapping and, 1563, 1564
- Territorial Disputes* (Huggan), 784–85
- Territorial Evolution of Canada*, 90, 660–61, 661
- Terrorism, 391, 391, 587, 1403, 1670, 1671
- Tesselation data models, 361–62, 362, 363, 364. *See also* Grid/raster data models
- Teunissen, P. J. G. (b. 1957), 462
- Text Book of Topographical and Geographical Surveying* (Close), 232
- Textbooks, 343–48. *See also* specific textbooks
 academic cartography and, 340, 341
 aerial photography, 1114
 on color, 259–60
 on drawing instruments, 327–28
 geodetic surveying, 478
- geographic information systems, 688
 on pen-and-ink drafting, 332–33
- Thacher, John Boyd (1847–1909), 245
- Thackwell, D. E. O., 200
- Thailand. *See also* Southeast Asia
 boundary surveying, 169, 171, 172, 173–74, 173, 174
 nation-state formation/maintenance, 1005–6
- Tharp, Marie (1920–2006), 1499–1500, 1759
 seafloor mapping, 533, 997, 1022, 1025, 1392, 1393
- Theberge, Albert E., entries by, 621–25, 629–32
- Thematic atlases, 112–15, 114
- Thematic Cartography and Visualization* (Slocum), 259
- Thematic Information Service (TIS) (United Kingdom), 419
- Thematic Mapper (TM), 754, 1284
 AVHRR and, 991
 for biogeographical cartography, 1278
 commercial applications, 1302, 1303
 feature extraction and, 1291
 geographical discovery and, 1391
 geospatial tagging and, 992
 for land use maps, 752
 meteorology and, 1280
- Thematic mapping, 1500–1525. *See also* Cartograms; Choropleth symbolization; Dasymetric symbolization; Demographic mapping; Electoral mapping; Recreational maps; SYMAP
 academic cartography and, 1, 341, 1505, 1507
 accuracy in, 13
 in administrative cartography, 16
 aerial photography for, 754, 1505
 Akademie für Raumforschung und Landesplanung, 42
 animation in, 114, 115, 1511, 1512, 1522
 Arnberger on, 42, 345
 atlases, 112–15, 114
 bivariate maps, 130–31
 cartographic conventions in, 275
 cartographic visualization and, 1511, 1684
 Central Intelligence Agency, 1670
 Chen Shupeng, 215
 in colonial/imperial cartography, 254–55, 256, 257
 color in, 113, 114, 264–65
 community mapping and, 267–69
 counter-mapping and, 286
 customization and, 293
 data capture for, 366, 368–69
 data marketing, 369
 defined, 1500–1501
 dot maps for, 1514–15, 1515
 Eckert on, 339, 1505, 1507
 electronic cartography development impacts, 1507–11, 1508
 exclusionary politics and, 307
- flow mapping for, 1518–20, 1520
 geographic information systems and, 1508, 1509, 1515
- historical geography and, 604, 605, 607
 interpolation for, 695, 695
- League of Nations, 763, 763
- map design for, 345, 1505, 1507, 1507
 in map libraries, 768
 map typologies and, 801
 Martonne on, 864–65, 865
 mathematics and, 868
 military development and applications, 1505, 1506, 1507
 military mapping and, 908, 944–45, 962–63, 969, 1778–79
 moral statistics, 221, 312, 1232, 1462
 multivariate maps, 1521–22, 1521, 1522, 1523
 national atlases and, 97, 99, 100, 112, 116, 994, 1001, 1501, 1501, 1502, 1503
 pedagogic role of cartography and, 344, 348
 plate tectonics and, 523
 postcolonial cartography, 307, 324
 projections for, 112, 1101, 1179, 1191–94, 1503, 1504
 proportional symbol mapping, 1515–16, 1516
 psychophysics and, 1082
 race in, 1232
 in regional atlases, 101, 103, 105, 106
 satellite imaging for, 1282
 in school atlases, 107–8
 sense of place and, 812
 Soviet Union, 1641
 symbolization overview, 112, 113, 1511–22, 1512
 in textbooks, 345
 three-dimensional, 1520–21, 1520
 timeline, 1524
 urban mapping and, 1650–51, 1652, 1653
 in wall maps, 1694, 1695
 Warntz on, 1700, 1701
 William-Olsson on, 1755–56, 1756
 in world atlases, 116, 1503, 1531
 World War I and, 1503, 1505
 World War II and, 1778–79
- Thematic Mapping Bulletin* (Australia), 16
- Thematische Kartographie* (Imhof), 6, 640
- Thematische Kartographie* (Witt), 259
- Thematische Kartographie: Methoden und Probleme Tendenzen und Aufgaben* (Witt), 7, 42
- Theodolites, 366, 452, 465, 466, 475. *See also* Electromagnetic distance measurement
 for boundary surveying, 159, 161
 for cadastral surveying, 183–84, 187, 1196, 1196, 1222
 total stations, 184, 187, 460, 1197, 1197, 1220, 1222, 1549
- Theoretical cartography, 339, 364, 371

- Thermal imaging, 1125
 Thermoforming, 1480, 1481
 Theunissen, Yolanda, entry by, 216–20
 They Rule website, 1403
Things Maps Don't Tell Us (Lobeck), 788
 Third World countries. *See* Less-developed countries
This Remarkable Continent (Rooney, Zelinsky, & Louder), 521
 "This Troubled World" series (Harrison & Petrucci), 715
 Thomas, H. Hamshaw (1885–1962), 1113, 1121, 1773
 Thomas, Paul D., 1193
 Thomas, W. K., 1363
 Thomas Brothers Maps (publisher) (United States), 1714
 Thomas Cook & Son (touring company), 1620–21
 Thompson, E. H. (1910–1976), 1106, 1130
 Thompson, F. Vivian (1880–1917), 1103–4, 1121, 1127, 1137, 1697
 Thompson, Stephen, 432
 Thomson, William, Baron Kelvin (1824–1907), 236, 623
 Thongchai Winichakul, 613, 1004–5, 1401
 Thorndale, William, 94, 96
 Thorndyke, Perry W. (b. 1949), 1081
 Thornthwaite, C. W. (1899–1963), 104, 228, 1464
 Thoulet, Julien (b. 1843), 444, 844
 3D Analyst (software), 1521
 Three-dimensional mapping, 1520–21, 1520
Three Voyages of Edmond Halley in the Paramore, 1698–1701, The (Thrower), 1525
 Three-worlds paradigm, 307
 Thrower, Norman J. W. (b. 1919), 1525 entries by, 112–15, 1241–42, 1244, 1389–94 academic cartography and, 3, 4 on animation, 61, 988 on demographic mapping, 312 on history of cartography, 610, 1525 National Institute of Cartography proposal, 4 on relief depictions, 1269 thematic atlas by, 113 on topographic mapping, 1541
 Thünen, Johann Heinrich von (1783–1859), 213
Thüringen-Atlas (RAGfR), 41, 102, 103
Tibet and the Surrounding Regions, Compiled from the Latest Information (Royal Geographical Society), 594
 TIBS (Through Ice Bathymetry System), 625–26
 Tice, Jim, 600
 Tidal measurement, 236, 821, 1525–28, 1526, 1528
 Tide tables, 236
 Tiessen, Ernst (b. 1871), 341
 TIGER (Topologically Integrated Geographic Encoding and Referencing), 60, 210, 359, 368–69, 449, 450, 451, 1657
 electronic atlases and, 90 Internet and, 1753, 1753 mapping software and, 1430, 1431, 1432, 1433 statistical mapping and, 1467 tactile maps and, 1723, 1724 U.S. Geological Survey and, 1664 web-based wayfinding and, 810
Tik-Tok of Oz (Baum), 783
 Tikunov, Vladimir S. (b. 1949), 56
 Tillo, Aleksey A. (1839–1899), 1380
 Timation (satellite), 775
 Time. *See* Temporal dynamics
 Time Geography, 362, 1530, 1530
Time magazine, 2, 715, 1022, 1091–92, 1093, 1747, 1749
Times (London), 876, 1746
Times Atlas of China, The, 703
Times Atlas of the Moon, The, 703
Times Atlas of the World, The (Bartholemew), 115, 229, 311, 519, 703, 706, 1531–32
Times Atlas of World History, The (Barclough), 93
Times Comprehensive Atlas of the World, The, 706, 1531
Times Concise Atlas of the World, The, 703
Times Handy Atlas, The, 703
Times Survey Atlas of the World, The (Bartholemew), 115, 703, 704, 1531
 Timetable maps, 35–36, 36
 TIN (software), 1441
 TIN (triangulated irregular network) model, 56, 60, 291, 361, 501
 TIROS (Television Infrared Observation Satellite), 370, 566, 630, 806, 873, 991, 1274, 1283, 1291
 Tissot, Nicolas Auguste (1824–1897), 55, 1172, 1532. Tissot's indicatrix, 55, 1385, 1532, 1532–34, 1533
 Titanic disaster (1912), 622, 1024
 Tobler, Waldo R. (b. 1930), 1534–35 academic cartography and, 2 on aggregate data, 499 animation and, 61 on automation, 1534 on cartograms, 195, 1516, 1534 on choropleth symbolization, 1511–12, 1513 on coordinate systems, 56 on dasymetric symbolization, 298 on data capture, 57, 357 on data models, 370 on digital filters, 58 on display hardware, 370 electronic cartography development and, 357, 359, 809 on flow mapping, 1519 on Fourier domain analysis, 58 on generalization, 371–72 on geocoding, 448 geographic information systems and, 1439 on geography and cartography, 524 on geometry, 59–60
 influence on analytical cartography, 5, 55, 56, 58–59, 868, 1534 on "map in, map out," 268 on mapping software, 1427, 1428 MICMOG and, 5, 56 National Institute of Cartography proposal, 4 on projections, 869, 1184, 1534 on pycnophylactic interpolation, 59, 695, 1514, 1534 on Sampling theorem, 58, 60 Sherman's influence on, 4 on simulation, 497 Space Oblique Mercator Projection and, 1399 on statistical mapping, 525 statistics and, 1469, 1470 on temporal dynamics, 1529 on thematic mapping, 1508, 1508 on Tissot's indicatrix, 1532
 TODALSIGS (map elements), 348, 348
 Togo, 155–56. *See also* Africa
 Tokyo Datum (TD), 463, 1606
 Tolkien, Christopher (b. 1924), 783
 Tolkien, J. R. R. (1892–1973), 91, 782, 783, 784, 812, 986
 Tolman, Edward Chace (1886–1959), 1060, 1067
 Tomaszek, Wilhelm (1841–1901), 1054
 Tomlinson, Roger F. (1933–2014), 189, 190, 387, 398, 490, 493, 809, 1439
 TOMS (Total Ozone Mapping Spectrometer), 1274
 Tooley, R. V. (1898–1986) (dealer), 246, 249–50, 317, 608, 1420, 1535
Tooley's Dictionary of Mapmakers (Tooley), 249, 317, 1535
 TOPEX/Poseidon (satellite), 537, 631, 1277, 1527
Topografickna Mapa (Czechoslovakia), 1588
 Topografische Dienst (Netherlands), 1535–39, 1536, 1537, 1538, 1580
 Topografische Dienst van Netherlands Indië (Indonesia), 1608–10, 1610, 1611
 Topografiska corpsen (Sweden), 407–8
 Topographic mapping, 1539–1615. *See also* Map design for topographic mapping; Map reproduction for topographic mapping; National mapping agencies; Relief depictions accuracy in, 13 aerial photography for, 182, 646, 647, 1536, 1541, 1553, 1563–64, 1580–81, 1581, 1613 in aeronautical charts, 24 alpine cartography, 43–46 analytical cartography and, 56, 59, 60 Antarctica, 1543–44 Australia, 1612–15, 1613, 1614, 1615 Austria, 1582, 1582 Austro-Hungarian empire, 43, 925, 926, 963, 1549, 1587, 1771, 1771 Belgium, 1579, 1584, 1586, 1586 boundary surveying and, 159, 161 British colonial/imperial cartography,

