

Index

Page numbers in *italic* denote figures. Page numbers in **bold** denote tables.

- achondrites
 - angrite, Angra dos Reis, Brazil, fall 174, 209, 211
 - Chassigny, France (1815) 55, 405
 - HED 348, 350, 352, 374, 388
 - lunar 55
 - Martian, SNC's 55, 210, 215, 405–414, 497, 502
 - Stannern, Moravia (1808) 54–55
- Agen, France (1790) fireball and fall 30–31
- Ahnighito *see* Cape York
- Ahnighito iron 271, 272, 279, 280
- Aire-sur-la-Lys, France (1769) fall 27, 35
- Alais, France (1806) carbonaceous chondrite fall 53, 171
- Albareto, Italy (1766) L4 chondrite fall 22, 24–26, 35, 206–207
- Alfvén, Hannes (1908–1995) 397, 422
- ALH 84001 261, 410, 411, 412, 413, 502
- ALH A81005 7, 256, 257, 261, 406
- All-Sky Network *see* European Fireball Network
- Allende, Mexico (1969) meteorite shower 188, 255–256
 - calcium-aluminium inclusions (CAIs) 255, 351, 353, 426, 427, 429
 - solar system formation age 355, 356, 370
 - presolar diamond 355, 356
- American Museum of Natural History *see* New York, American Museum of Natural History
- analysis
 - chemical
 - Alais carbonaceous chondrite 53
 - early 43–45, 47–48, 76–77
 - Ensisheim stone 43
 - Kaba carbonaceous chondrite 53
 - Lucé chondrite 26
 - Orgueil carbonaceous chondrite 54
 - Weston stones 52
 - metallographical, irons 56–58
- Angra dos Reis, Brazil (1869) angrite achondrite fall 174, 209, 211
- Antarctica
 - Japanese meteorites 291–303, 325, 336–337
 - ANSMET programme 259–262
 - classification 299, **300**, 301–303
 - concentration mechanism 298–299
- Apollo (asteroid) 388, 391
- Aristotle
 - atmospheric origin of falling stones 32, 43
 - Meteorologica* 91–93
- asiderites **105**, 106, 173–174
- asmanite 156
- asteroids
 - classification 388, 389
 - discovery 45–46, 52–53, 63
 - Earth-crossing orbits 387–390
 - and meteorite types 352–353, 379–400
 - Near-Earth 379, 386, 497
 - as origin of meteorites 63
 - reflectance spectroscopy 390–396
 - S-class 391, 393, 396, **396**, 398
 - spacecraft missions 397–400, 398–399
- astrobleme 455
- astronomy, Specola Vaticana 205–208
- astrophysics 430–431, 434–435
- Atacama Desert, Chile, meteorite finds 330–332
- ataxite 56, 272, 312
- atmosphere, origin of meteors 43, 51, 61–62, 76–77
- aubrite 143, 156, 347, 374
- Aurora Borealis*, in classical meteorology 92, 93, 94, 96
- australite, flanged-button 472, 473, 477, 479, 481
- Baillou, Johann von (1684–1758), natural history collection 123, 124
- Banks, Sir Joseph (1743–1820) 36, 38, 39, 43–44, 48, 95, 153
- Barbotan, France (1790) fireball and fall 30–31, 42, 48, 81
- Barringer Crater *see* Meteor Crater
- Barringer, Daniel Moreau (1860–1829) 60–61, 244, 452
- Barthold, Charles, chemical analysis of Ensisheim stone 43, 47
- Baudin, Nicolas (d. 1798) 42
- Beccaria, Giambattista (1716–1781), letter to Benjamin Franklin 25
- Bement, Clarence Sweet (1843–1923), meteorite collection 268–270
- Benares, India (1798) fireball 36, 42, 43, 44, 47, 168, 346
- Bencubbin, Australia (1930) carbonaceous chondrite find 310
- Bendego iron, Brazil 39
- Benzenberg, Johann Friedrich (1777–1846) 43, 381
- Berlin, Museum für Naturkunde, meteorite collection, history 135–150, 146, 148
- Berthelot, Pierre Eugène Marcellin (1827–1907) 54, 169
- Berwerth, Friedrich (1850–1918) 129–130, 130
- Berzelius, Jöns Jacob (1779–1848) 53, 137
- Bewitched Burgrave *see* Elbogen iron
- Bibliothèque Britannique* (1796) 40, 41, 47, 48, 50, 57, 58
- Biot, Jean Baptiste (1774–1862) 76, 168
 - importance of travel 78–79, 81
 - literary style 80–81
 - report of trip to L'Aigle 49–50, 74, 76–80, 85, 104, 139, 153, 163, 168
- Bingley, William 41
- Bitburg, Germany (1805) iron find 140, 142
- Blagden, Sir Charles (1748–1820) 40, 41, 96
- Blumenbach, Johann F. (1752–1840) 36, 44

- Bobrovnikoff, Nicholas T. (1896–1988) 390, 391
 Bode, Johann Elert (1747–1826) 45–46
 Bode's Law *see* Titius–Bode Law
 Boguslavka iron fall (1916) 233, 235
 Boisse, Adolph André (1810–96) meteorite model 63, 64
 Bonapartism, influence on scientific thought 81–84, 85–86
