

INDEX

[Italic page numbers refer to principal discussions]

A

Abbe, pls. 4, 9
Abulfeda, 41, 180, pl. 7
Abulfeda chain, 41, 115
Adams, 167, 180, pl. 7
Aeon, defined, viii, 19
Aeronautical Chart and Information Center, 124
Age, meaning, 19–22, 49, 129, 139, 163, 277
Ages, relative, 121–136. *See also* Crater dating, Crater frequencies, D_L method, D_L values, Superpositions, *and individual series and systems*
Agglutinates, 95, 96, 256, 266, 279. *See also* Regolith
Agrippa, 205, 253, 266, pl. 10
Airy, 155, 244, pl. 5
Airy model of isostasy, 143
Aitken, 120, pls. 4, 9
Al Biruni, pls. 4, 9
Al-Khwarizmi, 154, 180, pl. 7
Al-Khwarizmi/King basin, 65, 148, 154, pls. 3, 6
 crater frequency, 136, 146, 148, 157, 160
Albategnius, 10, 213, 214, 219, pls. 7, 8
Albedo, 2, 3, 49, 85, *94*, 256, 265–267
 color, 96, 97
 magnetism, 215, 256
 rays, 94–96, 249, 250, 256, 265–267, 279
 slopes, 48, 49, 96
Aliacensis, 48, 127, 180, 189, pl. 7
Alkalis, mare basalt, 101, 276
Alpes Formation, 15, 73, 81, 82, 119, 168, 171, 174, 200, *203*, pl. 8
Alphonsus, 10, 89, 90, 94, 96, 128, 213, pls. 5, 7
Alpine Valley, 113–116, 119, 204
ALSEP, defined, 23, 165, 240
Altai scarp, 164, 233
Altimetry, Apollo and Zond, 77, 120, 145
Alumina (aluminum)
 Apollo 16 units, 165, 168
 mare basalt, 101–103
 orbital sensing, 98–103, 139–144, 165, 168
 terra crust, 139–144
Amundsen-Ganswindt basin, 7, 65, 148, pls. 3, 6
Anaxagoras, 51, 204, pl. 11
Andèl M, 218
Anorthite, 140
Anorthosite and anorthositic norite, 140–143, 156, 165, 168
ANT suite, 140–143, 171, 201
Antipodes, basins, 67, 76, 82, 181, 215–217, 279
Antoniadi, 7, 58, 65, 81, 231, pls. 4, 9
Apennine Bench Formation, 8, 73, 113, 193, *197*, 231
 age, *198*, 212, 224, 243, 278
 geologic maps and sections, 15, 19, 200, 243, 276, pl. 8
 samples, *197*, 224, 278, 279
Apenninian Series, 123–125
Aphanitic texture, 23, 174, 177, 178
Apianus, 189, pl. 7
Apollo basin, 55, *60*, *64*, 79–82, 103, 145, *147*, *160*, 178–181, pls. 3, 6
 mare filling, 103, pls. 4, 9
Apollo missions, *12*, 19–23, 82, 101, 140, *163*, *195*, *229*, 235, 249, 277–280, pls. 2–4, 7–11. *See also individual missions*
 unvisited sites, 125, 131, 254, 255, 258, 259
Apollo photographs, types, 4, pl. 2
Apollo 8, 12, 145, 152, 160
Apollo 10, 12
Apollo 11
 crater frequency and D_L values, 230, 235, 238
 crater morphology, 135
 landing site, 12, 13, 99, 101, *169*, 227, *235*, pls. 2, 4, 9
 mare samples, 19, 85, 101, 224, *235*, 245, 276–279
 regolith, 235
 spectral reflectance, 96, 99
 terra samples, 140, 142
Apollo 12
 crater frequency and D_L values, 230, 259, 271–273
 crater morphology, 135
 landing site, 12, 99, 101, 132, 207, *259*, 272, pls. 2, 4, 10
 mare samples, 19, 23, 101, 102, 249, *259*, 276–279
 objectives, 259
 spectral reflectance, 96, 99, 261
 terra and Copernicus-ray samples, 140, 269, 270, 278
Apollo 13, 12, 195
Apollo 14
 crater frequency, 136, 230
 Fra Mauro Formation samples, 82, 195, 200, *204*, 276–279
 landing site, 10, 12, *22*, 82, 144, *204*, pls. 2, 3, 8
 mare-basalt clasts, 101, 190, 200, 278
 objectives, 195, 204
 sampling stations, 190, 200, 204, 205, 209
 terra samples, general, 19, 23, 140–144

Apollo 15
 Apennine Bench Formation samples, *197*, 224, 278, 279
 crater frequency and D_L values, 136, 197, 230, 231, 252, 262, 271–273
 landing site, ii, 8, 9, 12–15, *22*, 88, 91, 99, 101, 193, *200*, pls. 2–4, 8, 9
 mare samples, 19–23, 101, 102, 237, *243*, 276–279
 massif samples, 19, 23, 49, 82, 140–144, 195, *198*, 224, 276–279
 objectives, 88, 198
 sampling stations, 201, 237, 243, 244
 spectral reflectance, 96, 99
Apollo 16
 crater frequency, 197, 219, 222, 230
 crustal thickness, 12, 143
 landing site, 12, 21, *22*, 101, *164*, *218*, pls. 2, 3, 7, 8
 mare samples, 101, 237, 238, 245, 276, 278
 objectives, 21, 195
 sampling stations, 165, 168–170, 237
 significance, 21, 57, 72, 127, 146, 164, 216
 spectral reflectance, 97
 terra samples, 21, 57, 82, 140–144, *163*, 216–220, 276, 278
Apollo 17
 crater frequency and D_L values, 230, 273
 landing site, 9, 12, *22*, 93, 99, 101, 105, 109, *171*, 239, pls. 2–4, 7–9
 mare and dark-mantle samples, 101, 102, 237, *239*, 245, 276–279
 massif samples, 21, 46, 49, 82, 140–144, 156, 157, 163, *173*, 190, 195, 201, 270, 276, 278
 objectives, 173
 sampling stations, 174, 176, 178, 190, 237, 239, 240
 spectral reflectance, 96–99, 240
Apollonian metamorphism, 212
Apparent crater, 43
Arago, 28, 114
Aratus CA, 90
Archimedes, 8, 15, *19*, 21, 113, *124*, 125, 156, *193*, 216, 221, 231, pl. 9
Archimedian Series, 123, 124
Archytas, 204, pl. 10
Ariadaeus B, 220, 221
Aristarchus, 50, *91*, 121, 125, 126, 156, 252, 253, *263*, pl. 11
Aristarchus Plateau, 86, 89, *91*, 125, 233, 240, 244, pl. 4
Aristillus, 8, 9, *22*, 48, 253, *269*, pl. 11
Aristoteles, 9, 202, 252, pl. 10
Artamonov, pls. 4, 9
Arzachel, 10, 128, 221, pls. 5, 8
Asclepi, 41, pl. 6
Ash-flow tuff, 21, 85
Asthenosphere, 115
Astroblemes, 77
Astrogeology, vii
Atlas, 9, 32, 166, 231, pls. 5, 9
Augite, 140, 143, 243
Australe basin, 7, *62*, *64*, 103, 145, *148*, 179, 245, pls. 3, 6
Autolycus, 8, 9, *22*, 200, 253, *269*, pl. 11