- 321, 323, 1565, 1565–68, 1567, 1568, 1598, 1599
British mapping in Africa, 1565, 1565–68, 1567, 1568
cadastral mapping and, 185
Canada, 1552–54, 1553, 1554
cartographic conventions in, 275, 276, 276, 278, 1585
census mapping and, 60
China, 594, 942, 943, 1602–6, 1603, 1604, 1605
classical style, 1331, 1332
in climate maps, 228
coastal mapping, 235
cost of, 1539–40
coverage, 1539, 1546
Czechoslovakia, 731, 1588, 1589–90
data capture for, 366
data models for, 360, 361, 383
defined, 1539, 1546
Denmark, 460, 961–62
digitization, 1544–45, 1555, 1559
drawing media for, 330–31
East Germany, 177, 197–200, 199, 1589, 1589
Eastern Europe, 1550, 1587–91, 1588, 1589, 1590
extraterrestrial, 486
France, 1579. *See also* Service géographique de l'armée
French colonial/imperial, 1542, 1568–72, 1569, 1570, 1571, 1598
French mapping in Africa, 1568–72, 1569, 1570, 1571
generalization in, 374
geodetic surveying and, 482
geographic names in, 294
geologic mapping and, 527
geospatial data marketing and, 856
German colonial/imperial cartography, 1572–76, 1573, 1574, 1575
German mapping in Africa, 1568–72, 1569, 1570, 1571, 1572–76
Germany, 176–78, 179, 1579, 1583–85
for hiking/trail maps, 1711
Hungary, 1238, 1588
India. *See* Survey of India
Indonesia, 1608–12, 1609, 1610, 1612
interpolation for, 693–94
Italy, 921–24, 952, 1588, 1616, 1616, 1617
Japan, 68, 729–31, 730, 1606–8, 1607
for landscape architecture, 758
Latin America, 665, 1560–64, 1561, 1562, 1563, 1696
in map libraries, 768
Middle East, 1597–1602, 1599, 1600, 1601
military development and applications. *See* Topographic mapping military development and applications
military mapping and, 1546, 1552, 1553, 1560, 1579, 1592
Netherlands, 1535–38, 1536, 1537, 1538, 1580
Norway, 962, 1585, 1585
oil company maps, 1541–42
overview, 1545–52
pen-and-ink drafting in, 332, 333
personalization and, 292
postcolonial cartography and, 1547–48, 1550, 1611–12
projections for, 1101, 1185–86, 1589–90
Prussia, 176, 474, 909, 914, 959, 1165–66, 1166, 1167, 1573, 1587
vs. relief maps, 1260
road mapping symbolization and, 1736
Russian Empire, 1213, 1587, 1591, 1591, 1591–92
Russian Federation, 551, 1377–78, 1596, 1597
scale in, 180, 181, 1383, 1539, 1546, 1572
sequence diagram, 1662
South Africa, 1576–79, 1577, 1578, 1579
Soviet Union. *See* Soviet topographic mapping
Spain, 158, 650–54, 652, 653
Sweden, 1581, 1581
Switzerland, 332, 333, 640, 1579. *See also* Bundesamt für Landestopographie
terrain analysis and, 1490
United Kingdom. *See* Ordnance Survey
United States, 1555–59, 1557, 1558. *See also* U.S. Geological Survey
Western Europe, 178, 266–67, 417, 478, 1455, 1579–87
Topographic mapping military development and applications, 1660, 1662
Cold War, 1547, 1550, 1599–1600
World War I, 1165–66, 1539, 1540, 1598, 1770–71, 1770
World War II, 180, 646, 1576, 1584, 1592, 1594, 1610–11, 1612, 1775, 1776, 1776
Topographic Reconnaissance Map series (U.S. Antarctic Research Program), 69
Topographische Atlas der Schweiz (Siegfried) (Siegfriedkarte), 180, 180, 182, 332, 640
Topographische Karte der Schweiz (Dufour), 179, 1267, 1579
Topologically Integrated Geographic Encoding and Referencing. *See* TIGER
Topology, 56, 59–60, 185, 360, 449, 451, 868–69
Toponyms. *See* Geographic names
Topophilia (Tuan), 413
Török, Zsolt G., entries by, 335–38, 1238–39, 1376–79, 1413–14
Torrens, Robert Richard (1814–1884), 1218
Torres, João Agria, entry by, 475–79
Torres-García, Joaquín (1874–1949), 80, 307, 307
Torricelli, Evangelista (1608–1647), 1392
Torsion balance, 530, 530
Total stations, 184, 187, 460, 1197, 1197, 1220, 1222, 1549
Toth, Tibor G. (b. 1937), 1262
Touchton, J. Thomas, 247
Toulmin, Stephen (1922–2009), 1066
Tour de la France par deux enfants, *Le* (film) (Carboneau), 226
Touraide, 618
Touraides (H. M. Gousha), 1346–47, 1349
Touring Club de France, 878, 1736, 1736
Touring Club do Brasil, 1353
Touring Club Italiano (TCI), 97, 1361, 1362, 1615–20, 1617, 1618, 1619, 1620
Touring Club Schweiz (TCS), 736
Tourism. *See also* Airline maps; Place promotion; Recreational maps; Road mapping; Souvenir maps; Wayfinding
battlefield maps, 1627, 1628, 1636
cloth maps for, 233–34, 233, 234, 235
Directorate of Overseas Surveys maps for, 324
Grand Tour, 1620, 1629, 1630, 1637
Tourist's Road Guide, The, 1363
Tournachon, Gaspard-Félix. *See* Nadar
Townes, Charles H. (b. 1915), 774
Townshend, John R. G., entry by, 749–51
Tracing cloth, 330, 333
Tracing paper, 329
Traditional paradigm in history of cartography, 607–10, 613
Trafficability maps, 1492, 1492, 1496, 1497, 1498, 1774. *See also* Goings maps
Training in cartography, 1411–12. *See also* Academic cartography
Trainor, Timothy F., entries by, 101–6, 808–11, 1462–68
Traité de géographie physique (Martonne), 865, 865
Trampler, Kurt, 542
Trans-Canada Airlines, 39
TransCAD (software), 499
Transfer paper, 329–30, 738
Transit Maps of the World (Ovenden), 791–92
Transit System (Navy Navigation Satellite System) (NNSS), 468, 482, 484, 552, 775, 930, 1018, 1024, 1292
Transition period of academic cartography, 4
Translations (Friel), 787
Transportation maps. *See* Public transportation maps; Railroad maps; Road mapping
Travel mapping, 1620–28. *See also* Guidebooks; Place promotion; Public transportation maps; Railroad maps; Road mapping; Tourism; Wayfinding
cruise lines and, 1622–23, 1624, 1625, 1729
geospatial data marketing and, 856
journalistic cartography and, 715
map pins for, 815, 815
mass marketing and, 861
Traveling salesman problem (TSP), 500
TravelPilot, 1718
Travels of Babar, The (Brunhoff), 217
Traverses, 465, 468, 472, 475, 480, 1223, 1224, 1224
Treasure Island (Stevenson), 91, 784