 Bonderoy, August-Denis Fougeroux de (1732–1789) 26–27, 47, 167
 Bonnet, Charles Etienne (1720–93) 45
 Born, Ignaz von (1742–1791) 44, 123
 Borodino chondrite fall (1812) 231, 233
 Bournon, Jacques-Louis Comte de (1751–1825), chemical analysis of fallen stones 44–45, 47–48, 167
 Bourot-Denise, Michèle Mathilde 189, 190
 Boznmecova (asteroid) 397
 Brandes, Heinrich Wilhelm (1777–1834) 43
 Brant, Sebastian (1457–1521), *On the thunderstone fallen in the year '92 before Ensisheim* 17, 18, 19, 20, 22, 166
 Braunau, Bohemia (1847) iron fall 56, 127
 breccia, bunte 457, 460, 484
 Brezina, Aristides (1848–1909) 55, 56, 128–130, 129, 347
 British Museum (Natural History) *see* London, Natural History Museum
 British Museum, *Catalogue of Meteorites* 24–25, 26, 159–160
 Appendix to the Catalogue 26
 Bruhn, Ingeborg, Mars globe 214
 Bustee, India (1852) stony meteorite 156

 Cabin Creek, Arkansas (1886) iron fall 129
 Cabinet Royal d'Histoire Naturelle 165
 Caille, France (1828) iron find 164, 172, 176–178
 calcium-aluminium inclusions (CAIs) 255, 350, 353, 368, 370
 Camel Donga eucrite 9, 317, 320, 329
 Cameron, Alastair Graham Walter 425, 426, 427
 Campo del Cielo, Argentina
 El Mesón de Fierro (1576) iron find 28–31, 29, 30, 44–45, 272
 Otumpa iron 57–58
 canali, Martian 214–215
 Canyon Diablo, Arizona (1891) iron find 59–60, 244, 280, 367
 see also Meteor Crater
 Cape York, Greenland (1894–1897) iron finds 154, 271–272, 272
 Celis, Lieutenant Don Rubin de 28–29, 30, 44
 Ceres 46–47, 392
 Chaco, iron 29, 30
 Chamberlin, Thomas Chrowder (1843–1928) 420
 planetesimal hypothesis 419–422
 Chaptal, Jean-Antoine (1756–1832) 49, 81–82, 82, 84–86
 chassignite 55, 143, 347, 406, 409, 410
 Chassigny, France (1815) achondrite fall 55, 163, 178, 178, 215, 405
 Chesapeake Bay structure 482–483
 Chicxulub impact structure 462–464, 486, 487

 China
 scarcity of meteorites 24–25
 tektites 472, 476
 Chladni, Ernst Florenz Friedrich (1756–1827) 26, 33–37, 33, 53, 139, 222
 Eisenmassen 33–35, 33, 44, 47, 73–74, 138, 223
 responses 35–36, 41, 47
 extraterrestrial origin of meteorites 34, 35, 36, 42–43, 48, 49, 50, 62, 103–104, 138, 168, 223, 380, 381
 failure to travel 78
 meteorite collection 138–140, 141
 Über Feuer-Meteore 50, 55, 126, 139
 chladnite 143, 347
 chondrites 44, 106, 108, 142, 347, 348, **348**, **349**, 350, 352, 499
 brecciated 163, 167, 177, 178
 carbonaceous 53–54, 110, 172, 347, **348**, 352, 353, 428
 Alais, France 53, 171–173
 Bencubbin 310
 CH 334, **348**, 352
 CI **348**, 352, 428
 CK 334, 347, **348**, 352
 CM **348**, 352
 CM2 Murchison 255, 257–258, **348**
 CO **348**, 352
 Cold Bokkeveld 53, 172
 CR 334, 347, **348**, 352
 CV 347, **348**, 352
 Japanese Antarctic collection **300**, 303
 Kaba, Hungary 53, 172
 Orgueil, France 54, 163, 172
 classification of George Prior 159
 desert regions 333–334, 335–339
 H5, Eichstädt 31, 32
 H6, Peekskill 281
 Japanese Antarctic collection 299, **300**
 K3 352
 L4, Albareto 22, 24–26
 L6
 Lucé 26–27, 167
 Nogata 15–16, 16
 LL6 brecciated, Ensisheim 163, 167
 R 334, **348**, 352
 Chondritic Earth Model 353, 427–428
 chondrules 44, 106, 142, 145, 153, 182, 345–348, **350**, 351
 and CAIs 354–355
 formation age 355, 356
 origin 59, 157, 283, 348, 350, 356–360, 428, 499
 Clap, Thomas (1703–1767) 52
 Clarke, Frank Wigglesworth (1847–1931) 242–243, 243
 classification *see* meteorites, classification
 Clayton, Donald D., presolar grains 427, 431
 coesite 456, 457, 481
 Cold Bokkeveld, South Africa (1838) carbonaceous chondrite fall 53, 172
 comets
 as origin of fireballs 52
 as origin of meteorites 380

- Coon Butte *see* Meteor Crater
 Cooper, G. Arthur (1902–2000) 253, 254
 Cordier, Pierre-Louis Antoine (1777–1861) 168
 first catalogue of meteorites 168, 170, 171
 Cranbourne iron found 1854 127
 craters
 impact 60–61, 443–466, **447–451**, 465
 Campo del Cielo 30, 444
 Dalgara 311, 452
 lunar 60, 444
 Mars 500–501
 Veevers 311
 Wolfe Creek 310–311
 volcanic 60, 465
 Cretaceous–Tertiary boundary *see* K/T boundary
 Crumlin, County Antrim (1902) fall 157