B

Baco, 75, pl. 6
Bailly basin, *11*, *59*, *64*, 80, 179, 180, pls. 3, 7
Balmer-Kapteyn basin, 7, *65*, 148, 165, *167*, 190, pls. 3, 6
Barbier, 149, 151
Barocius G, 37
Barringer, 181, pl. 7
Barrow, 149, 199, 204, pl. 6
Basalt. *See* Fra Mauro basalt, KREEP basalt, Mare-basalt samples
 terrestrial, 101, 102
Base surge, 43
Basin-mare distinction, 3, 19, 85, 86
Basin materials, *55*, 276–279, pls. 3, 6–8, 12. *See also basins listed on p.* 64, 65, 148, 179
 ages, relative, 64, 65, *148*, 157, *179*, 190, 224, 276–279, pls. 3, 6–9, 12
 ages, absolute, 157, 160, 168–171, 177, 178, 186, 190, 191, 200, 201, 212, 224, *276*
 asymmetry, 66, 81, *82*, 127, 171, 173, 179, 276, pls. 3, 6–8
 crater frequencies, 148, 149, 160, 179, 186, 293
 degradation, 65, 81, 82, 145, 146, 163–165
 dunelike deposits (“deceleration dunes”), 67, 71, 130, 204, 218, 219
 ejection angles, 67, 73, 80, 81
 emplacement, 66–82, 174–177, 195, 202–204, 210–212, 218–220, 276
 excluded zone, 66, 164, 165
 extent, 64–82, 123, 127, 129, 145–147, 171, 179, 190, 195, 213–215, 218, 276, pls. 3, 6–8, 12

Basin materials—Continued
 Imbrian, 178, 179, 195, 279, pls. 3, 8, 12. *See also* Imbrium basin, Orientale basin, Schrödinger basin
 impact melt, 66–70, 73, 76, 77, 82, 203, 211, 212, 276
 knobby, 73, 81, 82, 168, 171, 172, 276
 lateral transitions, 66, 67, 72, 73, 81, 82, 163, 164, 190, 204, 205, 214, 215, 218, 219, 224
 lineate, 66, 67, 80–82, 127, 147, 150, 163, 164, 179, 180, 188, 189, 204, 206, 209
 mapping conventions, 127–129, pl. 6
 massifs, 6–11, 49, 66–73, 76–82, 105, 127–129, 145, 146, 152, 155, 171–178, 181, 193, 198–203
 Nectarian, *161*, 276–278, pls. 3, 7, 12
 pre-Nectarian, 139, *143*, 178, 180, 277, 278, pls. 3, 6, 12
 sampling points, 82, 144, 163, 171, 195, 276, pls. 3, 7, 8. *See also* Apollo 14, Apollo 15, Apollo 16, Apollo 17, Luna 20
 secondary-crater relations. *See* Basin-secondary craters
 stratigraphic mapping conventions, 121–129, pl. 6
 superpositions. *See* Superpositions
 thickness, 66, 82
Basin rings, 57–73, 77, 110, 276, 280, pl. 3. *See also* Basin materials, massifs
 external, 78–81
Basin-secondary craters, *32*, *67*, *74*, 81, 137, 151, 159, 160, 181–186, 196, 213–215, 276. *See also* Imbrium basin, secondary craters; Nectaris basin, secondary craters; Orientale basin, secondary craters
 distribution and extent, *32*, *64*, *127*, 163, 171, 213–215, pls. 3, 6–8
 ejecta relation, 42, 66, 67, 72, 81, 82, 211–213, 217–220, 276
 linearity and radiality, *3*, *32*, 67, 80, 81, 127, 147, 161–170, 179, 186–188, 196, 213–216, 225
 mapping conventions, 127–129, pl. 6
 plains relation, 67, 71, 72, 128, 146, 164, 190, 215–220, 224
 provenance of material, 42, 43, 81, 82, *129*, 211, 212, 217–220, 276
 “rays,” 74, 75, 82, 127
 stratigraphic relations, *127*, 145–151, *158*, 161–167, 175, *179*, *196*, pls. 6–8
Basins (ringed basins, multi-ringed basins), 3, 19–23, *55*, 276, pls. 3, 6–8. *See also other basin headings and basins listed on p.* 64, 65, 148, 179.
 antipodes, 67, 76, 82, 181, 215–217, 279
 craters, comparisons, 57, 58, 65, 66
 crater-uplift control, 145, 149
 crustal composition, 143–145
 defined, 3, 57, 65
 deposits. *See* Basin materials
 depth, 77, 80, 143–145
 ejecta. *See* Basin materials
 excavation cavity, 66, 77–81
 gravity, 77, 79, 117
 inventory, 57, 64, 65, 81, 148, 179, pl. 3
 mare-extrusion control, 102, 103, 145, 229, 238–245
 Moho control, 77, 80, 102, 103, 115, 120, 143–145, 229, 240–245, 276
 rings. *See* Basin rings
 secondary-impact craters. *See* Basin-secondary craters
 size series, 59–65
 topographic rim, defined, 66
 topography, 77, 100, 280
Bedrock, 12, 13, 21, 45
Beer, 8, 113
Bench Crater, 259, 261
Berosus, 166, pl. 7
Berzelius, 175
Bessarion B, 39
Bianchini, 34, pl. 9
Big Backside Basin. *See* South Pole-Aitken basin
Birkhoff basin, *59*, *64*, 147, *148*, *158*, 179, 188, 293, pls. 3, 6
Birkhoff X, 159
“Black-and-white rocks,” *23*, 165, *203*, 224, 278
Blancanus, pl. 7
Blanchinus, 149, 189
Blocks, ejected, 29, 46, 47, 99, 168, 258, *265*
Bonpland, 22, 189, 208
Bonpland D, 112, 221
Boscovich Formation, 205
Boulder tracks, 174, 178
Bowen’s reaction series, 140, 142
Boyce-Dial crater-dating technique, 133. *See also* D_L method, D_L values
Brayley, 253
Breccia, 12, 45–47
 complexities, 21–23, 45–47, 177
 dating, 22, 47, 156, 169, 177, 178
 dikes, 44, 46

Breccia—Continued

- dilitologic (dimict), 46, 165, 168
- friable fragmental feldspathic, 165–171
- granulitic, 165, 168–170, 174
- lens, crater-floor, 43
- melt-poor, 46, 47, 165, 168
- melt-rich, 47, 82, 157, 165, 168
- mixing and recycling, 21–23, 139–143, 157, 163
- provenance, 22, 23, 47, 205, 211, 212, 217–220, 276
- regolith, 45
- samples, 45–47
- shock grades, 44–47
- terrestrial, 45
- textures, 23, 45–47, 171, 174
- “Bright swirls,” 76, 215, 216, 256, 258, 269
- Bullialdus, 252, 253, 256, pl. 10
- Bunte Breccia, 45, 46, 73
- Bürg, 253, pl. 11
- Buys-Ballot, pl. 4

C

- Calcium, 101, 102, 139, 140
- Calderas, 17, 32, 40, 88, 113
- Camelot Crater, 239, 270
- Campanus, 112, pl. 8
- Campbell, 58, 257, pls. 4, 6, 9
- Cardanus, 197, 231, 234, pl. 9
- Carnot, 159, 180, pl. 7
- Caroline Herschel, 8, 32
- Carpenter, 252, pl. 11
- Cassini, 8, 202, 216, 221, pl. 8
- Cataclastic anorthosite, 141, 165, 168
- Cataclysm, 190, 191, 278
- Catena (pl., catenae), defined, 3
- Catena Artamonov, 156
- Catena Dziewulski, 156
- Catena Mendeleev, 188
- Catharina D, 37
- Cauchy, 119
- Cauchy structures, 115, 119, pl. 5
- Cavalierius, 256, 258, pl. 10
- Cayley, 220
- Cayley Formation (Cayley plains), 21, 165, 195, 216, 224, pl. 8
 - crater frequency, 197, 219, 221, 230
 - samples, 165–170
 - thickness, 220
 - type area, 218–221
- Central Cluster, 240, 270
- Central peaks. *See* Crater materials, peak; Crater processes, peak formation
- Chao, E.C.-T., vii, 42, 43
- Chaplygin, 6, 120, 180, pl. 7
- Chemistry
 - mare basalt, 101, 102, 276
 - orbital, 97, 139, 142, 143, 156, 190, 198, 241, 245, 258, pl. 2
 - terra crust, 139, 140
- Chretien, pls. 4, 9
- Cichus, 253, pl. 10
- Clavius, 58, 74, 180, pls. 7, 8
- Clearwater craters, Quebec, 32, 45
- Cleomedes, 166, 180, pls. 4, 5, 7
- Clinopyroxene, 101, 102, 140
- Collapse craters, 87–90
- Colluvium, 49, 174, 201, 202
- Color, 86, 96–99. *See also* Spectral reflectance
- Compass directions, lunar conventions, 2
- Compton, 58, 65, 81, 166, 186, 199, pls. 4, 5, 8
- Cone Crater, 190, 205, 209–212, 269, 270, 273
- Cones, 86–89
- Congreve and Congreve U, 180, 184, pl. 7
- Conon, 200, 203
- Continuous deposits, defined, 43
- Copernican Period
 - defined, 221, 265
 - duration, 249, 269–273, 280
 - impact rate, 246, 271–273, 280
- Copernican System, 263, 280, pl. 11
 - chronology, 269, 280
 - crater frequency and D_L values, 130, 136, 249–253, 256, 265
 - crater materials, 130, 236, 249, 252, 253, 263, 279, 280, pl. 11
 - defined, 121–125, 249, 265
 - distribution, 265, 280, pl. 11
 - mare materials, 196, 265, 269, pls. 11, 12
 - remote-sensing properties, 265–267
 - structures, 269, 271
- Copernicus, 1, 8, 29, 49, 52, 92, 250, 265, 269, pl. 11
 - age, 269–273, 278, 280
 - composition, 156, 269, 270
 - crater frequency and D_L value, 136, 252, 253, 266, 271–273
 - depth-diameter ratio, 80
 - impact energy, 29
 - impact melt, 49, 50, 52, 76
 - rays, 1, 29, 30, 48, 250, 269–272
 - secondary craters, 8, 29, 125, 126, 247, 250, 270
 - stratigraphic relations, 121, 125, 126, 247, 250, 265, 272
- Copernicus H, 31, 250, 265–268
- Cordillera ring. *See* Montes Cordillera
- Core, 12, 277, 280
- Coriolis L, 149, 151, pl. 6