Treccani, Giovanni (1877–1961), 1619
 Trekker, 1725
 Trench maps. *See* Military mapping
 Trend surfaces, 694–95, 1470
 Trewartha, Glenn Thomas (1896–1984), 228
 Triangulated irregular network (TIN) model, 56, 60, 291, 361, 501
Triangulation. *See also* Geodetic surveying; Geodetic triangulation; Stellar triangulation; Surveying
 aerial, 1110–11, 1110, 1129–30, 1140
 for cadastral surveying, 1222–23, 1222, 1224
 defined, 452, 452
 Trianon, Treaty of (1920), 161
 Trigonometric Survey of India, 454
 Trilateration, 453, 453–54, 775, 1223, 1223
 Trinity University, 2
 TripMaker (software), 1247
 TRIPS (Agreement on Trade-Related Aspects of Intellectual Property Rights), 655, 656
 TripTiks (AAA), 48, 48, 292–93, 1346, 1368–69, 1738
 Troll, Carl (1899–1975), 1118
 Tropical Rainfall Measuring Mission (TRMM), 1276
 Tropical Wind Energy Conversion and Reference Level (TWERLE), 630
 Trotsky, Leon (1879–1940), 1766, 1768
 Truman, Harry S. (1884–1972), 662, 888
 Tryon, Robert C. (1901–1967), 378
 Tscherning, Carl Christian (b. 1942), 426, 460
 Tsentral'nyy nauchno-issledovatel'skiy institut geodezii, aeros"yemki i kartografi (TsNIIGAiK) (Soviet Union/Russian Federation), 480, 551, 981, 983, 1379, 1592, 1639–41
 Tsikada (Cicada) (satellite navigation system), 1018
 Tsinger, Nikolai Yakovlevich (1842–1918), 1182
 TsNIIGAiK (Tsentral'nyy nauchno-issledovatel'skiy institut geodezii, aeros"yemki i kartografi), 480, 551, 981, 983, 1379, 1592, 1639–41
 Tsvetkov, K. A. (1874–1954), 982
 Tsvetkov, M. A. (1875–1960), 1213
 Tuan, Yi-Fu (b. 1930), 413, 613, 811
 Tufte, Edward R. (b. 1942), 346, 790, 1521–22, 1523
 Tufts, William O., 1660
 Tukey, John W. (1915–2000), 419
 Turchi, Peter, 785
 Turk, Greg, 1520
 Turkey, 337. *See also* Ottoman Empire
 Turner, Eugene (b. 1946), 311
 Turner, Frederick Jackson (1861–1932), 350, 598
 Turner, Ralph J., 486
 Turnkey GIS systems, 398, 499, 810
Tuxedo Park (Conant), 492
 Tüxen, Reinhold (1899–1980), 127

Tversky, Barbara, 1069, entry by, 1059–62
 TWC (Weather Channel, The) (United States), 1489, 1743, 1743–44, 1744, 1746–47
 Two-Degree Field (2dF) Galaxy Redshift Survey, 86
 Two Micron All Sky Survey (2MASS), 88
 Tyacke, Sarah, entry by, 771–74
 Tyner, Judith A., 1088, 1089, 1525, 1758 entries by, 232–35, 309–10, 1054, 1087–95, 1500–1525, 1758–61
 Typewriters, 741–42
Typography, 744–49. *See also* Labeling
 for photomechanical processes, 745–49, 746, 747, 748, 1331
 for public transportation maps, 791
 software and, 1430
 stamped type, 744, 745
 for topographic mapping, 1585
 visual perception and, 1057–58, 1059
 Tyrwhitt, Jacqueline (Jaqueline) (1905–1983), 267, 1439
 Tyvek, 1712
 U-2 program (United States), 889–90, 1123, 1124, 1273, 1667–68, 1667, 1668, 1698
Übersichtskarte von Mitteleuropa, 925
 Udall, Stewart L. (1920–2010), 993
 Ufficio cartografico (Italy), 1616, 1620
 Uganda, 124, 301, 302, 1209. *See also* Africa
 UHURU observatory, 88
 UK Hydrographic Office (UKHO), 836–39, 844, 849
 Ukraine, 1414
 Ukrayins'ke tovarystvo geodeziyi i kartografiyi (Ukraine), 1414
 Ultraviolet, 88
Ulysses (Joyce), 787, 986, 988, 989
 UN Committee on the Peaceful Uses of Outer Space, 1648
 UN Conference on the Standardization of Geographical Names, 514, 515, 520
 UN Convention on the Law of the Sea (UNCLOS), 761–62
 UN-ECA Committee for Development Information (CODI), 1648
 UN Economic Commission for Africa (UNECA), 475, 687
 UN Environmental Programme (UNEP), 635
 UN Food and Agriculture Organization (FAO), 1192
 UN Group of Experts on Geographical Names (UNGEGN), 134, 514, 515, 516, 517, 520, 1047, 1644, 1646–47, 1646
 UN International Strategy for Disaster Reduction (UNISDR), 587
 UN Office for Outer Space Affairs (UNOOSA), 1648
 UN Regional Cartographic Conferences (UNRCC), 147, 150, 673, 1644, 1647–48, 1647, 1648
 UNAMACE (Universal Automatic Map Compilation Equipment), 891, 1111–12, 1144, 1295, 1698
 Uncertainty, 1642–44. *See also* Accuracy
 accuracy and, 13, 15
 boundary disputes and, 136
 cartometry and, 206
 in geographic information systems, 496
 in geologic mapping, 526
 in hazard/risk mapping, 585
 symbolization and, 1643, 1644
 Unclassed choropleth symbolization, 221, 374, 384, 1511–12, 1513
 Underground maps, 424
Understanding Maps (Keates), 728
 UNESCO (United Nations Educational, Scientific and Cultural Organization)
 biogeographical cartography and, 125, 127, 128
 GEBCO and, 321, 445
 Global Geodetic Observing System, 462
 Integrated Global Observing Strategy Partnership, 462
 marine charting and, 682–83, 844, 848
 place promotion and, 1637
 on race, 1236
 UNGEGN (UN Group of Experts on Geographical Names), 134, 514, 515, 516, 517, 520, 1047, 1644, 1646–47, 1646
 UNICEF (UN Children's Fund), 1100
 Unified European Levelling Network (UELN), 478
 United Airlines, 38, 38
 United Arab Emirates, 1600
 United Kingdom. *See also* British colonial/imperial cartography; British military mapping
 academic cartography, 342
 aeronautical charts, 22, 23, 24
 Africa boundary surveying, 153, 154–55
 Africa geodetic surveying, 472–73
 Asia boundary surveying, 169, 170, 171, 173
 cadastral surveying, 1227
 census mapping, 209, 221
 coordinate systems, 279, 280, 281, 283
 electronic atlases, 90
 Eurocentric bias and, 413
 geographic information systems origins, 1440
 geographic names, 512
 geography education, 217
 historic preservation maps, 601
 historical-boundaries atlases, 95–96
 intellectual property, 657
 journalistic cartography, 716–17
 land use maps, 751–52
 marine charting, 836–40, 837, 838, 839, 840, 841
 Middle East boundary surveying, 163, 164
 monumentation, 1225, 1225
 national map collection, 771
 place promotion, 1637, 1640
 road mapping, 1361, 1362, 1637

- school atlases, 107
topographic mapping. *See* Ordnance Survey
United Nations (UN), 1644–49, 1646. *See also* International Civil Aviation Organization; UN Group of Experts on Geographical Names; UN Regional Cartographic Conferences; UNESCO administrative cartography and, 16 air-age globalism and, 34, 34, 415 American Congress on Surveying and Mapping and, 1405 boundary disputes and, 138, 156, 164, 1645, 1645 cartographic conferences, 387 Cartographic Section (UNCS), 1644, 1645–46 census mapping and, 211 climate maps, 229 definition of cartography, 10 Directorate of Overseas Surveys and, 324 emblem of, 34, 34, 415, 582 geographic names and, 133–34, 514, 515, 516, 517, 518, 519–20 Global Mapping Project and, 1648–49 Gulf War (1991) and, 568, 569 International Cartographic Association and, 670, 671–72 International Civil Aviation Organization, 26, 27, 274–75, 673–77, 692, 1015–16, 1018, 1648, 1765 International Hydrographic Organization and, 683, 685 International Institute for Geo-Information Science and Earth Observation and, 686 International Map of the World and, 177, 691, 692, 693, 1645 International Maritime Organization, 685, 828, 832, 844, 1015, 1017, 1433–34, 1648 Law of the Sea and, 141, 629, 760, 761 Peters projection and, 244, 1100 terrain analysis, 1496 UNESCO, 125, 127, 128 United States. *See also* Colonial/imperial cartography; North America; specific conflicts; specific journals, agencies, and organizations academic cartography, 1–5, 340, 341–42, 343 administrative cartography, 16, 17, 18 aeronautical charts, 22, 23–24, 25, 26, 27–29 Agricultural Adjustment Administration, 30–31 Asia boundary surveying, 172–73 cadastral surveying, 188, 1194–1200, 1220 Canada boundary surveying, 144, 145, 146, 146 colonial/imperial cartography and, 255 coordinate systems, 279–80, 280, 281 copyright traps, 285 demographic mapping, 314, 315 electoral mapping, 352, 354, 354, 355 emergency planning, 389–92 European boundary surveying and, 158 geographic names, 512–13, 516–17, 520–21 geographical societies, 1415–17 geopolitical cartography, 542–44, 546, 715 historic preservation maps, 601 historical-boundaries atlases, 94–96 intellectual property, 654, 656, 657 land use maps, 752 lunar and planetary mapping, 792–93 map libraries, 766 marine charting, 830–35, 833, 834, 835 Mexico boundary surveying, 144, 150, 150, 1564 military mapping, 884, 884–93, 885, 887, 969–70, 1777, 1778, 1779. *See also* U.S. Army Map Service national atlases, 97, 100, 112, 580, 580, 992, 993–94 national map collection, 771 public globes, 561 regional atlases, 104, 105 road mapping, 1339–50 Russia maritime boundary dispute, 139–40, 140 school atlases, 107 statistical mapping, 18, 1462 subscription atlases, 110–12, 111 topographic mapping, 1555–59, 1557, 1558. *See also* U.S. Geological Survey world atlases, 115 *United States, 1830–1850, The* (Turner), 350 *United States Atlases* (Le Gear), 110 *United States Congressional Districts, 1788–1841* (Parsons & Beach), 94 *United States Congressional Districts and Data, 1843–1883* (Parsons & Beach), 94 *United States Soil Provinces* (USDA), 1444 Units of measurement. *See* Metric system UNIVAC, 209, 1656 Univariate maps, 122 *Universal Atlas* (Cassell), 1531 Universal Automatic Map Compilation Equipment (UNAMACE), 891, 1111–12, 1144, 1295, 1698 Universal Copyright Convention (UCC), 655 Universal instruments for photogrammetric mapping (base-in, base-out method), 1110–11, 1110, 1129–30, 1140 Universal Photogrammetric Data Reduction and Mapping System (UPDRAMS), 1295 Universal Polar Stereographic (UPS) coordinate system, 273, 281, 464, 1188, 1189, 1191 Universal Postal Union, 516 Universal Press (Australia) (publisher), 1363 *Universal-Taschenatlas* (Hickmann), 440 Universal Transverse Mercator (UTM) coordinate system, 888, 1186 in Austrian military mapping, 927 conformality and, 273, 871 data handling/analysis and, 1289, 1290 in Israeli military mapping, 930 in Italian military mapping, 923 for marine mapping, 1191 Military Grid Reference System and, 464 for military mapping, 1188 military mapping of North Africa and, 955 NATO adoption of, 894, 908, 965, 1189, 1536, 1697 for satellite imaging, 992, 1289, 1290 for topographic mapping, 281, 647, 651, 1585 in U.S. military mapping, 890 University of California, Berkeley, 494 University of California, Los Angeles (UCLA), 1 University of Chicago, 1, 524 University of Connecticut Map and Geographic Information Center, 320 University of Kansas, 1, 2, 3, 494 University of Michigan, 1 University of Minnesota, 494 University of Washington, 1, 2, 3–4, 494, 525 University of Western Ontario, 4 University of Wisconsin, 1, 2–3, 494, 525, 1366 Unmanned aerial vehicles (UAVs), 1670 UNRCC (UN Regional Cartographic Conferences), 147, 150, 673, 1644, 1647–48, 1647, 1648 Unsharp masking, 324 Unverhau, Dagmar (b. 1944), 198 “Up her can nada” (Birney), 783, 784, 785 Updating of maps. *See* Map revision UPDRAMS (Universal Photogrammetric Data Reduction and Mapping System), 1295 UPS (Universal Polar Stereographic) coordinate system, 273, 281, 464, 1188, 1189, 1191 Urban and Regional Information Systems Association (URISA), 387, 494, 1407 *Urban Atlas: 20 American Cities*, 102, 105 *Urban Atlas: Tract Data for Standard Metropolitan Statistical Areas*, 103, 105, 1466, 1657 Urban Data Processing Inc., 450 *Urban Land Uses* (Bartholomew), 752 Urban mapping, 574, 1649–55. *See also* Urban/regional planning campus maps and, 1704 census mapping and, 211 Central Intelligence Agency, 1652, 1653, 1670 community mapping and, 267 electronic cartography development impacts, 1652–53 historical atlases, 1652