 cryptosiderite **105**, 106, 107, 110
- Dalgara Crater 311, 452
 Daubrée, Gabriel August (1814–96) 54, 63, 101–117,
 102, 170
 career 101–103
 experimental work on meteorites
 composition 106–112, 170
 physical appearance 112–113, 170
 meteorite classification 103–106, **105**, 170, 171
 work at MNHN, Paris 169–175
 catalogue of meteorites 170, 172, 174
 work on ‘native’ iron 113–117
 daubréelite 103, 116, 174, 177
 deformation features, planar 46
 Denise, Michèle Mathilde Bourot- *see* Bourot-Denise,
 Michèle Mathilde
 Descartes, René (1596–1650) 32–33
 Desert Fireball Network 381, 382
 deserts
 meteorite finds 325–340, 327
 distribution 335–338
 weathering 338–339
 Dhurmsala chondrite fall (1860) 127
 diamond
 Australian ureilite 312
 Canyon Diablo iron 59
 Novo Urei achondrite 24, 174
 presolar 282, 355, 356
 diogenite 143, 282, 302–303, 347
 distance, planetary 45
 Douar M’Ghila, Morocco (1932) chondrite fall 184, 185
 Droguier du Roy 165
 dunite 55, 110, 178
 Dürer, Albrecht (1471–1528)
 A Heavenly Body 22, 23
 Melencolia I 22, 24
- Earth
 age determination 366–368, 423–425
 origin 60
 as potential source of meteorites 407
 EET A79001 408, 413, 502
 Eger, asteroid-meteorite link 388–389
 Eichstädt, Bavaria, (1785) H5 chondrite fall 31,
 32, 35, 38, 41
 Elbogen iron, ‘Bewitched Burgrave’ 55, 61, 140, 141
 Eltanin impact structure 464, 483, 486
- Ensisheim, Alsace (1492) H chondrite fall 16–22,
 16, 18, 20, 21, 35, 41, 166, 167, 345
 analysis 43, 47
 enstatite 156, 159, 177, 313, 347, **348**
 Eros (asteroid) 379, 397, 398, 400
 Estherville mesosiderite 129, 268
 eucrite 55, 142, 171, 172, 178, 302, 317, 347
 see also meteorites, HED and Vesta
 EUROMET 9, 161, 317, 328, 353
 European Fireball Network 381, 383–386, 385
 Évora Monte, Portugal (1796) meteorite 36, 42
 exhalation theory 92–94
 exposure, cosmic ray, age determination
 371–375, 390
 extinctions 462–464, 486
 eyewitnesses, trustworthiness 54, 78–79, 81
- Fabriès, Jacques Louis (1932–2000), work at
 MNHN 186, 187
 fireballs 19, 20, 21, 22, 23, 24, 30, 32, 36, 50, 52
 behaviour during flight 53–54
 Melun, France (1771) 34
 photographic network surveys 381–387
 Western Australia 314, 315
 Weston, Connecticut (1807) 51–52
 work of Ernst F.F. Chladni 33–35, 43, 50
 fission tracks, work of Paul Pellias 189
 Fletcher, Sir Lazarus (1854–1921) 129,
 156–158, 156
 Flora (asteroid) 390, 393
 Fogliani, Giuseppe, Bishop of Modena 25, 26
 Foshag, William F. (1894–1956) 246, 247
 Fouchy, Jean-Paul Granjean de (1707–88) 27
 Fougeroux *see* Bonderoy, August-Denis Fougeroux de
 Fouchy, Antoine-François de (1755–1809) 47, 49, 74,
 84, 168, 169
 France, Bonapartist administration 81–84, 85–86
 Franklin, Benjamin (1706–90), lightning
 experiment 25, 96
 Franz I, Holy Roman Emperor (1708–1765) 31,
 123, 124
 Franz Joseph, Emperor of Austria (1830–1916), Natural
 History Museum, Vienna 126, 127, 128
 Friedrich II (‘the Great’) King of Prussia
 (1712–1786) 135
 Friedrich Wilhelm III, King of Prussia (1770–1840)
 136, 137
- Gaspra (asteroid) 379, 397, 398, 398
 Gassicourt, Louis-Cadet de (1731–1799) 26–27, 167
 Gauss, Carl Friedrich (1777–1855) 46, 53
 Gerhard, Carl Abraham (1738–1821) 135–136, 136
 Gilbert, Grove Karl (1843–1918) 59–60, 445
 work on craters 244, 444–446, 452
- glass
 impactite 485
 K/T boundary 486
 Libyan Desert 483–484
 Mount Darwin and Macedon 484
 Göbel, A.F. 224–226
 Goose Lake, California (1939) iron find 248, 249
 grains, presolar interstellar 355, 356, 430
 Gratacap, Louis Pope (1851–1917) 270
 Great Ustyug, Russia (1290) fall 220, 220, 221

- Greenland
 Cape York irons 154, 270–272
 ‘native’ iron 113–118, 154, 169
- Grevill, Charles Francis (1749–1809), mineral collection 44, 52, 154, 238
- Güssmann, Franz (1741–1806), *Lithophylacium Mitisianum. Ferrum Nativum* 30, 31
- Haidinger, Wilhelm Karl (1795–1871) 26, 44, 56, 127, 127
- Hamilton, Sir William (1730–1803) 38–39, 40, 238–239
- Harding, Karl Ludwig (1765–1834) 52–53
- Haüy, Abbé René Just (1743–1822) 166
- Hebe (asteroid) 390, 391