- Coulomb, 158, 159, pl. 7
- Coulomb-Sarton basin, 60, 64, 72, 79, 145, 148, 158, 179, pls. 3, 6
- Crater dating, 129–136
 - “counts.” *See* Crater frequencies
 - D_L method, 133, 136, 216, 250, 253, 265, 272, 273
 - morphologic basis, 129, 145, 149, 180, 222, 232, 249, 253–257
 - Pohn-Offield method, 129–131, 143, 145
 - superpositional basis, 17, 27, 47, 125. *See also* Superpositions
 - Trask's method, 131–135, 236, 243, 253
- Crater frequencies, 18, 19, 129–136, 145–147, 180, 221, 230–232.
 - See also individual Apollo and Luna missions, basins, formations, maria, series, and systems*
 - basins, 136, 148, 160, 179, 186, 293
 - diameter dependence, 129, 132, 136, 257
 - D_L correlations, 130, 136, 216, 230, 256, 273
 - endogenic craters, 29
 - secondary-impact craters, 29, 32, 132, 276
 - slopes of size-frequency curves, 29, 32, 129–134, 145, 146, 216, 257
 - small-on-large superpositions, 129, 133–135, 145, 250–253, 266, 267, 273
 - substrate influence, 231, 234, 239, 241, 250, 252, 269, 272
 - time-stratigraphic correlations, 130, 136
- Crater materials, 3, 17–19, 25–53. *See also individual craters, series, and systems, and craters listed on p. 149, 180, 221, 231, 253, 265*
 - asymmetric, 32, 38, 39, 258, 266, 267
 - dunelike, 27, 28, 268
 - endogenic interpretations, 17–19
 - erosional degradation, 19, 20, 27, 47, 48, 129, 145, 149, 180, 185, 189, 222, 232, 249, 253, 256, 265–267
 - extent, 27, 127
 - floor, 27, 28, 43, 45, 50–52, 113, 116, 117
 - geologic mapping, 15, 27, 47–50, 67, 125, 127, pls. 6–12
 - herringbone, 28–35, 47, 48, 67, 125, 211
 - mixing, 44–48
 - morphology, 3, 27, 149, 180, 222, 223, 232, 253–256
 - origin, 17–19
 - peak, 27, 43–51, 58, 65, 77–80, 280
 - remote-sensing properties, 96–99, 265–267
 - rim, 27–29, 42, 45–48
 - shock zoning, 41, 42, 45–48
 - subunits, 27, 28, 45–53
 - wall, 27–29, 45–51
- Crater processes. *See also* Ejection process
 - floor uplift, 19, 58, 65, 93, 99, 113, 129, 145, 149, 196, 245, pl. 5
 - formation mechanics, 33, 40–45
 - formation times, 43, 45
 - impact melting, 44. *See also* Impact melt
 - interference, 29–32, 35, 37, 48, 220
 - origin, general, 17–19, 27, 32, 33, 41, 47
 - peak formation, 43, 44, 49, 50, 77
 - “push” and “pull” mechanisms, 43
 - terrace formation, 43, 44, 48, 77
 - thrusting, 42, 47
- Crater properties, 3, 17–19, 27–33
 - circularity, 29
 - depth-diameter ratios, 27, 29, 42, 43, 66, 80
 - excavation cavity, 41–43
 - morphology, 3, 27–29
 - simple-to-complex transition, 3, 27–29, 43, 65
 - size classes, 27–29, 57, 58
 - size-frequency distributions. *See* Crater frequencies
 - spatial distributions, 17–19, 29, 32, 139, 163, 265, 276, pls. 6–12
 - target influence, 43, 44, 47, 133, 239, 241
- Crater types
 - atypical, 19, 32, 41
 - collapse, 87–92
 - complex, 25–29, 43, 44, 47–53, 77, 78, 280
 - dark-haloed. *See* Dark-haloed craters
 - delta-rim, 32, 33, 92
 - dimple, 236
 - double-ring, 113, 116
 - endogenic. *See* Endogenic craters
 - explosion, 32, 77–81
 - gravity, 43, 81
 - hybrid, 33
 - irregular, 32
 - laboratory, 31–33, 38, 39
 - missile, 29, 39
 - nested, 78, 113, 116, 258
 - noncircular, 32
 - paired, 8, 32, 39
 - primary, defined, 17
 - ringed, 116
 - satellitic (secondary). *See* Secondary-impact craters
 - simple, 25–29, 33
 - smooth-rimmed, 32, 33, 40
 - strength, 43, 81
- Cratering flow, 41, 80
- Cratering rate. *See* Impact rate
- Craters, 3. *See also crater and cratering headings, individual craters, and craters listed on p. 149, 180, 221, 231, 253, 265*
- Crisium basin, 7, 63, 65, 100, 103, 165, 170, 242, pls. 3, 5, 7
 - age, 171, 179, 186, 278
 - antipode, 215–217
 - composition, 144
 - crater frequency, 179, 186, 293
 - cross sections, 82, 192, 235, 243, 276

Crisium basin—Continued

- deposits, 65, 164–167, 171–175, 190, 238, 243, pls. 3, 7
- impact, 82, 171
- mare fill, 103. *See also* Mare Crisium
- mascon, 117
- rim and rings, 65, 78–81, 100, 103, 110, 117, 171, 214, 235, 241, 242, pl. 3
- samples, 82, 163, 171, 276, 278
- secondary craters, 167, 171, 175
- stratigraphic relations, 148, 165, 171, 179, 192, 235, 243, pls. 7, 12
- structures, tectonic, 112, 115
- topography, 77, 78, 100
- Crocco, pls. 4, 9
- Crookes and Crookes D, 185, pl. 11
- Cross sections
 - diagrammatic (schematic), 44, 45, 82, 100, 102, 112, 115, 118, 120, 144, 200, 210, 211, 222, 240, 274, 275
 - geophysical, 13, 79
 - local, 19, 200, 210, 238, 240, 243, 261
 - regional, 21, 144, 192, 235, 240, 243, 272, 274–276
- Crozier, 40
- Crüger, 67, 71, 127, 130, pls. 4, 8
- Crust (terra)
 - age (time of solidification), 156, 157, 277, 280
 - basin effects, 77, 80, 102, 103, 115, 120, 143–145, 229, 240–245, 276
 - composition, 139, 165, 201, 280
 - density, 12, 140, 143
 - differentiation, 142, 143, 156, 157
 - igneous and impact processes, importance, 140–143
 - layering, 12, 13, 99, 143, 274–276
 - mare-extrusion influence, 102, 103, 115, 145, 229, 238–245
 - mineralogy, 140
 - mixing, 139–143
 - petrology and petrogenesis, 140–143
 - thickness, 12, 77, 102, 103, 115, 143, 145, 278, 279
 - zonation, 143
- Cumulates, 141–143, 174
- Curie, 226, pl. 6
- Cyrano, 149, 151, pl. 6