Urban mapping (*continued*)
 historical geography and, 604, 606
 indexed street maps, 183, 185, 1714–16,
 1715, 1716
 Japan, 1608
 John Bartholomew & Son, 701, 702
 in journalistic cartography, 708, 712
 mass marketing and, 861
 military mapping and, 915, 917, 1651,
 1652, 1653
 perspective maps in, 1652, 1654
 place promotion and, 1622, 1629–30,
 1630, 1631, 1632, 1632, 1633, 1637
 postcolonial cartography, 324
 public transportation maps, 1239, 1242,
 1729–32, 1730
 regional atlases and, 105
 thematic, 1650–51, 1652, 1653
 typology of, 1640, 1649–50
 vs. urban/regional planning, 1157
 walking tour maps, 1628, 1629, 1633–
 34, 1636, 1636

Urban/regional planning, 1157–62, 1160,
 1650. *See also* Urban mapping
 administrative cartography and, 17
 aerial photography for, 1113, 1114
 City Beautiful movement, 1157–58, 1158
 dot maps in, 1158–59, 1161
 facilities maps and, 424
 Germany, 40–42, 1159
 historic preservation maps and, 601
 historical geography on, 603
 land use maps and, 752
 Ordnance Survey and, 1034
 photogrammetric mapping for, 1108
 Prussia, 1165, 1166, 1167
 Saudi Arabia, 1161, 1162
 social theory and, 1400
 vector data models for, 363–64
 William-Olsson on, 1755

Urban Surveying and Mapping (Blachut,
 Chrzanowski, & Saastamoinen), 424

Urban Traffic: A Function of Land Use
 (Mitchell & Rapkin), 752

URISA (Urban and Regional Information
 Systems Association), 387, 494, 1407

Urmayev, N. A. (1895–1959), 1641

Urteaga, Luis, entry by, 650–54

Uruguay, 1560. *See also* Latin America

U.S. Agency for International Development
 (USAID), 664

U.S. Antarctic Research Program, 69

U.S. Army Corps of Engineers (USACE),
 1655–56
 Engineer Reproduction Plant, 1670
 geodetic surveying, 1656
 land systems analysis and, 750
 military mapping and, 884
 thematic mapping, 1503
 U.S. Geological Survey and, 1661
 World War I mapping, 1655, 1655

U.S. Army Map Service (AMS), 255
 accuracy standards and, 1454
 color proofing, 1396

founding of, 1655
 French topographic mapping and, 647
 geodetic surveying and, 473
 gravimetric surveys, 456
 Himalaya cartography and, 594
 institutional role of, 1670
 International Map of the World and, 691
 map libraries and, 766
 map reproduction, 1152
 mapping software and, 1430
 military mapping of Europe, 965
 military mapping of Korea, 973
 military mapping of North Africa, 955
 military mapping of Southeast Asia, 972
 military mapping of the Middle East,
 969–70
 orthophotography, 1112
 physiographic diagrams, 1154
 projections, 1186
 reliability diagrams, 1642, 1643
 relief models, 1266
 topographic mapping and, 1585, 1611
 Vietnam War and, 891, 972
 World War II and, 886, 888

U.S. Board on Geographic Names (BGN),
 133–35, 319, 443, 1085

U.S. Census Bureau, 1656–59. *See also* Cen-
 sus data; Census mapping; GBF/DIME
 format; TIGER
 analytical cartography and, 90
 bivariate maps, 131, 1521
 color, 261, 262, 264
 DIME format, 209–10, 368, 816. *See also*
 GBF/DIME format
 electronic atlases, 90
 ESRI data formats, 401
 geocoding and, 449, 450, 451
 geographic information systems and, 493,
 494
 Harvard Laboratory for Computer
 Graphics and Spatial Analysis and,
 583
 Hollerith system, 209
 illustration software and, 1437
 interactive mapping, 315
 Internet access, 315
 printing, 506
 race and, 1232, 1233, 1237
 regional atlases, 105
 statistical mapping, 1464, 1466–67
 U.S. Geological Survey and, 1664

U.S. Census of Population and Housing, 449

U.S. Center for Disease Control, 1074, 1084

U.S. Coast and Geodetic Survey (USC&GS)
 aeronautical charts, 23–24, 25
 coastal mapping, 236, 621
 electromagnetic distance measurement,
 355–56
 geodetic surveying, 465, 475
 gravimetric surveys, 454–55
 hydrography and, 622, 623, 625
 marine charting, 831, 832–34, 833, 834,
 835
 military mapping and, 886

monumentation, 1225
 on projections, 870–71
 public access to cartographic information
 and, 1227
 scribing and, 1395
 Soviet geodetic surveying and, 550
 topographic mapping and, 1556
 World Aeronautical Chart and, 1764–65,
 1766

U.S. County Boundary Data File project, 95

U.S. Department of Agriculture (USDA),
 1193, 1300, 1444, 1463–64, 1505

U.S. Department of Defense. *See* Military
 development and applications

U.S. Department of Homeland Security
 (DHS), 391

U.S. Department of Labor, 493

U.S. Federal Housing Administration (FHA),
 1254–55, 1257, 1257

U.S. Fish and Wildlife Service, 319

U.S. Forest Service, 1118, 1295, 1676

U.S. Geological and Geographical Survey of
 the Territories, 443

U.S. Geological Survey (USGS), 1539–40,
 1659–66. *See also* TIGER
 accuracy and, 13, 14, 15
 aerial photography and, 754, 1113, 1118,
 1505
 Antarctica maps and, 70
 cartographic conventions and, 275
 cartographic style and, 1472
 census mapping and, 210
 Center for Earth Resources Observation
 and Science, 318, 321
 coastal mapping and, 236
 Cold War and, 239
 coordinate systems and, 281
 Corona and, 1294, 1295
 digital elevation models, 358, 1664
 digital geospatial libraries, 318
 ESRI data formats, 401
 funding for, 1556
 Gannett and, 443
 geographic information systems and, 493,
 494, 504, 1664
 geographic names and, 134, 319
 geophysics and, 531
 Global Land Survey, 1289
 Harvard Laboratory for Computer
 Graphics and Spatial Analysis and, 583
 hazard/risk mapping and, 590, 592
 International Map of the World and, 690
 labeling, 746–47, 747
 Landsat and, 754, 755, 756, 992
 lunar and planetary mapping and, 793
 MAP III program, 1663, 1664
 map reproduction, 1310, 1322
 map revision, 1295, 1295, 1296, 1297
 mapping software and, 1429, 1432–33
 metric system and, 878
 military mapping and, 884
 national atlases by, 97, 100, 112, 993–94
 orthophotography, 805–6, 805, 1112,
 1141, 1144, 1145, 1151, 1333