 asteroid-meteorite link 388, 389
- Henbury, Australia (1931) octahedrite find 184
- Henderson, Edward Porter (1898–1992) 160, 246–252, 246, 249, 253–254
- Herschel, William (1738–1822) 38, 45, 46, 62, 95
- Hey, Max H. (1904–1984) 26, 160, 251
- hexahedrite 56, 330
- Holmes, Arthur (1890–1965) 366, 424
- holosiderite 104, 105, 106, 110, 177, 182
- Hooke, Robert (1635–1703), work on lunar craters 443–444
- Hoppe, Günter (b. 1919) 147–148
- Hörnes, Moriz (1815–1868) 53, 126–127, 126
- Howard, Edward Charles (1774–1816), chemical analysis of fallen stones 43–45, 47–48, 74, 76, 153, 345–346
- howardites 142, 347
- Hraschina, Croatia (1751) IID octahedrite fall 30, 31–32, 32, 35, 38, 55, 141
 Natural History Cabinet, Vienna 123, 125
- Humboldt, Baron Alexander von (1769–1859) 36, 137, 141, 380
 Morito, Humboldt iron 136, 138
- Ida (asteroid) 379, 396, 398, 398
 space weathering 396
- impact
 structures 458, 459, 460–462
 terrestrial risk 464, 465
- impactites 456–457, 459, 460
 and tektite glass 462, 484–486, 485
- Imperial Royal Mineralogical Court Cabinet 126–128
- iridium spike 462, 463, 486
- Iris (asteroid) 391
- Iron Cabin Creek 129
- iron, terrestrial 111, 172
 ‘native’
 modern ideas 117–118
 work of Chladni 35
 work of Daubrée 111, 113–118, 154, 169
 work of Güssmann 30
 work of Howard 44
- irons
 Australia 306–308, 310, 313
 Cape York, Greenland 154, 271–272
 chemical analysis 44–45
 desert regions 335–336
 exposure age 374
 Japanese Antarctic collection 299, 300, 301
 Mars 500–501, 501
 metallography 55–57
 MNHN collection 166
 treatise by Franz Güssmann (1785) 30, 31
 weathering 273
 work of August Daubrée 104, 107, 109
- Itokawa (asteroid) 399, 400
- Izarn, Joseph (1766–1834), *Lithologie Atmosphérique* 50–51, 50, 76–77
- Japanese Antarctic Research Expedition 291–303
 history 294–298
- Jardin du Roy 165, 169
- Jefferson, Thomas (1743–1826) 51–52
- Jeffreys, Sir Harold (1891–1989), critique of planetesimal hypothesis 421–422
- Jerémine, Elisabeth (1879–1964), work with Jean Orclé 185
- Juno (asteroid) 52–53
- Juvinas, France (1821) brecciated eucrite fall 111, 171
- K/T boundary
 glass objects 486
 impact structures and extinctions 462–464
- Kaba, Hungary (1857) carbonaceous chondrite fall 53, 172
- Kalgoorlie School of Mines *see* Western Australia School of Mines
- King, Edward, *Remarks concerning stones said to have fallen from the clouds* 40–41
- Kingsley, James L. (1778–1852) 51–52
- Kirkwood, Daniel (1814–1895), Kirkwood gap 63, 388
- Klaproth, Martin Heinrich (1743–1817) 48–49, 76, 137
- Klein, Johann Friedrich Carl (1842–1907) 144–146, 145
- Knyahinya, Ukraine (1866) stone fall 127
- König, Karl Dietrich Eberhard (Charles) (1774–1851) 153–154
- Königliche Bergakademie *see* Royal Academy of Mining, Berlin
- Krasnoyarsk *see* Pallas iron
- Kulik, Leonid A. (1883–1942) 226–227, 227, 228
- Kunz, George Frederick (1856–1932), meteorite collection 274
- Kurat, Gero (b. 1938) 132
- Lacroix, Alfred François Antoine (1863–1948)
 meteorite classification 179
 work at MNHN 178–182, 179, 181
 work on tektites 472
- L’Aigle, Normandy (1803) fireball and shower 49–50, 56, 74–87, 75, 136, 168, 212, 239
 report of visit by Jean Baptiste Biot 74, 76–80, 85, 168, 170
- Laplace, Pierre-Simon Marquis de (1749–1827) 49, 62, 76, 168
 nebular hypothesis 417, 418
- Laurenty Chronicle (1091) 219
- Lavoisier, Antoine-Laurent de (1743–1794) 26–27
 atmospheric origin of fiery meteors (1789) 32–33, 44, 167

- Lawrence Smith, John (1818–1882) 142, 240
 at the Smithsonian Institution 240–241
 work on Greenland iron 111–117, 174
- lead–lead age dating 364–367, 405, 424
- legislation, Western Australia 3–4
- Leonid meteor shower 63, 359, 381
- Le Roy, Jean-Baptiste (1720–1800) 34
- Libya
 desert glass 483–484
 meteorite finds 330, 331
- Lichtenberg, George C. (1742–1799) 34, 42–43, 62, 63
- lightning, as source of meteorites 25, 26–27, 32, 48, 51
- lithosiderite 182
- Lockyer, Sir Joseph Norman (1836–1920), meteoritic hypothesis 417–418
- London, Natural History Museum
 meteorite collection