D

- “D caldera,” 90, 203
- Daedalus R, S, U, 149, 151, 231, pl. 6
- D'Alembert, 257, pl. 7
- Damoiseau, pls. 5, 9
- Daniell, 40, pl. 5
- Dark-haloed craters
 - endogenic, 89, 90, 266
 - exogenic (impact), 19, 176, 190, 191, 223, 266, 268, 279
- Dark-mantling materials, 3, 8, 9, 40, 89, 109, 113, 116, 117, 174, 203, 205, 233, 239, 270, pl. 4. *See also* Glass
 - age, 174, 234–237, 241, 245, 269, 270, 278, 279
 - Apollo 17, 234, 237–241, 278
 - color (spectral reflectance), 96, 97, 240
 - composition, 101
 - distribution, 15, 89, 94, 95, 113, 174, 234, 240–245, 276, 279, pl. 4
 - mantle source, 102
 - origin and eruptive mode, 89, 102, 240, 241, 245, 276
 - radar properties, 99
 - source vents, 89–93, 102, 113, 234, 240, 276
 - stratigraphic relations, 93–95, 109, 233–235, 239, 240, 245, 276–279
- Darwin, 130, pl. 6
- Davy, pls. 5, 9
- Dawes, 239, 252
- Debris surge (flow). *See* Ground surge
- Deceleration dunes, 67, 130, 204, 218, 219
- Delaunay, 37
- Delisle, 18, 19, 121, 125, 252, pl. 10
- Densities
 - magma, 102, 103, 241
 - mantle, 12
 - mare basalt, 12, 102, 103
 - Moon, 12
 - terra crust, 12, 143
- Depth-diameter ratio
 - basins, 77, 80
 - craters, 27, 29, 42, 43, 66, 80
- Descartes and Descartes A, 22, 218, pl. 7
- Descartes Formation (Mountains), 21, 165–171, 195, 216
- Deslandres, 10, 149, pl. 6
- Diameters, data source, 4
- Differentiation, magmatic, 102, 142, 143, 156, 157
- Dikes and veins
 - breccia, 44, 46
 - igneous, 101, 102, 157, 276
 - impact melt, 44–47, 165
- Dionysius, 220, 221, 265
- Diophantus, 18, 19, 121, 125, 252
- D_L method, 133, 136, 216, 250, 253, 265, 272, 273
- D_L values
 - Copernican-Eratosthenian boundary, 250, 265
 - Copernican maria, 130, 136, 250, 269
 - craters, 250, 253, 256, 273
 - crater-frequency correlations, 130, 136, 216, 230, 256, 273
 - Eratosthenian-Imbrian boundary, 229–231, 243, 250

D_L values—Continued
 Eratosthenian maria, 125, 130, 136, 230, 231, 247–250, 253, 259, 269, 273
 farside maria, 245
 Imbrian maria, 125, 130, 136, 229–233, 243, 245, 250, 273
 Orientale basin, 216, 230
 plains, 136, 216
 Dobrovol'skiy, 47
 Dollond B and C, 218
 Domes
 intercrater, 29, 35, 127, 214, 215
 mare, 86–89
 terra, 110, 111, 127, 146, 214, 215, 222–225
 Doppelmayr, pls. 5, 7
 Doppelmayr Formation, 244
 Doppler, 184, pl. 8
 Dorsum (pl., dorsa), defined, 3. *See also* Mare ridges
 Downslope movement, gradual, 49, 89, 96, 110, 111, 133, 280. *See also* Colluvium, Slumping
 Dune Crater, 201, 237, 243
 Dumite, 143, 157, 174

E

Early Imbrian Epoch. *See also* Lower Imbrian Series
 defined, 121, 196
 duration, 224, 279
 igneous activity, 190, 198, 224, 232, 238, 279
 impact rate, 160, 246, 279
 "Eclipse temperatures," 99, 113, 265–268
 Einstein, 35, pl. 6
 Ejecta, defined, 3. *See also* Basin materials, Crater materials
 Ejection process
 angle, 41–43, 72, 80, 211
 ballistic, 41–43, 47, 48, 211, 212
 basins, 66, 67, 72, 73, 77–81
 complex craters, 47
 deposition, 42
 nonballistic, 43, 46, 47, 202, 211, 212. *See also* Ground surge
 overturned flap, 42, 73
 range, 42, 48, 211, 212
 sequence, 41, 42
 target effects, 41, 47
 velocity, 42, 43, 72, 203
 Elastic waves, 81
 Elbow Crater, 201, 237, 243
 Elements. *See also* individual elements and oxides
 large-ion-lithophile (LIL), 140
 major, 96–103, 139–144, 165, 280
 radioactive, 98, 99, 102, 140, 190, 198
 rare-earth. *See* Europium anomaly, KREEP, Rare-earth elements
 siderophile, 101, 141, 143, 157, 158, 202
 trace, 102, 140–142, 156, 276
 volatile, 101
 Elevation
 average, 12
 Crisium (basin and mare), 77, 78, 99, 100
 farside, 12, 120
 maria, 93, 115, 120
 nearside, 12, 120
 Orientale (basin and mare), 77
 Endogenic craters, 87–93, 239
 impact-crater distinction, 19, 27, 29, 32, 33, 47, 88, 89, 113, 266
 size-frequency distribution, 29
 Endymion, 199, 166, 180, pls. 4, 7, 9
 Energy coupling, 41, 43, 81, 212
 Energy partitioning, 43, 44, 157, 212
 Energy scaling. *See* Scaling laws
 Engelhardt, 184, pl. 8
 Epigenes, 204, pl. 7
 Epoch, defined, 123
 Equilibrium. *See* Steady state
 Eratosthenes, 8, 121, 125, 193, 231, 247, pl. 10
 Eratosthenian Period
 defined, 121, 125
 duration, 249, 262, 280
 impact rate, 246, 271–273, 280
 Eratosthenian System, 247, 279, pl. 10
 chronology, 262, 279, 280
 crater frequency, 130, 136, 230, 249–253, 256, 257, 265, 272, 280
 crater materials, 130, 236, 247, 265, 280, pl. 10
 defined, 121–125, 249, 250
 D_L values, 125, 130, 136, 229–231, 247–250, 253, 256, 259, 269, 273
 mare materials, 15, 121–125, 131–135, 207, 230, 231, 234, 243, 244, 247–256, 258, 265, 269, 272, 278, 279, pls. 10, 12
 samples, 249, 259–262, 276–279
 structures, 279
 Escape velocity, 29
 Esnault-Pelterie, 149, 159
 Eudoxus, 9, 202, 252, 253, pl. 11
 Euler, 8, 49, 121, 125, 126, 250–253, pl. 10
 Europium anomaly, 101, 142
 Excavation cavity
 basins, 23, 66, 77, 80, 280
 defined, 43
 depth and volume, 42, 43, 66, 77, 80
 excavation and growth, 41–43