- photogrammetric mapping, 1140, 1549, 1660, 1661, 1662–63, 1662
 plane tabling, 1156, 1659
 projections, 1186, 1193
 public access to cartographic information and, 1227, 1228
 satellite imaging and, 1283, 1289
 scale and, 1383
 soils maps and, 1444
 terrain analysis, 501, 1493–95, 1496, 1497
 thematic mapping, 1503
 U.S. Census Bureau and, 1664
 World War I and, 1660, 1661
 World War II and, 1662–63
- U.S. intelligence community mapping, 1666–72. *See also* Central Intelligence Agency; Military development and applications; Military mapping; National Geospatial-Intelligence Agency
- U.S. Lake Survey, 622, 831–32
- U.S. military mapping, 884–93. *See also* Defense Mapping Agency; U.S. Army Map Service
 Cold War, 888–92, 891, 966
 Korea, 973, 974
 Middle East, 892, 969–70
 Southeast Asia, 891, 971, 971, 972
 Spanish-American War, 884, 884
 U.S. intelligence community and, 1666–72
 World War I, 884, 885, 886
 World War II, 886–88, 887, 889, 890, 899, 964–65, 971, 1778
- U.S. National Historical Geographic Information System, 96
- U.S. National Park Service, 1023, 1253, 1253
- U.S. National Photographic Interpretation Center (NPIC), 890–91
- U.S. National Reconnaissance Office (NRO), 891, 1671
- U.S. National Research Act (1974), 1171
- U.S. Naval Hydrographic Office, 831, 832, 852, 871, 891
- U.S. Naval Intelligence Department (NID), 1666
- U.S. Navy. *See* Military development and applications
- U.S. News & World Report*, 1749
- U.S. Office of Coast Survey (OCS). *See* U.S. Coast and Geodetic Survey
- U.S. Postal Service, 210
- U.S. Privacy Act (1974), 1170
- U.S. Signal Service, 872
- U.S. Standard Datum, 1135
- USA Today, 260, 716, 839, 1509, 1510, 1511, 1746
- Usability studies, 1065
- USACE. *See* U.S. Army Corps of Engineers
- User perceptions. *See* Communication paradigm; Perception/cognition
- USGS. *See* U.S. Geological Survey
- Ushakov, Georgiy Alekseyevich (1901–1963), 74
- USS *Nutilus* (submarine), 76, 1018
- USSR Agriculture Atlas (CIA), 103, 105
- U.S.S.R. and Eastern Europe, *The*, 102
- Ustinov, V., 982
- Uti possidetis juris*, 146, 156, 301
- UTM coordinate system. *See* Universal Transverse Mercator (UTM) coordinate system
- V-2 rocket imaging, 1283
- Väisälä, Yrjö (1891–1971), 426
- Vale, Edmund (1888–1969), 1372
- Valkenburg, Samuel van (1890–1976), 1609
- Vallaux, Camille (1870–1945), 1050
- Value-area cartograms, 313–14, 314
- Van den Hoonaard, Will C. (b. 1942), 1758
- Van der Grinten, Alphons J. (1852–1921), 997, 1179, 1193
- Van der Grinten projection, 244, 871, 997, 998, 1179, 1193
- Van der Steer, Willem Cornelis (1867–1933), 1576
- Van Sant, Tom (b. 1931), 522, 806, 990
- Van Warren, Lloyd, 990
- Vancouver, George (1757–1798), 139
- VanDam (publisher) (United States), 1714
- Vandyke prints, 1306, 1552
- Varanka, Dalia E., 55
 entry by, 73–84
- Vasiliev, Irina Ren, 1530
- Vaster data model, 364
- VEB Geographisch-Kartographische Anstalt Gotha (publisher) (East Germany), 723
- VEB Hermann Haack Geographisch-Kartographische Anstalt Gotha (publisher) (East Germany), 723, 724
- Vector data models, 189, 360–61, 360, 362–64, 369, 372, 382, 496. *See also* GBF/DIME format
- Vector plotters, 1324–25
- Vector Product Format (VPF), 320
- Vegetation maps. *See* Biogeographical cartography
- Vehicle navigation systems. *See* In-vehicle navigation systems
- Veis, George (b. 1929), on geodetic computations, 461
- VELA Uniform project (United States), 533–34
- Velhagen & Klasing (publisher) (Germany), 721, 723, 1673–74, 1674, 1690
- Velká cykloturistická mapa*, 1253
- Venezuela, 1563. *See also* Latin America
- Vepakomma, Udayalakshmi, entry by, 378–82
- Verband Deutscher Schulgeographen, 722
- Verbree, Edward, 1682
- Verein für das Deutschtum im Ausland, 541
- Vereshchaka, T. V., entry by, 1591–97
- Verlag Ed. Hörlzel (Austria) (publisher), 1674–76
- Vermeer, Martin, entry by, 425–28
- Vernadskiy, Vladimir I. (1863–1945), 549, 1213, 1380
- Verner, Coolie (1917–1979), 191, 247
- Vernon, John, 785
- Versailles Peace Conference. *See* Post-World War I settlement
- Verst scales, 935, 936
- Verstappen, Herman Th., 1611
- Very High Resolution Radiometer (VHRR), 630. *See also* Advanced Very High Resolution Radiometer
- Very long baseline interferometry (VLBI), 461, 477
- Veselovskiy, N., 982
- Vespucci, Giovanni (d. after 1528), 1175
- VGU (Vyssheye geodezicheskoye upravleniye) (Soviet Union), 240, 479, 549–50, 982, 1213, 1380, 1592, 1767. *See also* GUGK
- VHRR (Very High Resolution Radiometer), 630. *See also* Advanced Very High Resolution Radiometer
- Viamichelin (company), 880
- VICAR (Video Information Communication and Retrieval), 991
- Victoria Medal, 43
- Victory Through Air Power* (Disney), 542
- Vidal de la Blache, Paul (1845–1918), 294, 297, 864
- Videodiscs, 633
- Vietnam, 168, 171, 172–73. *See also* Southeast Asia
- Vietnam War
 boundary surveying and, 171, 172–73
 community mapping and, 268
 military mapping and, 891, 972
 photogrammetric mapping and, 1667
 radar and, 891, 1125
 U.S. Army Corps of Engineers mapping, 1655–56
- View of the World from 9th Avenue* (Steinberg), 812, 1067, 1067
- Viewshed mapping, 1676–78, 1677, 1678
- Vigil, José F., 264
- Vignelli, Massimo (1931–2014), 791, 1077
- Vignetting, 1327, 1327
- Vincent of Beauvais, 1678
- Vine, F. J. (b. 1939), 1025
- Vinland Map, 1678–80, 1679, 1756, 1757
- Vinylite, 333
- Virtual Earth (software), 662
- Virtual Environment Technology Lab (VETL), 1681
- Virtual globes, 227, 229, 559, 561–62, 564, 661–62, 1385, 1387. *See also* Google Earth
- Virtual Puget Sound, 1682
- Virtual reality, 1680–83
 Aspen Movie Map Project, 633, 659, 659, 1681
 for campus maps, 1704
 cartographic visualization and, 1681–82, 1687–88
- Virtual Reality Modeling Language (VRML), 1681
- Virtual vs. real maps, 56–57, 57