 catalogue of George Prior 160
 history 153–161, 159
 Ninninger collection 160
- Lost City, Oklahoma (1970) fall 258, 381
- Lucé, France (1768) L6 chondrite fall 26–27, 35, 47, 167
- Manicouagan structure 456, 458
- marchesita 25, 26, 206–207
- Mars
 Exploration Rover *Opportunity* 497, 500–503
 Bounce Rock 502
 evidence of iron oxide 502–503
 evidence of water 501–502
 iron meteorite discovery 500–501, 501
 globe, Specola Vaticana 214, 214
 life 413
 meteorites 335, 405–414, 411
 planetary history 410–413
 work of Fr. Secchi 214
 work of Giovanni Schiaparelli 215
see also achondrites, Martian; meteorites, Martian;
 SNC meteorites
- Maskelyne, N.S. *see* Story-Maskelyne, Mervyn Herbert
 Nevil
- Mason, Brian H. (b. 1917)
 Antarctic meteorites 259–262
 at AMHN 275–276, 282–283
- Mathilde (asteroid) 398, 400
- Mauroy, Adrien-Charles Marquis de (1848–1927) 179, 208–209, 208, 210, 211
- Maximilian, King of the Romans and Holy Roman Emperor (1459–1519) 17, 19, 73, 167
- McCord, Thomas B. 391–392
- Medvedev, Yakov 27, 221, 222
- Melun, France (1771) fireball 34
- Mercury
 impact craters 465
 as potential source of meteorites 407
 sampling missions 497
- Meridiani Planum, Mars 500, 501, 502–503
- Merrill, George Perkins (1854–1929) 61, 242, 243–245, 244
- Mesón de Fierro, Campo del Cielo, Argentina, (1576 onwards) iron find 28–31, 29, 30, 35, 44–45, 56
- mesosiderite 142, 312, 331
- metallography, iron meteorites 55–58
- metamorphism *see* shock metamorphism
- Meteor Crater 61, 244, 444–446, 445, 446, 452, 454–455
- Meteorite Observation and Recovery Project (MORP), Canada 382–383, 383
- Meteorite Photography and Recovery Project, USA 381–382, 383
- meteorites
 age determination, history 363–376
 Antarctic 256, 257, 259–262, 291–303
 concentration mechanism 298–299
 and asteroid class linkage 352–353, 379–400
 classification
 Bourot-Denise 189, 190
 Daubrée 103–106, 105, 169, 172
 Japanese Antarctic collection 299, 300, 301–303
 Jérémine 185
 Lacroix 180–182
 Prior 159, 347
 Rose 142, 145, 347
 Rose-Tschermak-Brezina 159, 347
 comparison with terrestrial rock 107–111, 178
 composition, work of August Daubrée 104, 106–112
 debates on falls 47–49
 desert 325–340, 327
 exposure age determination 371–375, 390
 flux 339, 390
 ‘fossil’ 374–375
 as good omen 17, 19, 73
 HED and Vesta 352, 379, 388, 392, 393
 isotopic anomalies 425–427
 legislation, Western Australia 314
 lunar 210, 256–257, 293, 296, 300, 301, 332, 334–335, 406, 407–408
 exposure age 374
 Martian 293, 300, 301–302, 302, 332, 335, 405–414
 exposure age 374
 groups 408–410
 origin 410, 411
 SNC 55, 210, 215, 405–414, 497, 502
 origin 406–408, 410, 411
 monuments 27, 39, 223
 as ominous portent 17, 19, 220
 origin
 extraterrestrial 96, 153, 166–168, 178, 380
 cosmic 51, 53, 61, 62
 interstellar 64–65
 lunar volcanic 49
 scientific proof 48, 76, 77–78, 80, 167, 380
see also Chladni
 hypotheses 49, 61–65, 76–77
 provenance, and asteroid linkage 379–400
 sound and light during flight 53–54
 sulphurous fumes 39, 41, 54
 terrestrial age 375
- meteorology
 classical 91–97
 electro-chemical 96
 mineral 93–97
- Meunier, Stanislas Etienne (1843–1925) 176
Promenade géologique à travers le ciel 178
 work at MNHN 173, 174–178, 176, 209

- Michel, Hermann (1888–1965) 130, 131
 microscopy
 AMNH 285
 Klein 145
 Rose 142
 Sorby 58–59
 Story-Maskelyne 156
 microtektites 473, 474, 487
 Mineralogical Cabinet, Vienna 124–128
 Mineralogical Museum, Berlin 137–144
 mineralogy, early 44–45, 47–48
 Miraval, Hernán Mexia de 28, 29
 Mohs, Friedrich (1773–1839) 126, 127
 moldavite 474, 478, 480, 481
 Monod, André Théodore (1902–2000) 182
 Moon
 Apollo 11 landing, lunar samples 255, 256–257
 impact craters 60, 465
 as source of meteorites 49, 62–63, 210,
 334–335, 407–408
 as source of tektites 481
 Morito, Humboldt iron 136, 138
 MORP *see* Meteorite Observation and Recovery Project
 (MORP)
 Moulton, Forest Ray (1872–1952) 421, 422
 Mundrabilla, Western Australia, iron find 8,
 315–316, 317, 318, 326
 Murchison, Australia (1969) carbonaceous chondrite fall