Explorer 35, 12
 Explosions, 41
 Exposure ages, 235, 238, 269, 270

F

Fabricius, 147, 253, pl. 10
 Fabry, 4, pl. 6
 Farside
 crustal and lithospheric thickness, 12–14, 115, 145
 defined, 2, 3
 maria, 3, 103, 115, 233, 245, 280
 southern, 3
 structures, 107, 112, 115, 245, pl. 5
 Faults, 107. *See also* Fractures, Rilles
 craters, 42, 47, 113–118
 mare ridges, 110–112
 solitary, 113, 115
 thrust, 115, 269
 Fecunditatis basin, 40, 65, 117, 145, 146, 148, 179, 235, 241, 243, pls. 3, 6
 Feldspar, crustal varieties, 140
 Felsite, 177, 178
 Fermi, 5, pl. 6
 Ferroan anorthosite, 142, 143, 156
 Fersman, 158, pl. 7
 Feuillée, 8, 113
 Fizeau, 179, pl. 9
 Flammarion, 128, 213, pl. 6
 Flamsteed and Flamsteed P, 111, 253, 254, 258, pl. 6
 Flamsteed-Billy basin, 65, 146, 148, 244, 251, 254, 258, pls. 3, 6
 Fleming, 4, 156, 180, 191, pl. 7
 Flynn Creek Crater, Tenn., 43
 Fontenelle, pls. 5, 8
 Formation, defined, 123
 Fowler, 158, 159, pl. 6
 Fra Mauro, 22, 89, 149, 208, pl. 6
 "Fra Mauro basalt," 140
 Fra Mauro breccia, 200, 211, 212
 Fra Mauro Formation, 204, 218, pl. 8
 age, 200, 212, 224, 279
 composition, 143, 144, 211, 269, 279
 crater frequency, 136, 230
 crater morphology, 131, 135
 definition and type area, 73, 124, 125, 196, 208
 distribution, 15, 204, 207, 213, pl. 8
 emplacement process, 195, 204, 211, 212
 Hevelius Formation analogy, 73, 82, 204, 212, 213, 216, 218
 lateral gradations, 190, 204, 208, 213
 samples, 195, 200, 204, 278, 279
 stratigraphic relations, 127, 196, 207, 235, 272
 stratigraphic significance, 19, 21, 121, 125, 127, 195, 196
 thickness, 205, 210
 Fra Mauro peninsula, 10, 22, 115, 262
 Fracastorius, pls. 5, 7
 Fractures (fissures, gashes). *See also* Faults, Rilles
 crater-floor, 113–118. *See also* Crater processes, floor uplift
 impact-melt, 113, 117
 regolith, 269, 271
 Fraunhofer E and J, 147, 149
 Freundlich, pl. 7
 Freundlich-Sharonov basin, 60, 64, 82, 147, 179, pls. 3, 6
 Furnerius, 149, 167, pls. 4–6

G

Gabbro, 140
 Gabbro-norite, 142
 Gagarin, 6, 31, 58, 120, 149, 191, pl. 6
 Galois and Galois Q, 183, pl. 6
 Gambart, 40, 92, 208
 Gambart A, 268
 Gamma-ray spectrometer, 97–99, 156
 Gargantuan basin. *See* Procellarum basin
 Gassendi, 113, 116, pls. 5, 7
 Gassendi A, 253, pl. 11
 Gaudibert, 113, 117, pl. 5
 Gauss, 58, 166, pls. 5, 7
 Geminus, 166, pl. 10
 Geo-, vii
 Geochronology
 breccia dating, 22, 47, 156, 169, 177, 178
 decay constants, 19, 168
 exposure ages, 235, 238, 269, 270
 mare-basalt dating, 101, 235–244, 261, 269, 270
 methods, 156, 177, 235–238, 269
 model ages, 156
 pyroclastic dating, 241, 244
 Geologic cross sections. *See* Cross sections
 Geologic mapping, vii, 17–21, 123–129
 basins, 15, 66, 67, 73, 76, 127, 129, 169, 174, 207, pls. 3, 6–8, 12
 craters, 27, 47, 50, 176, pls. 6–12
 maria, 86, 94, 95, 174, 236, pls. 4, 9–12
 systematic program, vii, 123–125
 Geologic maps
 local, 176, 236
 regional, 15, 76, 94, 95, 169, 174, 207, 217, pls. 3–12
 Geologic units, vii, 17–23, 121–129. *See also* Rock-stratigraphic units, Time-stratigraphic units, Time units

Geologic units—Continued
 correlation of types, 121–125
 correlation with samples, 21–23, 101, 139, 143, 276, 280
 interfingering, 27, 121, 124
 lateral continuity, 17, 21, 27
 nomenclature, 121–125
 superpositions, 17, 21, 125–127. *See also* Superpositions
 three-dimensionality, 17
 Giordano Bruno, 191, 265
 Glass. *See also* Dark-mantling material
 Apollo 15, green, 101, 237, 244, 245, 278
 Apollo 15, red, 101, 244
 Apollo 17, orange and black, 101, 237, 240, 241, 245, 278
 coatings, 46
 darkening, 95, 96, 280
 devitrification, 240
 regolith, 95, 96, 101
 Goclenius, 119, pl. 7
 Goddard A, 76, 265
 Godin, 205, 253, 266, pl. 11
 "Gold dust," 85
 Goldschmidt, 49, 204, pl. 6
 Gosses Bluff, Australia, 43
 Grabens. *See* Rilles
 Granite, 140, 223, 269
 Granodiorite, 140
 Granulitic and granoblastic texture, 46, 157
 Granulitic breccia, 165, 168–170, 174
 Granulitic impactite, 141, 212
 Gravity, cratering effects, 43, 44, 81
 Gravity anomalies, 77–80, 117. *See also* Mascons and individual basins and maria
 craters, 77, 113
 Grimaldi (basin and mare), 11, 59, 64, 71, 77, 117, 120, 147, 148, pls. 3–6, 9, 10
 Grissom-White basin, 65, 148, 160, 179, pls. 3, 6
 Ground surge (debris flow, debris surge, ground flow, surface flow)
 basins, 66, 164, 204, 211–213, 217–220, 222, 276
 craters, 42, 43, 47, 48
 secondary-crater relation, 42, 67, 211–213, 217–220, 222, 276
 Group, defined, 123
 Gruithuisen domes, 222, 225
 Gruithuisen K, 92

H

Hackman, R.J. *See* Shoemaker-Hackman stratigraphic scheme
 Hadley rille, 13, 88, 91, 200, 201, 237, 243
 Hahn, 166, pl. 8
 Hainzel A, 187, 253, pl. 10
 Halo Crater, 259, 261
 Hansteen and Hansteen alpha, 225, pls. 5, 9
 Hausen, 28, 253, pl. 10
 Hayn, 199, pl. 11
 Head Crater, 259, 261
 Heat flow, 198
 Heat sources, 102, 157, 190, 198, 212, 277–280
 Heaviside, 6, 120, 150, pl. 6
 Heis, 8, 32
 Helicon, 8, 32
 Henbury craters, Australia, 29, 31, 32
 Hercules, 9, 32, 166, pl. 10
 Herodotus, 91, pl. 9
 Herschel, 128, 253, pl. 10
 Hertzprung basin, 60, 64, 79–82, 148, 149, 158, 159, 178–183, 188, pls. 3, 7, 8
 crater frequency, 179, 180, 186, 293
 elevation, 120
 plains, 190, 245, pl. 8
 Hevelius, 67, 71, 120, 180, pls. 5, 7
 Hevelius Formation, 66–73, 79–82, pls. 3, 8. *See also* Orientale basin
 crater analogy, 57, 66, 79
 crater frequency, 216
 definition and type area, 66, 67, 71, 196, 197
 extent, 66, 67, 76, 79–82, pl. 8
 Fra Mauro Formation analogy, 73, 82, 204, 212, 213, 216, 218
 inner facies, 66, 76, 81, 197
 Montes Cordillera relation, 67–71, 79, 232
 nonlineated facies (member), 70, 72
 outer facies, 67, 76, 82
 plains relation, 67, 164, 190, 215, 218, 219, 224
 stratigraphic significance, 66, 121–125, 196
 transverse facies, 67, 71, 73, 76, 204
 "Highland basalt," 140, 141, 156
 Hilbert, 4, 5, 154, 191, pl. 7
 Hipparchus, 19, 37, 213, pls. 6, 8
 Horrocks, 253
 Hortensius-Milichius domes, 86
 Hubble, pls. 4, 7, 9
 Humboldt, 7, 58, 102, 113, 167, 223, 226, 231, pls. 4, 5, 9
 Humboldtianum basin, 61, 64, 79–81, 117, 148, 166, 179, 186, 199, pls. 3–5, 7
 crater frequency, 179, 186, 293
 impact, 79, 82, 171
 stratigraphic relations, 148, 171, 175, 179, 186, 199, 204, pl. 7
 Humorum basin, 57, 61, 64, 82, 148, 153, 179, 187, 192, 214, pls. 3–5, 7
 crater frequency, 179, 186, 293
 mascon, 117, 244