- Visejezicni kartografski rječnik* (Borčić), 317
- Visibility base map, 1193
- Visintin, Luigi (d. 1958), 696–97
- Vision. *See* Visual impairment; Visual perception
- Visual analytics, 206
- Visual Display of Quantitative Information, The* (Tufte), 346
- Visual flight rules (VFR), 28
- Visual impairment, 265, 293, 1057, 1058, 1068–69, 1480–83, 1722–26
- Visual perception, 1055–59. *See also* Color color vision impairment, 265, 293, 1057, 1058 typography and, 1057–58, 1059
- Visual variables. *See* Semiology
- Visualization. *See* Cartographic visualization
- Visvalingam, Mahes, 800
- Vitkovskiy, Vasily Vasil'evich (1856–1924), 1182
- VLBI (very long baseline interferometry), 461, 477
- VMap Level 0 (Digital Chart of the World), 320, 321, 401, 508, 660, 903, 1431, 1455
- Vogel, Carl (1828–1897), 721, 722
- Vogt, Peter R. (b. 1939), 1028
- Volcanic hazards, 592
- Völger, Klaus, 1250
- Volk Und Reich, 541
- Volkert, M. M. H. B., 687
- Vollmann, William T. (b. 1959), 787
- Vollmar, Rainer (b. 1938), 612
- Von Gruber points, 1128, 1128, 1138, 1139
- Voorhees, Alan M. (1922–2005), 247
- Voprosy geografii i kartografii* (Nauchno-izdatel'skiy institut), 135
- VOR (very-high-frequency omnidirectional radio range stations), 27–28, 1015, 1016
- Voronoi diagrams, 1177, 1178
- Voyages to the West* (Bailyn), 598
- Voyenno-topografi cheskaya sluzhba (VTS) (Soviet Union), 935, 940, 1214, 1592
- Voyenno-topograficheskaya upravleniya (Russian Federation), 1596
- Voyennotopograficheskaya sluzhba (Soviet Union), 479, 550
- Vujakovic, Peter, 275, 716 entries by, 413–16, 811–14, 1162–65, 1742–43
- Vulnerability mapping, 585, 587
- Vygotskiy, Lev (1896–1934), 218
- Vysshey geodezicheskoye upravleniya (VGU) (Soviet Union), 240, 479, 549–50, 982, 1213, 1380, 1592, 1767. *See also* GUGK
- W. & A.K. Johnston (Scotland), 701, 1694
- W. G. Fuller's Road Guide to South Australia, 1363
- Waag, A. van der, 687
- WAAS (wide area augmentation system), 1718
- WAC. *See* World Aeronautical Chart
- Wacom tablets, 35
- Wade, E. B. H., 163
- Wadley, Trevor Lloyd (1920–1981), 454, 460, 1196, 1222
- Wagner, Eduard (1811–1885), 1690
- Wagner, Henry Raup (1862–1957), 246
- Wagner, Hermann (1840–1929), 340, 721
- Wagner, Karlheinz (1906–1985), 1100, 1172, 1193, 1692
- Wagner, Otto Richard, 573
- Wagner & Debes (publisher) (Germany), 723, 1690–91, 1691, 1692, 1693
- Wagner projections, 1503
- Wainwright, Alfred (1907–1991), 812, 1712
- Waldseemüller, Martin (ca. 1475–before 1522), 785, 1175, 1756, 1757
- Walker, (Byron) Edmund (1848–1924), 1417
- Walker, Emery (1851–1933), 783, 1702
- Walker, Francis Amasa (1840–1897), 443
- Walker, Frank (1914–1976), 1114
- Walking tour maps, 1628, 1629, 1633–34, 1636, 1636
- Wall maps, 1693–96
- Freytag-Berndt und Artaria KG, 440
 - geographical mapping and, 523
 - Hammond Map Company, 575
 - Justus Perthes, 722, 1694
 - projections for, 871, 1173, 1694
 - thematic mapping in, 1694, 1695
- Wallace, Timothy R., entry by, 814–16
- Waller, Lance A., entry by, 1468–71
- Wallingford, Daniel K., 812–13
- Wallis, B. C., 312, 1050
- Wallis, Helen (1924–1995), 191, 610, 772, 1759
- Wallum Olum (Red Record)*, 287
- Walmsley, D. J. (b. 1946), 811
- Walters, S. M. (1920–2005), 1440
- Wang Jiayao, 945
- Wang Zhizhuo (1909–2002), 1603, 1780, 1783
- War Atlas for Americans, A* (U.S. Office of War Information), 34
- War atlases, 1503
- War in Maps, The*, 542, 714
- Ward, Robert DeCourcy (1867–1931), 1232
- Wardington, Christopher Henry Beaumont Pease, Lord (1924–2005), 249
- Warfare. *See* Military development and applications; Military mapping; specific conflicts
- Warner, Deborah Jean, entries by, 355–56, 454–56
- Warntz, William (1922–1988), 1700–1701, 1701
- on analytical cartography, 56, 868, 1700
 - on demographic mapping, 312–13
 - geographic information systems and, 494, 1440
- Harvard Laboratory for Computer Graphics and Spatial Analysis, 583, 1440, 1700
- social physics and, 56
- on thematic mapping, 1700, 1701
- Warntz networks, 56, 59
- Warren, Gwendolyn, 268
- Warsaw Pact. *See* Eastern Europe
- Washburn, Bradford (1910–2007), 595–96, 1269, 1272
- Washington [D.C.] Map Society, 1421
- Watanabe, Akira (1904–1984), 731
- Water Atlas, The*, 113–14
- Waterman projection, 1177
- Watermarks, 656
- Waterproofing, 24, 1253
- Waugh, Thomas C. (b. 1945), 496, 1440
- Wawrik, Franz (b. 1940), 317, 610
- Wax engraving, 802, 1308, 1314, 1316, 1701–4, 1703
- color and, 1322
- labeling style and, 739–40, 744, 745, 1245, 1331, 1436, 1472, 1702
- mass production and, 1401
- Rand McNally & Company, 1245, 1318, 1322, 1401, 1702, 1703
- steps in, 1702
- Wayfinding, 1621. *See also* Cycling
- maps; Hiking/trail maps; In-vehicle navigation systems; Public transportation maps; Road mapping; Route maps; Travel mapping; Web-based wayfinding
 - advertising and, 19
 - campus maps, 1704–6, 1705, 1706, 1726
 - cloth maps for, 233–34, 233, 234, 235
 - escape/evasion maps, 233, 234, 703, 1709–11, 1710, 1711
 - indexed street maps, 183, 185, 1714–16, 1715, 1716
 - orientation maps, 1066, 1080, 1081, 1724, 1726, 1726–27, 1727
 - shortest path algorithm and, 500
 - topographic mapping for, 1548
 - walking tour maps and, 1634, 1636
- Weather Channel, The (TWC) (United States), 1489, 1743, 1743–44, 1744, 1746–47
- Weather Forecasting* (U.S. Weather Bureau), 873
- Weather maps, 1744–50. *See also* Meteorology
- animation in, 293, 1393, 1747
 - chroma key for, 225, 225, 226, 873, 1489
 - customization of, 293
 - design of, 1489
 - disaster management and, 1744–45, 1745, 1747, 1748, 1749
 - early limitations, 1744–45, 1745
 - geographical discovery and, 1392–93
 - interactive, 876
 - Jet Propulsion Laboratory, 1749, 1749 in *USA Today*, 1509, 1510, 1511, 1746
 - The Weather Channel, 1489, 1743–44, 1743, 1744
 - World War II and, 1745
- Weather routing, 1018

- Weather.com, 876
Web-based applications. *See* Internet; Web-based wayfinding
Web-based wayfinding, 816–18, 1739–42, 1752, 1753
advertising and, 20
animation in, 62
cartographic style and, 1472
census data and, 210, 810, 816
customization and, 293
electronic cartography development and, 359
geocoding and, 450, 810
in-vehicle navigation systems and, 1740
intellectual property and, 656
map pins and, 815–16
map-use skills and, 1078
mapping software and, 1434
marketing and, 859, 861
orientation maps and, 1727
pattern recognition and, 1293
personalization and, 293
persuasive cartography and, 1089
privacy issues, 1170, 1301
public access to cartographic information and, 1231
R. R. Donnelley & Sons and, 1376
road mapping and, 1349–50, 1362
shortest path algorithm and, 500
timeline, 1741
Web Cartography (Kraak & Brown), 1739
Webber, Roger, 562
Weber, Ernst Heinrich (1795–1878), 1082–83
WECDIS (Warship Electronic Display and Information Systems), 823, 826
Wedderburn, R. W. M. (1947–1975), 1470
Weekly Reader (magazine), 861
Weele, Anton van der, 686, 687
Weems, Philip Van Horn (1889–1979), 1013
Wegener, Alfred (1880–1930), 523, 527, 531, 1025, 1392, 1500
Weibel, R., 59
Weierstrass, Karl (1815–1897), 867
Weiner, Daniel, 269
Weir, Gary E., entry by, 463–65
Weir, Thomas, 105
Weiss, Rüdiger, 288
Wells, H. G. (1866–1946), 1050
Wells, Katie J., entry by, 600–602
Welt-Seuchen-Atlas: Weltatlas der Seuchenverbreitung und Seuchenbewegung (Rodewaldt & Jusatz), 404
WEND (Worldwide Electronic Navigational Chart Data Base), 828
Wendt, Donna, 402
Wendy's, 19
Wenker, Georg (1852–1911), 778, 779, 780
Wenschow, Karl (1884–1947), 911, 1265, 1266, 1269
Werkmeister, Paul (1878–1944), 317
Werner-Ernst-Preis (Germany), 42
Wertheim, Hans, 636
Wessel, Paul, 535
West, Robert C. (1913–2001), 603
West Germany, 17, 41, 177, 1584. *See also* Europe; Germany
Westermann, Eberhard, 726
Westermann, Georg (1810–1879), 1754
Westermann Verlag (publisher) (Germany), 1694, 1695, 1754–55
Western Association of Map Libraries (WAML), 1421, 1422
Western Electric Company, 19
Western Europe. *See also* Europe; specific countries
cartographic societies, 1410–13, 1411
topographic mapping, 178, 266–67, 417, 478, 1455, 1579–87
Western States Geographic Names Conference (United States), 134
Westfall, Claude Z., 329
Westgard, A. L. (1865–1921), 46, 47, 1342, 1343
WGS. *See* World Geodetic System
Whatman, James (1702–1759), 329
Wheat, Carl I. (1892–1966), 246
Wheat, Joseph H., 1660
Wheelchair access maps, 1742, 1742–43
Wheeler, E. Oliver, 595
Wheeler, George M., 1546
Where the Wasteland Ends (Roszak), 613
WHIRLPOOL (software), 1441
White, Denis, 584, 1441
entry by, 129–33
White, Gilbert F. (1911–2006), 589
Whitfield, R. A. S., 1039
Whitmarsh, Agnes (1909–2001), 274
Whitmore, George D. (1898–1981), 424
Whitney, J. D. (1819–1896), 443
Whittle, Peter (b. 1927), 1469
“Whole Earth”/“Blue Marble” photograph, 522, 566, 567
Whole-world maps. *See* World maps
Whyte, Brendan R., entry by, 168–76
Wickman, Åke, 408, 409
Wide area augmentation system (WAAS), 1718
Wiechel, H., 59, 350, 1267, 1503, 1516
Wieder, Frederik Caspar (1874–1943), 91
Wiegand, Patrick (b. 1948), 217, 218
Wiener, Norbert (1894–1964), 461, 733
Wiget, Russell L., 1050
Wiggins, W. D. C., 798
Wiki technology, 1753
Wild, Heinrich (1877–1951), 1222
Wild Leitz Gruppe, 326
Wilford, John Noble (b. 1933), 609, 1428
Wilhelmy, Herbert (1910–2003), 317
Wilkins, George Hubert (1888–1958), 64
Wilkinson, Henry Robert (1916–2000), 341, 344, 777, 1466, 1513
Wilkinson Microwave Anisotropy Project (WMAP), 88
Willi Nordberg Symposium (1987), 1285
William-Olsson, William (1902–1990), 1755–56, 1756, 1757
Williams, J. E. D. (d. 1992), 1014
Williams, L. G., 1072
Williams, Robert J., entry by, 974–76
Williams, Robert L. (b. 1917), 1083–84
Willingham, Robert M., Jr., 72
Willkie, Wendell L. (1892–1944), 33
Wills, Graham, 421
Wilmott, A. J., 746
Wilson, Harold (1916–1995), 839
Wilson, J. Tuzo (1908–1993), 534
Wilson, Robert Woodrow (b. 1936), 88
Wilson, William, entries by, 124–29, 143–46
Wilson, Woodrow (1856–1924), 158, 762, 876, 1050, 1053, 1234
Wimperis, Harry Egerton (1876–1960), 1011
Winch, Kenneth L., 1452
entry by, 701–6
Wind in the Willows, *The* (Grahame), 812
Wingert, Everett A., 4
Winichakul, Thongchai, 613, 1004–5, 1401
Winkel, Oswald (1873–1953), 1172. *See also* Winkel tripel projection
Winkel tripel projection, 999, 1172, 1173, 1193, 1368
Winnie-the-Pooh (Milne), 216, 783, 812
Winslow, Barbara, 1742
Winsor, Justin (1831–1897), 245
Winter, Nancy Leeson Tear, entries by, 389–93, 585–93
Winterbotham, Frederick William (1897–1990), 897
Winterbotham, H. S. L. (1878–1946), 312, 1106, 1314, 1317, 1566
WIPO Copyright Treaty (WCT), 655, 656
WIPO Performances and Phonograms Treaty (WPPT), 655
Wire sweeping, 622, 622, 628
Wirtanen, C. A. (1910–1990), 85
Wirtschaftsatlas der deutschen Kolonien (Eckert), 339
Withington, Thomas entries by, 884–94
Withycombe, J. G., 746, 1057
Witt, Werner (1906–1999), 7, 42, 259, 317, 339, 341
Witten, Laurence C., 1678
Wittenberg, C., 1050
Wojskowy Instytut Geograficzny (Poland), 1588
Wold, Herman (1908–1992), 733
Woldenberg, Michael J., 56, 583
Wolfegg Castle, 1756–57
Wolff, Alexander, 375
Wolff, Paul M. (b. 1921), 630
Wölfl, Adolf (1864–1930), 814
Wolters-Noordhoff (Netherlands), 109
Womble, William H., 378–79
Wombling procedure for genetic mapping, 446
Women in cartography, 1758–61. *See also* specific people
U.S. Geological Survey, 1661–62
World War II and, 1667, 1758–59
Women in the World: An International Atlas (Seager & Olson), 1760