 255, 257–258
 Nakhla, Egypt (1911) achondrite fall 178, 210, 405
 nakhlite 409
 crystallization age 406, 410
 secondary weathering 412
 Namibia, desert meteorite finds 332–333
 National Institute of Polar Research, Japan 291
 National Museum of Natural History 252–253
 meteoritics 253–255
 see also Smithsonian Institution
 Natural History Cabinet, Vienna 123–126
 Natural History Court Museum, Vienna 128–130
 Natural History Museum *see* Berlin, Museum für Natur-
 kunde; London, Natural History Museum; Vienna,
 Natural History Museum
 NEAR-Shoemaker spacecraft 379, 397, 398
 NEO searches 386
 Neuschwanstein, Germany (2002) fall 384, 386
 New York, American Museum of Natural History 269
 meteorite collection
 Arthur Ross Hall of Meteorites 279–280, 280, 282
 catalogue 275
 Hayden Planetarium 275, 279, 279, 281
 history 267–286
 Rose Center for Earth and Space 281, 282
 Ward-Coonley collection 277–27
 meteorite science 282–285
 research tools 285–286
 Newton, Isaac (1642–1727), *Opticks* 33–34, 93
 nickel, in meteorites 45, 47, 48, 56, 62, 76, 104, 116, 153,
 347, 452
 Nicorps, France (1750) fall 27, 35
 Nier, Alfred (1911–1994) 364, 365, 424
 Nininger, Harvey Harlow (1887–1986) 26, 245,
 246–248, 246
 meteorite collection 160, 250–252
 in Western Australia 312
 Nogata, Japan (861) chondrite fall 15–16, 16
 Nordenskjöld, Baron Nils Adolf Erik (1832–1901),
 Greenland ‘native’ iron 113–115
 Novo Urei, Russia (1886) ureilite achondrite fall 24, 174,
 233
 Nullarbor, Western Australia, meteorite finds 8, 9, 312,
 315–318, 325, 326, 328–329, 336–339
 nunataks, Yamato Mountains 293–294, 296–298,
 301–302
 octahedrite 56
 Cape York, Greenland 271–272, 273
 Henbury 184
 IID, Hraschina 31–32
 Willamette 272–273
 Olbers, Heinrich Wilhelm Matthäus (1758–1840)
 39, 46, 53, 63
 Old Woman, California (1976) find 258–259, 258
 oligosiderites 105, 106, 108, 110
 olivine 110–111
 inclusions 355
 Olmsted, Denison (1791–1859) 381
 Oman, Sultanate, meteorite finds 332
 Ondrojev Observatory, Czech Republic 383, 383
 Öpik, Ernst Julius (1893–1985) 379, 387, 387, 389, 425,
 434
 Orcel, Jean François (1896–1978), work at MNHN 179,
 183
 Orgueil, France (1864) carbonaceous chondrite fall 54,
 163, 172
 Otumpa, Campo del Cielo (1803) iron find 57–58,
 154, 167
 Pallas (asteroid) 46, 392
 Pallas iron, Siberia (1772) iron find 27–28, 27, 39, 44,
 111, 135–136, 136, 140, 220–223
 work of Chladni 33, 35, 36, 104
 work of Stütz 31
 work of Thomson 56, 57, 58
 Pallas, Peter Simon (1741–1811) 27, 220–221, 222
 pallasite 28, 142, 312
 Paneth, Friedrich Adolf (1887–1958) 57, 423
 Paracelsus, Theophrastus (1493–1541), *Meteora* 93
 Paris, Musée National d’Histoire Naturelle
 meteorite collection 173, 176, 177, 184, 191, 192–200
 catalogue of Cordier 168, 169, 171
 catalogue of Daubrée 170
 expansion by Daubrée 169–174
 history 163–189
 Partsch, Paul Maria (1791–1856) 125–126, 125
 Patrin, Eugène (1742–1815) 40, 47, 48, 77
 Patterson, Clair C (1922–95) 367, 367, 424–425
 Peary, Robert Edwin (1856–1920), Greenland irons
 270–272
 Peekskill, New York (1992) H6 chondrite fall 281
 Pellas, Paul Nicodème Félix (1924–97), work at
 MNHN 186–187
 peridotite 111, 170
 Perry, Stuart (1879–1957) 245, 249–250, 249
 Japanese Antarctic collection 299, 300, 301–303
 petrography, microscopic 58–59
 Pettiswood, Ireland (1779) fall 41

- Piazzi, Giuseppe (1746–1826) 46
 Pictet, Marc-Auguste (1752–1825) 40, 47, 48, 49–50
 planetesimals 60, 421–422, 432–434
 Pliny the Elder (c. 23–79), *Historia Naturalis* 17, 19, 166
 Poisson, Siméon-Denis (1781–1840) 168
 polysiderite 105, 106, 110
 Popigai structure 456, 485
 Port Orford meteorite hoax 242
 Prairie Camera Network 252, 255, 256, 258, 381–382, 383
 Příbram, Czech Republic (1959) fireball 381, 384, 386
 Prinz, Martin (1931–2000) 277, 280, 281, 281, 283–285
 Prior, George Thurland (1862–1936) 26, 158–160, 159
 chondrite classification 159, 282, 347
 Proctor, Richard (1837–1888), meteoritic origin of planets 418
 proof, nature of 81
 proto-planetary cloud 432–433