Humorum basin—Continued
structures, tectonic, *112*, 117, 244, pl. 5
Hypervelocity, 17, 40

I

Ilmenite, 95, 101, 140, 235
Ilmenite basalt, 101, 235, 238, 261
Imbrian-Imbrium distinction, 124
Imbrian Period. *See also* Early Imbrian Epoch, Late Imbrian Epoch
defined, 124, 125
duration, 245, 279
impact rate, 160, 191, 245, 246, 279
Imbrian System. *See also* Lower Imbrian Series, Upper Imbrian Series
crater frequency, 136, 186, 197
crater materials, 15, 131–136, 186, 221, 222, 232
defined, 124, 125, 193, 196
extent, 195, 229, 279, pls. 8, 9
plains materials. *See* Plains
type area, 196, 208, 231
Imbrium basin, 8, 19, 21, 36, 57, *63*, *65*, 79–82, *193*, pls. 3, 8, 12
age, 186, 191, 201, 212, 224, 277, 279
antipode, 215–217
center, 103, 198, 202, 204
composition, 143, 144, 168, 201, 211
crater frequency, 135, 136, 160, 191, *197*, 219–222, 230, 293
deposits, 19, 57, 65, 127, 129, 164, 165, 168, 174, 175, 190, *193*, 279, pls. 3, 8. *See also* Alpes Formation, Apen-nine Bench Formation, Fra Mauro Formation, “Material of Montes Apenninus”
depth, 143, 240
excavation cavity, 81, 197, 198, 204, 211
fissured plains, 203
impact angle, 82
impact melt, 198, 203, 211, 212
mapping conventions, 127, 129
mare fill, 103, 240, 243–245, 258, 259, 269, 279. *See also* Mare Imbrium
mascon, 117
Orientale basin, comparisons, 196, 197, 202, 203, 213, 218
plains, 3, 21, 164, 213, *215*, 279, pl. 8. *See also* Apennine Bench Formation, Cayley Formation
plains/secondary-crater relation, 215–219
radials. *See* Imbrium sculpture
rim and rings, 57, *65*, 79, *81*, 110, 117, 193, *196*, 207, 211, 218, 240, 253, pl. 3. *See also* Montes Alpes, Montes Apenninus, Montes Archimedes, Montes Carpatas, Montes Caucasus
samples, 19, 21, 82, 192, 200, 276, 278. *See also* Apennine Bench Formation, samples; Fra Mauro Formation, samples; Montes Apenninus, samples
secondary craters, 32, *36*, 40, 41, 65, 74, 116, 127–131, 155, 156, 164–168, 172, 175, 187, 189, 196, 205, 206, *213*, 232, 233, 243, pls. 3, 8, 12
secondary craters, sampling, 164, 165, 173, 174, 204, 205, *211*, *218*
stratigraphic relations, 15, 19, 21, 121, 127, 129, 148, 173, 174, 179, 196, 199, 204–209, 213–219, 233, 243, 276–279, pls. 3, 8, 12
stratigraphic significance, 19, 21, 121–125, 195, 196, 204, 221, 279
structures, external, 81
structures, tectonic, 112, *113*, 117, pl. 5
Imbrium sculpture, 10, 19, 37, 41, 57, 89, *113*, 115, 118, *127*, 187, 196, 199, 204, 208, *213*
Impact breccia. *See* Breccia
Impact melt
basins, 66–70, 73, *76*, 82, 164, 198, 203, *211*, 274–276
cooling time, 45
ejected, 41, 47, 48, 113, 117, 174, 177, 212
fissured (fractured), 50–52, 113, 117, 203, 212
flows, 44, 47–50, 53
homogenization, 50, 177, 178
injected, 44, 46
origin, 40, *44*, 50, 212
pools, 28, 44, 46–48, 50, 53, 212, 265
projectile effects, 44, 47
stratigraphic relations, 44, 45, 50
target effects, 47, 212
terrestrial, 45
volcanic interpretation, 50, 76, 140
Impact-melt-rock samples, *22*, 23, *45*, 82, *140*, 157, 210
aphanitic, 201
Apollo 14, 211, 212, 278
Apollo 15, 198, 201, 203, 278, 279
Apollo 16, 165, 168–170, 219, 220, 278
Apollo 17, 174, 177, 278
bomb, 177, 178
composition, 101, 140–142, 165, 174, 177, 201, 211, 212
dating, 22, 168–170, 177, 178, 212, 278
fragment-laden, 141, 165–170, 174, 177, 278
mare-basalt samples, comparison, 101
poikilitic, 46, 168, 174, 177
texture, 23, 46, 140, 165, 174, 177, 178, 201, 203, 210
uncertain sources, 22, 23, 168–170, 174, 177, 211, 219, 220
Impact rates
Copernican and Eratosthenian, 246, 271–273, 280
Imbrian, 160, 191, 245, 246, 279

Impact rates—Continued
Nectarian and pre-Nectarian, 151, 157, 160, 180, 190, 191, 246, 278–280
present, 280
terrestrial, 271
Impacts, 3, 17–19, 27, 33, 38–42. *See also* Projectiles and basin and crater headings
clustered, 180
crustal disruption, 142, 143, 157, 190, 279
energy, 17, 29, 43
experimental, 31, 33, 38, 39, 280
layering effects, 40, 43, 44, 77, 78, 81
missile, 29, 39
oblique, 19, 32, 38, 39, 81, 82, 171, 173, 258, 266, 267
petrogenetic effects, 143, 157, 277
primary, defined, 17
recent, 280
scaling laws, 43, 81, 211, 212
secondary, defined, 18. *See also* Secondary-impact craters
simultaneous, 8, 19, 30–33, 39, 81, 171, 197
spacecraft, 266
velocities, 17, 18, 29
Infrared, 96, 97. *See also* “Eclipse temperatures”
Ingenii basin, 6, *60*, *64*, 146, 148, pls. 3, 6
Inghirami and Inghirami A, 71, 180, 221, 224, pls. 7, 8
Insularum basin, 65, 146, 148, 153, 190, 207, 244, pls. 3, 6
Intrusions, igneous, 101, 102, 113, 140–143, 157, 276, 277
Iridum crater, 8, 32, *34*, 125, 197, 221–224, 231, 232, 258, 259, pl. 9
Iron, 95–101, 140, 141, 276
Isaev, pls. 4, 9
Isostasy, 77, 112–115, 143, 145, 245, 277. *See also* Mascons

J, K

J. Herschel, pls. 5, 6
Janssen, 37, 149, 162, 164, pls. 5, 6
Janssen Formation, 73, 121, 143, 163–167, pl. 7
Jenner, 5, 7, 223, 226, 231, pl. 9
Jetting, 41–46
Joliot, 76, 166, 191, pls. 4, 6, 9
Jules Verne, 6, pls. 4–6, 9
Julius Caesar, 9, 95, 218, pl. 6
Kant Plateau, 164, 165, 218
Karpinskiy, pls. 5, 8
Keeler, 6, 25, 120, 150, pl. 8
Keeler-Heaviside basin, 6, 25, *61*, *64*, 146, 148, *150*, 179, pls. 3, 6
Kepler, 121, 125, 253, 255, 265, pl. 11
Kibal'chich, 180, 183, pl. 7
King, 4, 46, 50, 53, 154, 265, pl. 11
Kipukas, 86, 110
Kirchhoff, 173, 175
Kohlschütter, 85, 245, pls. 4, 7
Kopff, 33, 40, pls. 5, 9
Korolev basin, *59*, *64*, 79–82, 148, 178, 179, *181*, 190, 245, pls. 3, 7, 8
Korolev M, 182
Kovalevskaya, 158, pl. 9
Krafft, 197, 231, 234, pl. 9
KREEP
basalt, 140, 156, 190, 198, 202, 211, 224, 276–279
composition, 140
crustal component, 140, 143, 144, 156, 211
defined, 140
high-K (HKFM), 140
low-K (LKFM), 140, 141, 168, 171, 174, 201
medium-K (MKFM), 140, 198
orbital chemistry, 143, 156, 190, 198, 245
origin, 142, 198
samples, 165, 168, 171, 174, 190, 198–203, 211, 269, 270
volcanic, 144, 156, 198, 211
Krieger, 121, 125, 231–233
Krusenstern, 149, 189