Women's rights movement, 268, 1760
 Women's suffrage movement, 1092, 1093
Wonderful Wizard of Oz, The (Baum), 783
 Wong, Richard B., 1663
 Wood, Alberta Auringer, entry by, 1405–8
 Wood, Clifford H., 1073
 entry by, 201–2
 Wood, Denis (b. 1945)
 on children and cartography, 217
 community mapping and, 812
 on earth-from-space perspective, 522
 geopolitical cartography and, 544
 on narrative, 990
 on paramap, 1404
 on persuasive cartography, 1089
 social theory and, 1403
 on sociocultural paradigm, 613, 613
 Wood, Michael (b. 1941), entry by, 1046–47
 Wood engraving, 1148, 1308, 1314, 1316
 Woodcut, 744, 1308, 1316. *See also* Wood
 engraving
 Woodman, Paul, 1086
 entry by, 1085–87
 Woodward, Arthur, 1352
 Woodward, David (1942–2004), 1761–64
 academic cartography and, 3
 Chicago Map Society and, 1420
 on definitions of “map,” 799, 1764
 on history of cartography, 578, 612, 614,
 1400, 1761–62, 1762
 History of Cartography Project and, 577,
 579, 614–16, 1366, 1761, 1762–63
 on Rand McNally & Company, 1245,
 1247
 Robinson’s influence on, 1366, 1761
 Woodworth, Philip L., entry by, 1525–28
 Woppard, George Prior (1908–1974), 456
 Worby, Eric (b. 1957), 411
 Works Progress Administration (WPA)
 (United States), 1255, 1464, 1480
 World Aeronautical Chart (WAC), 1764–66,
 1765
 Arctic, 73, 74
 cartographic conventions and, 274–75
 geographical discovery and, 1389
 International Civil Aviation Organization
 and, 673, 674
 International Map of the World and, 692,
 1766
 projection for, 871, 1764
 World War II and, 22
 World atlases, 115–16
 digital, 561
 National Geographic Society, 997
 Rand McNally & Company, 108,
 115–16, 568, 1177, 1247, 1248, 1249,
 1503
 Soviet Union, 135–36, 137, 550
 thematic mapping in, 116, 1503, 1531
 The Times Atlas of the World, 115, 229,
 311, 519, 703, 706, 1531–32
 World Council of Churches, 244, 1193
 World Data Bank (CIA), 320, 357, 809,
 1430
 World Data Center (WDC), 680

World Digital Database (WDDB), 699
*World Directory of Dealers in Antiquarian
 Maps*, 247
World Directory of Map Collections (IFLA),
 772, 1422
World Factbook (CIA), 1670
 World Geodetic System (WGS)
 accuracy and, 14, 456
 Cold War and, 463
 feature extraction and, 1292
 for geographic information systems,
 555
 gravimetric surveys and, 530
 Heiskanen and, 455
 for marine charting, 821, 836, 853
 for military mapping, 891, 927, 1188
 for topographic mapping, 1585
 World Geographic Reference System
 (GEOREF), 281, 894
 World Gravimetric System, 482
 World Heritage Site program (UNESCO),
 1637
 World Hydrographic Office, 464
 World Hydrography Day, 683
 World Magnetic Model (WMM), 464
World Mapping Today (Parry & Perkins),
 1452
 World maps. *See also* Globes; International
 Map of the World; Projections
 Digital Chart of the World, 320, 401,
 508, 660, 903, 1431, 1455
 digital projects, 320–21
 geographical mapping and, 523
 Global Mapping Project, 321, 418, 731,
 1402, 1455, 1457, 1648–49
 Soviet military mapping and, 939–40
 World Data Bank, 320, 357, 809, 1430
 World Meteorological Organization
 (WMO), 679
World Ocean Floor Panorama (National
 Geographic Society), 1500
 World Polyconic Grid (WPG), 1188
 World revolution theory, 1766–70, 1767,
 1768, 1769, 1770
 World Vector Shoreline (WVS), 660
 World War I, 1770–74. *See also* Post–World
 War I settlement; World War I and
 aerial photography; World War I
 military mapping of Europe
 advertising and, 19–20
 aeronautical charts and, 22–23, 23, 24,
 1698–99
 art and, 78–79, 80
 Austrian military mapping and, 926
 battlefield maps, 1627, 1628, 1636
 biogeographical cartography and, 124
 British military mapping, 896, 896,
 966–67, 968, 1770–71, 1770
 cartographic conventions and, 274
 colonial/imperial cartography and, 254,
 255, 1566, 1574–75
 color in maps and, 258
 coordinate systems and, 281
 Eckert and, 339, 911
 eugenics and, 1233–34
 French military mapping and, 645–46,
 905–6, 905, 907, 1770
 General Staff Map, 1698–99
 geographic names and, 513, 1085
 geographical societies and, 1418
 geologic mapping and, 527, 1773–74,
 1773
 geopolitical cartography and, 539, 541
 German military mapping, 909, 910,
 911–12, 911, 912, 913, 914, 915, 968
 Hinks and, 597
 hydrography and, 623
 International Map of the World and,
 689–90
 journalistic cartography and, 707–8, 709,
 710
 map publishers and, 1249
 map reproduction and, 1331, 1552
 map revision and, 1294, 1772–74, 1774
 marine charting and, 831, 833–34, 837,
 846, 852
 military mapping of Australia and, 974,
 975
 military mapping of North Africa and,
 952
 military mapping of sub-Saharan Africa
 and, 959
 military mapping of the Middle East and,
 967–68, 968, 1598, 1773–74
 National Geographic Society and, 996
 navigation and, 1013
 Ordnance Survey and, 896, 898,
 1032–33, 1034
 Ottoman military mapping and, 928–29,
 928
 pen-and-ink drafting and, 332
 persuasive cartography, 513, 539, 541, 987
 photogrammetric mapping and, 1104,
 1121, 1127, 1424
 projections and, 871, 1186, 1188
 regional atlases and, 103
 relief models and, 1264–65
 road mapping and, 1245
 Arthur H. Robinson and, 345
 Royal Geographical Society and, 1373,
 1539, 1540, 1666
 Russian Empire military mapping and,
 932, 933, 934
 sonar and, 237, 1024
 terrain analysis and, 1490
 thematic mapping and, 1503, 1505
 topographic mapping and, 1165–66,
 1539, 1540, 1598, 1770–71, 1770
 U.S. Army Corps of Engineers mapping,
 1655, 1655
 U.S. Geological Survey and, 1660, 1661
 U.S. intelligence community mapping
 and, 1666–67, 1666
 women in cartography and, 1758
 World War I and aerial photography, 367,
 1273, 1298
 civilian influence of, 897
 coastal mapping and, 236
 map libraries and, 768
 map revision and, 1772–73