 Proust, Josef-Louis (1754–1826) 29, 44
- radiation, cosmic 188, 354, 355
 and meteorite age determination 363–376, 390, 410, 423–425
 radionuclides, extinct 368–371
 reflectance spectroscopy 390–396
 Reichenbach, Karl Ludwig von (1788–1869) 56, 59, 65, 379, 380, 380
 Ries structure 456, 480, 481, 484, 487
 Ringwood, Alfred Edward (1930–1993) 426, 426, 427–428
 Roebing Endowment 245–246, 247, 248
 Roman College 205–208
 Roosevelt County, New Mexico, desert meteorite finds 329, 333, 337–338
 Rose, Gustav (1798–1873) 44, 106, 137–138, 346
 Mineralogical Museum, Berlin 139, 141–143
 Rose–Tschermak–Brezina classification 159, 347
 Royal Academy of Mining, Berlin 135–137
 Royal Mineralogical Cabinet, Berlin 135–137
 Rumuruti, Kenya (1934) chondrite 149
 Russian Academy of Sciences, meteorite collection 225, 232, 234
 history 219–235
 Rutherford, Ernest (1871–1937) 364
- Safronov, Victor Sergeevich (1917–1999) 431
 planetesimal theory 431–434
 Sahara, meteorite finds 325, 329–330, 331, 334, 336–338, 340
 Saint-Amans, Jean F.B. (1748–1831) 31, 48
 Salpeter, Fr. Ernst W. (1912–76) 211, 213–214
 Schiaparelli, Giovanni (1835–1910) 215, 270
 Schickard, Wilhelm (1592–1635) 43
 Schilling, Diebold, *Schweizer Bilderchronik des Luzerners* 21, 22
 Schmidt, Otto Iulevich (1891–1956), meteoritic theory 431–432
 Schreibers, Carl Ritter von (1775–1852) 54, 56, 104, 124–126, 125
 scoria, universal 111, 170
 Secchi, Fr. Angelo (1818–78) 207–208, 214
 serpentinite 110–111
 shalkite 143, 347
 shatter cones 454, 455, 456
 Shepard, C. U. (1842–1915) 242–243
 shergottite 409
 crystallization age 405–406, 410
 EET A79001 408, 502
 found on Mars 502
 Shergotty, India (1865) achondrite fall 127, 405
 Shergotty-Nakhla-Chassigny group *see* achondrites, Martian; SNC meteorites
 shock metamorphism 59, 347, 352, 358, 408, 412–413, 453–457, 462
 Shoemaker, Eugene (1928–1997) 281, 311, 452, 454, 454
 siderite 105, 173
 Siena, Italy (1794), meteorite fall 36, 37–39, 41, 42–43, 44, 239, 346
 Sikhote-Alin, Russia (1947) fall 5, 227, 229, 230, 231, 453
 Silliman, Benjamin (1799–1864) 51–52
 Simpson, Edward Sydney (1875–1939) 309–310, 309
 Sloane, Sir Hans (1660–1753) 94, 153, 154
 Smith, Cyril Stanley (1903–92) 57
 Smith, J. Lawrence *see* Lawrence Smith, John
 Smithson, James (c. 1765–1829) 237, 238–239, 238
 Smithsonian Astronomical Observatory 252, 258
 Smithsonian Institution, meteorite collection
 Antarctic Meteorites 259–262
 catalogues 243, 244
 donations of Stuart Perry 249–250
 history 237–262
 relationship with Harvey Nininger 246–248, 250–252
 Roebing Endowment 245–246
 work of Clarke 242–243
 work of Henderson 246–252, 253–254
 work of Merrill 242, 243–245
 SNC meteorites 55, 210, 215, 405–414, 497
 origin 406–408, 410
 solar system
 asteroid positions 353
 formation age 353–356, 365–371
 origin 59, 417–435
 chemical evidence 419
 cold 427–428
 hot 428–430
 meteoritic hypothesis 417–418
 meteoritic theory 431
 nebular hypothesis 417, 418, 421, 422–423
 planetesimal hypothesis 419–422
 planetesimal theory 432–434
 proto-planetary cloud 432–433
 supernova trigger 425–427
 tidal-encounter theory 421–422
 planetary rotation 418–419, 421
 Soldani, Abbé Ambrogio (1736–1808), work on Siena fall 37–38, 40
 soldanite 38
 Sør Rondane Mountains, Antarctica 291, 294, 296, 297
 Sorby, Henry Clifton (1826–1908) 58–59, 109, 111–112, 346–347
 sound, during meteorite flight 53–54
 Southey, Robert (1774–1843) 42
 Sowerby, James (1752–1822) 39–40

- spacecraft missions 215, 255, 256, 397, 407, 495–497
see also NEAR-Shoemaker
- spallation 363, 372, 443
- Specola Vaticana *see* Vatican, Castel Gandolfo, Specola (Observatory)
- spectrochemistry, Vatican 213
- sporadosiderite 104, **105**, 106, 114, *115*, 173, 174, 182
- Stannern, Moravia (1808), achondrite fall 54–55, 124, *140*, 171, 347
- Steenstrup, Knud Johannes Vogelius (1842–1913) 114, 117
- Stepling, Father Joseph (1716–78) 31
- Stöffler, Dieter. (b. 1939) 148–149
- stony meteorites, composition 107
- stony-irons
 Australia 310
 desert regions 335–336
 exposure age 374