L

La Caille, 128
La Condamine, 34, 221, 224, pls. 5, 8
Lacus, defined, 3
Lacus Autumni, 245, pls. 4, 9
Lacus Felicitatis, 90
Lacus Mortis, 96, pls. 4, 9
Lacus Odii, 93
Lacus Solitudinis, 86, 154, 245, pls. 4, 9
Lacus Somniorum, 40, 96, 99, 244, pls. 4, 9
Lacus Veris, 245, pls. 4, 9
Lade, 205, 206, 213, pl. 6
Lalande A, 49
Lambert, 8, 110, 121, 125, *247*, 250–253, pl. 10
Lambert R, 110, pl. 8
Lamont, 115, 227, 235
Landau, 58, 158, pl. 6
Landslide, Apollo 17 landing site, *105*, 174, 176, 240, 269, *270*, *273*
Langemak, 5, pls. 4, 9
Langrenus, 167, 252–256, pl. 10
Lansberg, 221, 223, 272, pl. 9
Lansberg B and C, 223, 231, 265
Lassell, 40, pl. 5
Late Imbrian Epoch. *See also* Upper Imbrian Series
defined, 121, 196

Late Imbrian Epoch—Continued
duration, 245, 246, 279
impact rate, 246, 279
Latitude, equivalence in kilometers, 4, 98, pl. 1
Lava. *See also* Magma, Mare-basalt samples, Mare units
channels and tubes, 89, 92
flow lobes, 83, 86
Layered intrusions, 141, 143
Layering, effect on impacts, 40, 43, 44, 77, 78, 81
Lebedinskiy, 180, 184, pl. 8
Lee-Lincoln scarp, 105–107, 176
Leeuwenhoek, pls. 4, 7, 9
Leibnitz, 103, 160, pls. 4, 6, 9
Le Monnier, 109, 173, pl. 7
Letronne, 110, 221, 251, pl. 8
Le Verrier, 8, 32
Lexell, 253, pl. 10
Licetus, 216, pl. 6
Lichtenberg, 196, 265, 269–271, pl. 11
Light plains. *See* Plains
Limb, defined, 2, 4
Lindenau, 232, pl. 9
Lineated terrain, pre-Imbrian, 127, 205
Linné, 28, 265
Liouville DA, 117
Lithosphere, *12*, 77, 102, *115*, 145, 243–245, 259, 277–279
Littrow, 171–175
Lomonosov, 4, 76, 156, 191, 221, 222, pls. 4, 8, 9
Lomonosov-Fleming basin, *65*, 146, *148*, *156*, 179, 190, *191*, pls. 3, 6
Lunar Crater, India, 43
Longitude, lunar conventions, 2
Longomontanus, 74, pls. 7, 8
Lorentz basin, *59*, *64*, 72, 118, 147, 148, *158*, 179, 196, pls. 3, 6
Lower Imbrian Series, *193*, 279, pl. 8. *See also* Early Imbrian Epoch, Schrödinger, and Imbrium- and Orientale-basin headings
chronology, 224, 279
crater frequency, 130, 135, 160, 186, 197, 221, 222, 230, 246
crater materials, 130–136, *221*, 246, 279, pl. 8
definition and type area, 71, 121–123, *196*, 208
domes, 222–225
extent, 195, 279, pl. 8
mare materials, 223, 224, 232, 238, 279
plains materials, 156, 197, 198, 204, 208, *215*, 222, pl. 8
Lubieniezy, 256, pl. 7
Luna missions (U.S.S.R.), 12
Luna 3, 3, 12, 94
Luna 16
crater frequency and D_L values, 230
landing site, 12, 99, 101, *242*, pls. 2, 4, 9
samples, 101, 140, 237, *241*, 245, 276–279
spectral reflectance, 99
Luna 20
landing site, 12, 101, *167*, 214, *242*, pls. 2, 3, 7
samples, 82, 101, 140, 143, 144, *171*, 276–278
Luna 24
landing site, 12, 99, 101, pls. 2, 4, 9
samples, 101, 237, *241*, 245, 276–279
spectral reflectance, 99
Lunar Astronautical Charts (LAC), 124
Lunar grid, 107
Lunar Module (LM), 235, 259
Lunar orbiter, future, 280
Lunar Orbiter missions (U.S.A.), 5, 12, 57, 196
Lunar Orbiter photographs, types, 5, pl. 2
Lunar Receiving Laboratory (LRL), 23
Lütke, 47
Lyot, 7, 103, 226, pls. 4, 6, 9

M

Macrobius, 172, 175, pl. 8
Maestlin G, 255
Maginus, 74, 149, pl. 6
Magma
conduits and extrusion sites, 102, 103, 115, 240, 259
density, 102, 103, 241
differentiation, 102, 142, 143, 156, 157
fluidity, 86
fractionation, 102, 238, 243
high-Al, 102, 103, 241
high-Ti and low-Ti, 102, 103
mixing, 102
primary, mare, 102
primary, terra, 141
Magma ocean, 142, 143, 244, 277
Magma pods (ponds), 143
Magnesium, 98–101, 140–143. *See also* Mg suite
Magnetism, 168, 215, 256, 269, 280
Main sequence, craters, 27, 32
Mairan 34, pl. 9
Mairan domes, 222
Maksutov, pls. 4, 9
Manicouagan Crater, Quebec, 45
Manilius, 8, 9, 205, 252, 253, pl. 10
Manned Spacecraft Center (MSC), Johnson Space Center, Houston, Tex., 23
Mantle
composition, 102, 277, 280
density, 12