- military mapping of Europe and, 963
military mapping of the Middle East and, 967–68
photointerpretation, 1113, 1117–18
thematic mapping and, 1505
U.S. Geological Survey and, 1660
U.S. intelligence community mapping and, 1666, 1666
U.S. military mapping and, 884, 885, 886
World War I military mapping of Europe, 962–63, 1770–74
 British, 963, 1770–71, 1772
 French, 905–6, 905, 907, 1770
 German, 909, 909, 910, 911, 912, 913, 914, 915, 926, 1772, 1772
World War II, 1775–79. *See also* Air-age globalism
academic cartography and, 2, 3, 341
accuracy standards and, 1454
administrative cartography and, 17
advertising and, 19–20
aerial photography and. *See* World War II and aerial photography
aeronautical charts and, 22, 26–27, 886, 888, 917, 920, 969, 1189, 1699, 1775–76
art and, 78–79, 80
astrophysics and, 87
biogeographical cartography and, 124
boundary surveying and, 156, 162, 171
British military mapping and. *See* British military mapping in World War II
cartobibliography and, 191
cartographic conventions and, 274
colonial/imperial cartography and, 1566, 1574–75
coordinate systems and, 1697
cruise missiles and, 290–91
drawing media and, 330
Eastern European boundary changes and, 337–38
electromagnetic distance measurement and, 355
emergency planning and, 392
escape/evasion maps, 233, 234, 703, 1709–11, 1710, 1711
Eurocentric bias and, 415
French military mapping and, 646–47, 907, 969, 1492, 1492
geodetic surveying and, 480–81, 662
geographic names and, 134–35, 1085
geographical mapping and, 522
geographical societies and, 1418–19
geologic mapping and, 527
geopolitical cartography and, 542–43
geospatial data marketing and, 855
German military mapping and, 915–17, 916, 917, 918, 919, 920, 963, 964, 1776–77, 1777, 1778
gravimetric surveys and, 455
Hotine and, 620
International Map of the World and, 690, 764
Istituto Geografico De Agostini and, 698
Japanese military mapping and, 949, 950
John Bartholomew & Son and, 703
journalistic cartography and, 415, 708, 712, 714, 714, 715, 1022, 1091–92
Lobeck and, 788
map collecting and, 246
map libraries and, 766, 1421
map publishers and, 1250
map reproduction, 804, 1146, 1313, 1331, 1698, 1779
map revision and, 1294
marine charting and, 819, 830, 831, 832, 834, 838–39, 847, 852, 854
military mapping of Australia and, 976
military mapping of Canada and, 951
military mapping of Europe. *See* World War II military mapping of Europe
military mapping of Finland and, 962
military mapping of North Africa and, 953–54, 953, 954, 955, 1776, 1776
military mapping of Southeast Asia and, 898–900, 971, 971
military mapping of sub-Saharan Africa and, 959
military mapping of the Middle East and, 899, 919, 929–30, 968–69, 969, 970
National Geographic Society and, 997
navigation and, 1016, 1018
Office of Strategic Services and, 1030, 1031
Ordnance Survey and, 964, 1035
perspective maps and, 1022–23
photogrammetric mapping and, 1107–8, 1122–23, 1123, 1667, 1697–98
physiographic diagrams and, 1154
projections and, 33, 871, 1186, 1775–76
radar and, 240, 460, 1279, 1698
Radó, 1238
Rand McNally & Company and, 1247
relief models and, 1151, 1265–66, 1265, 1266
road mapping and, 880, 1735
Royal Geographical Society and, 1373, 1419
school atlases and, 107
scribing and, 1395, 1396
secrecy and, 1169
social theory and, 1402
Soviet cartography and, 550
Soviet military mapping and, 935–37, 939, 965, 966
Survey of India and, 898–99, 1473
surveying and, 898, 898
terrain analysis and, 1491–95, 1491, 1492, 1493, 1494, 1496, 1497, 1498
textbooks and, 344, 346
thematic mapping and, 1778–79
topographic mapping and, 180, 646, 1576, 1584, 1592, 1594, 1610–11, 1612, 1775, 1776, 1776
urban mapping and, 1651, 1652
U.S. Army Corps of Engineers mapping, 1655
U.S. Geological Survey and, 1662–63
U.S. intelligence community mapping and, 1667
U.S. military mapping and, 886–88, 887
weather maps and, 1745
women in cartography and, 1667, 1758–59
World Aeronautical Chart and, 1764–65
world atlases and, 116, 136
World War II and aerial photography, 367, 1273, 1273
Agricultural Adjustment Administration and, 30
British military mapping and, 898, 899
German military mapping and, 917
map libraries and, 768
photointerpretation, 1113–14, 1118
strategy applications, 1299
U.S. military mapping and, 888
World War II military mapping of Europe
 British, 898, 899, 900, 901, 903, 963–65, 1107–8
 French, 964
 German, 915, 916, 918, 920, 964, 965, 1776–77
 United States, 964–65
World War II persuasive cartography, 1087, 1091
 animation in, 61, 987–88
 cartoons, 1162
 critiques of, 1088
 Nazi Germany, 542, 987–88, 988, 1092, 1163, 1402
 United States, 61, 542–43, 1091–92, 1091
World Water and Climate Atlas (International Water Management Institute), 229
World-Wide Standardized Seismograph Network (WWSSN), 533–34
World Wide Web. *See* Internet
World Wildlife Fund (WWF), 643
World Wind (software), 662
World's Fair (New York) (1964–1965), 561
World's Fair (World's Columbian Exposition) (1893), 267, 1629–30
WorldCat, 192, 193
WorldMapper Project, 1516, 1519
WorldView Imaging (corporation), 369
Worthington, E. Barton (1905–2001), 321
Worzel, J. Lamar (1919–2008), 456
WPG (World Polyconic Grid), 1188
Wrede, Ferdinand (1863–1934), 778
Wright, Bruce, 96
Wright, F. E. (1877–1953), 463
Wright, John Kirtland (1891–1969), 1779–80
 on choropleth symbolization, 221
 communication paradigm and, 1071, 1402
 on dasymetric symbolization, 298, 299, 695, 1503
 on demographic mapping, 312, 1780
 electoral mapping by, 350
 geographic information systems and, 494
 historical geography and, 604
 on persuasive cartography, 1088
 social theory and, 1401–2

Wright, Richard D. (b. 1937), 3
 Wright, Wilbur (1867–1912), 1133
 Wrigley, Gladys M., 1050
 Wu, Kevin, 220
 Wuhan cehui keji daxue (Wuhan Technical University of Surveying and Mapping (WTUSM)), 687, 1780–82, 1781
 Wundt, Wilhelm Max (1832–1920), 1082
 Wurman, Richard Saul (b. 1935), 105
 WVS (World Vector Shoreline), 660
 WWSSN (World-Wide Standardized Seismograph Network), 533–34
 Wyman, Lance (b. 1937), 811–12

x, y systems. *See* Coordinate systems
 X-rays, 88
 Xerography. *See* Photocopying
 Xia Jianbai, 1780
 Xi'an zuobiaoxi (Xi'an geodetic coordinate system), 1604
 Xiao, Ningchuan, entry by, 693–96
 Xora (company), 495

Yale, Seymour H. (d. 2008), 247
 Yalta Conference (1945), 162
 Yang, Qihe H., 1399
Yao gan di xue fen xi (Geoanalysis with remote sensing) (Chen), 215
 Ye Xue-an, 1780
 Yeltsin, Boris (1931–2007), 1163
 Yemen, 1600
 Yoder, Stephen C., 1516
 Yoeli, Pinhas, 376, 376, 1271
 Yom Kippur War (1973), 1125
 Yost, Lou, 134
 You-are-here (orientation) maps, 1066, 1080, 1081, 1724, 1726, 1726–27, 1727
 Young, Allyn Abbott (1876–1929), 1049
 Young, John W. (b. 1930), 563

Young Geographers (Mitchell), 216
 Youngblood, Dawn, 1419, 1420
 Youngmann, Carl, 3, 5
 Yu Wen, 1784
 Yugoslav Association of Cartographers, 1414
 Yugoslavia/former Yugoslavia. *See also* Dayton peace accords; Eastern Europe cartographic societies, 1414 ethnographic mapping of, 294, 295, 411 geographic names, 515 nation-state formation/maintenance and, 1003, 1004 NATO military mapping and, 894, 966 political boundaries, 161, 161, 162, 337, 338 post–World War I settlement and, 337, 411 terrain analysis, 1496 topographic mapping, 1588 Yurkina, M. I., 981

Zacharakis, Christos G. (b. 1939), 250
 Zadeh, Lotfi Asker (b. 1921), 496
 Zambia, 1209. *See also* Africa
 Zanger, Jules, 782, 784
 Zarutskaya, I. P. (1908–1990), 1640
 Zarzycki, George J. M. (d. 2012), entry by, 1552–54
 Zdravsky, Charlie, 1171
 Zebra Imaging company, 619
 Zeiss, Carl (1816–1888), 1128
Zeitschrift der Gesellschaft für Erdkunde zu Berlin (journal), 1118
Zeitschrift für Geopolitik (journal), 541
 Zelinsky, Wilbur, 312, 521
 Zellon, 1150, 1394
 Zeng Shiying, 1783
 Zenit (satellite), 1124, 1283, 1300
 Zenith telescopes, 465

Zenithal projections. *See* Azimuthal projections
 Zentai, László, entry by, 1043–47
 Zhongguo dadi zuobiaoxi (China Geodetic Coordinate System), 1606
Zhongguo dixing niaokan tuji (Chen), 215
 Zhongguo kexueyuan (Chinese Academy of Sciences) (CAS), 215, 1783–85
 Zhongguo lishi dili xinxì xítōng (China Historical GIS), 96
Zhongguo renmín jiefangjūn jūnguān dùti ji (Chinese people's liberation army officer atlas), 945
Zhonghua renmín gōnghé guó ziran dùti ji (Physical atlas of the People's Republic of China), 215
 Zhongyang guotu cehui ju (Central Bureau of Land Survey) (CBLS) (China), 942, 1602
 Zhu, A-Xing, 15
 Zhu Kezhen, 1784
 Ziegfeld, Arnold Hillen (b. 1894), 541, 542
 Zinchuk, Liudmila, entry by, 1212–17
 Zinchuk, Nikolay N. (d. 2009), entry by, 1212–17
 Zip-A-Tone, 1512
 ZIP Code Tabulation Areas (ZCTAs), 210
 ZIP codes, 210, 450, 451
 Zola, Émile (1840–1902), 905
 Zon, Raphael (1874–1956), 433, 434, 436
 Zone-design problem, 500
 Zone maps, 1728
 Zoom, 62, 226, 227, 238, 523, 810, 1337, 1387. *See also* Interactive mapping
 Zoopomorphic maps, 1163
 Zoraster, Steven, 377, 378, 505
Zwischeneuropa, 335
 Zy-Tex (microcapsule paper), 1481–82