 Japanese Antarctic collection **300**, 301
 Pallas iron, Siberia 27–28
- Story-Maskelyne, Mervyn Herbert Nevil (1823–1911) 115, 127, 154–156, *155*
- Stütz, Abbé Andreas Xaver (1747–1806)
 Natural History Cabinet 123–124
 work on fallen stones 31–32, 38
- suevite 457, 481, 484
- Suga Jinja Shinto shrine 15–16
- sulphur
 in classical meteorology 93–94
 reported fumes 39, 41, 54
- supernova trigger 425–427
- superstition 79
- syssiderite 104, **105**, 110, 114, *115*, 173, 174, 182
- Tabor, Bohemia (1753) fall 31, 35, 44, 346
 Natural History Cabinet, Vienna 123
- Tamentit, Algeria (1864) iron find 180, 184
- Tata, Domenico (1723–1800) 38
- tektites 165, 180, 182, 186, 188, 190, 276, 462
 age determination 473
 Australasian Strewn Field 462, 472, 476, 484, 486
 Central European Strewn Field 462, 471, 475
 composition 474, 477
 history 471–489
 impactor traces 483
 Ivory Coast Strewn Field 462, 472, 475
 microtektites 473, 474, 487
 Muong Nong type 473, 474, 477, 482, 487, 488
 North American Strewn Field 462, 472, 475, 482–483
 origin 477, 479–483, **482**
 physical character 473–474
- Thomson, Guglielmo (William) (1761–1806) 238
 metallography of irons 56–57, 58, 239
 mineralogical separation of Siena stone 37–38
- Tieschitz, ordinary chondrite fall (1878) 129
- Titius, Johann Daniel (1729–1796) 45–46
- Titius-Bode Law 45–46
- Topham, Edward (1751–1820) 39
- Tower of the Winds, Vatican 206, 206, 207, 208, 209
- Troili, Father Domenico (1722–1792)
Della Caduta di un Sasso dall'Aria 25–26, 206–207
- Lettera Apologetica* 25–26
- troilite 26, 44, 104, 207
- Tschermak, Gustav (1836–1927) 56, 127–128, *128*, 155, 347
- Tucson, Arizona, Ring meteorite 241–242, *241*
- Tunguska, Russia (1908) fall 220, 227, 228
- Ubeisk, Siberia (1772) iron find *see* Pallas iron
- University of Berlin 137
- Uranus, discovery 38, 45
- ureilite 24, 174, 312
- Urey, Harold (1893–1981) 282, 283, 423, 425–426, 427–429, 498
- Vaca Muerta, Chile (1861) mesosiderite find 270, 330, 331–332
- Vatican, Castel Gandolfo
 meteorite collection *210*
 catalogues 210–211
 history 205–215
 Specola (Observatory) 205–208, 206, 209, 213
 work on Mars 214–215
 spectrochemistry 213
- Vauquelin, Louis-Nicolas (1763–1829) 48, 49, 51, 55, 76, 168, 170
- Veevers Crater 311
- Venus, as potential source of meteorites 407
- Vernadsky, Vladimir Ivanovich (1863–1945) 226, 226
- Vesta (asteroid) 53 352, 390, 391, 392, 393, 397
- Vesta-HED meteorite match 352, 379, 388, 392
- Vesuvius
 work of Hamilton 38–39, 40
 work of Smithson 238–239
- Vienna, Natural History Museum, meteorite collection, history 123–132, *131*
- volcanism
 craters 60, 465
 as source of meteorites 25, 26, 29, 39, 40, 51, 167
 lunar 38, 39, 49, 62–63
- Von Zach, Franz Xaver (1754–1832) 46
- Ward, Henry A. (1834–1906) 277, 278
- weathering
 space 391, 396–397
 terrestrial 338–339
- Weiss, Christian Samuel (1780–1856) 137, *139*, 141
- Weizsäcker, Baron Carl Friedrich von, nebular hypothesis 422–423
- Western Australia, observed falls 314–315
- Western Australian Museum
 meteorite collection 308–320
 catalogue 310
 legislation 314
- Western Australian School of Mines 312–313, 326
- Weston, Connecticut, (1807), fireball and fall 51–52
- Wetherill, George West *433*
 work on Earth-crossing asteroids 387–388
 work on Safronov's theory 433–434
- Wetmore, Alexander 246, 247, 248
- Whipple, Fred Lawrence (1906–2004) 252, 422
- Widmanstätten, Alois Beck von (1753–1849) 55
 figures 55–57, 55, 59, *106*, 109, *109*, 114, 140, *141*, 177, 239, 452

- Wiechert, Emil (1861–1928) 419
Willamette, Oregon (1902) iron find 272–273, 273, 281
Wöhler, Friedrich (1800–1882) 26, 53, 116
Wold Cottage, Yorkshire (1795) fall 36, 39–41, 40,
42–43, 44, 346
Wolfe Creek Crater 310–311, 454, 454, 456
Woodward, John (1665–1728) 93
X-wind model 359
Yamato Mountains, Antarctica 291–303,
293, 325
Yarkovsky, Ivan Osipovich (1844–1902), Yarkovsky
effect 389–390, *see also* YORP effect
Yatoor (fall 1852) 156
YORP effect 497
Youndegin, Western Australia (1884 onwards)
iron finds 130, 306–309,
307, 308, 310