Mantle—Continued

- mare-source zones, 101, 238, 240, 259, 261, 276, 280
- origin, 102
- samples, 73, 80, 143, 278
- structure, 12, 13, 102, 103
- uplifts, 77, 102, 115, 120, 145, 240, 274–276
- Maraldi, 111, 172–175, pl. 7
- Maraldi B, 87
- Mare (pl., maria), 3, 19, 21, 83, 117, 229, 232–245, 249, 258–262, 269, pls. 4, 9–12. *See also* Mare-basalt samples, Mare units, and *lacus, mare, and sinus headings*
 - area, 3, 85
 - basin relations, 3, 85, 100–103, 115, 117, 145
 - defined, 3, 85, 86
 - elevations, 77, 78, 100, 115, 117, 120, 241
 - morphology and landforms, 85–93
 - origin and emplacement, 19, 21, 85, 86, 102, 276
 - thickness and volume, 12, 77, 99, 117, 190, 277
- Mare Australe, 7, 62, 103, 167, 223, 226, 233, 245, pls. 4, 9
- Mare-basalt samples, 19, 23, 101. *See also* Mare Crisium, Mare Fecunditatis, Mare Imbrium, Mare Insularum, Mare Nectaris, Mare Serenitatis, Mare Tranquillitatis, Palus Putredinis
 - ages, absolute, 235–245, 259, 261, 273, 278
 - Al-rich (high-Al), 101–103, 190, 200, 210, 238, 241, 242, 245, 279
 - Apollo 11, 19, 85, 96, 101, 224, 235, 245, 276–279
 - Apollo 12, 19, 23, 96, 101, 102, 249, 259, 276–279
 - Apollo 15, 19–23, 96, 101, 102, 237, 243, 276–279
 - Apollo 16, 96, 101, 237, 238, 245, 278
 - Apollo 17, 96, 101, 102, 239–241, 245, 276–279
 - classification, 101, 235, 239–242, 262
 - clasts in breccia, 101, 156, 190, 200, 210, 212, 278
 - compositions, 96–103
 - defined, 85, 101
 - density, 12
 - Eratosthenian. *See* Apollo 12 (above)
 - europium anomaly, 142
 - feldspathic, 101, 237, 241, 242, 245, 261, 278
 - high-K, high-Ti, 101, 237, 238, 245, 278
 - ilmenite, 235, 238, 261, 262
 - KREEP-rich, 156, 190, 198, 245
 - low-K, high-Ti, 101, 235–241, 245, 278
 - low-K, low-Ti, 101, 235–238, 278
 - Lower (Early) Imbrian, 224, 279
 - Luna 16, 96, 101, 237, 241, 245, 276–279
 - Luna 24, 96, 101, 241, 245, 276–279
 - mantle sources, 102, 103, 238, 240, 259, 261, 276, 280
 - Mg-rich, 242
 - mineralogy, 101
 - olivine (olivine-normative), 237, 239, 243, 245, 259–262, 278
 - pigeonite, 237, 243–245, 259–262
 - pre-Imbrian (Nectarian and pre-Nectarian), 190, 200, 212, 238, 278, 280
 - quartz-normative, 243
 - reduction, 101
 - terra-melt-rock samples, comparison, 101
 - textures, 23, 101, 102, 235–244, 259, 261
 - Ti-poor (low-Ti), 96, 101–103, 235–238, 245, 278
 - Ti-rich (high-Ti), 96, 101–103, 235–241, 245, 259, 262, 278
 - Upper (Late) Imbrian. *See* Apollos 11, 15–17 and Lunas 16, 24 (above)
 - very low titanium (VLT), 101, 102, 237, 242, 278
- Mare Cognitum, 86, 112, 120, 244, pls. 4, 9
- Mare Crisium, 4, 63, 78, 100, 103, 165–167, 172, 241, pls. 4, 5, 9
 - age, 230, 241, 245, 279
 - color (spectral reflectance) and composition, 96, 99, 241, 242, pl. 4
 - crater frequency and D_L values, 230, 231
 - cross section, 100
 - dark-mantling material, 89
 - diameter, 103, 117
 - elevation, 77, 78, 100, 117, 120
 - Mare Imbrium, comparison, 243
 - mascon, 99, 117, 241
 - peripheral “lakes” and eruption sites, 78, 103, 241, 259
 - samples, 241, 245, 276–279
 - stratigraphy, 100, 241, 243, pl. 9
 - structures, 117, 241, pl. 5
 - thickness, 99, 100, 103, 117, 241, 242
- Mare Fecunditatis, 119, 167, 241, pls. 4, 9
 - age, 241, 245, 279
 - color (spectral reflectance), 96, 99, 241, pl. 4
 - composition, 241
 - crater frequency, 230
 - diameter, 117, 241
 - elevation, 78, 117, 120
 - mascon, absence of, 99, 117
 - samples, 241, 245, 276–279
 - stratigraphy, 233, 241, pl. 9
 - structures, 115–119, 241, pl. 5
 - thickness, 99, 100, 103, 117, 242
- Mare Frigoris, 8, 96, 99, 125, 199, 204, 224, 243, 258, 279, pls. 4, 9, 10
 - basin-related trough, 81, 198, 243
- Mare Humboldtianum, 9, 61, 103, 117, 166, pls. 4, 9
- Mare Humorum, 61, 112, 117, 187, 244, pls. 4, 5, 9, 10
 - color (spectral reflectance), 96, 99, 244, pl. 4
 - dark-mantling material, 89, 116
 - mascon, 99, 117, 244
 - structures, 107, 112, 116, 117, 244, pl. 5

Mare Humorum—Continued

- thickness, 99, 100, 117
- Mare Imbrium, 8, 63, 83, 92, 99, 125–127, 193, 224, 231, 243, 247, 253, 258, 259, 272, pls. 4, 5, 9, 10. *See also* Palus Putredinis
 - age, 243–245
 - color and composition, 96, 99, 243, 244, 258, 259, 279, pl. 4
 - composition, 99, 244, 258, 259, 279
 - diameter and elevation, 117, 120
 - D_L values, 231, 243
 - flow lobes, 83, 86, 258
 - mascon, 99, 117, 243
 - stratigraphy, 94, 121, 125–127, 243, 247–253, 258, 259, 265, 269, pls. 9, 10
 - structures, 113, 117, 243, pl. 5
 - thickness, 100, 117, 243, 244
- Mare Ingenii, 6, 60, 216, pls. 4, 9
- Mare Insularum, 153, 259, 272, pls. 4, 9, 10
 - crater frequency and D_L values, 230, 259, 271–273
 - domes, 86
 - samples, 259, 276
- Mare Marginis, 4, 67, 76, 166, 191, 224, 245, pls. 4, 9, 10
- Mare Moscoviense, 59, 245, 257, pls. 4, 9
- Mare Nectaris, 1, 62, 164, 238, pls. 4, 5, 9
 - age, 245
 - color (spectral reflectance), 96, 99, 238, pl. 4
 - dark-mantling material, 89
 - diameter and elevation, 115, 117, 238
 - D_L value, 230
 - mascon, 99, 115, 117, 238
 - samples, 238, 245, 276, 278
 - stratigraphy, 233, 238, pl. 9
 - structures, 112–117, 238, pl. 5
 - thickness, 100, 103, 117
- Mare Nubium, 10, 96, 103, 112, 116, 117, 120, 153, 232, 244, 256, 258, pls. 4, 5, 9, 10
- Mare Orientale, 11, 62, 69, 77, 99, 103, 115, 117, 233, 245, pls. 4, 5, 9
 - name, 2
- Mare ridges (dorsa), 3, 8, 103, 107, 153, 277, pl. 5
 - age, 115
 - basin-ring markers, 110, 196
- Mare Serenitatis, 9, 61, 92, 108, 171, 174, 238, pls. 4, 5, 9, 10
 - age, 230, 241, 245
 - color (spectral reflectance), 96, 99, 239, 244, 245, pl. 4
 - crater frequency and D_L values, 230, 231
 - dark-mantling material, 89, 92–95, 239–241, 245
 - diameter, 117
 - elevation, 93, 117, 120
 - geologic maps, 94, 95, 174, 176, pls. 9, 10, 12
 - gravity structure (mascons), 79, 99, 117, 171, 239
 - landforms, 86, 90, 239
 - samples, 237, 239, 245, 276–279
 - sources, 259
 - stratigraphy, 19, 94, 95, 99, 238, 244, 245, pls. 9, 10
 - structures, 107, 117, 239, pl. 5
 - thickness, 99, 100, 117, 173, 239, 241
- Mare Smythii, 4, 7, 62, 116, 154, 245, pls. 4, 5, 9, 10
 - composition, 99, 103, 245
 - dark-mantling material, 89
 - diameter, 117
 - elevation, 115, 117, 120
 - Mare Orientale, comparison, 245
 - mascon, 99, 115, 117, 245
 - stratigraphy, 245, 259, pls. 9, 10
 - structures, 115–117, 245, pl. 5
 - thickness, 99, 103, 117, 245
- Mare Spumans, 78, 100, 241
- Mare Tranquillitatis, 9, 39, 114, 119, 172, 227, 235, pls. 4, 5, 9
 - color (spectral reflectance), 96, 99, 235, pl. 4
 - crater frequency and D_L values, 230, 235, 238
 - diameter, 117, 235
 - elevation, 93, 115, 117, 120
 - landforms, 86, 87
 - mascon, absence of, 99, 117
 - samples, 224, 235, 245, 276
 - stratigraphy, 233, 235, 238, pl. 9
 - structures, 39, 114–119, pl. 5
 - thickness, 99, 100, 117, 235, 238, 241
- Mare Undarum, 78, 100, 241
- Mare units. *See also* individual *lacus, mare, sinus, series, and system headings*
 - ages, 96, 102, 124, 125, 190, 223, 224, 229–262, 265, 269, 278–280, pls. 9–12
 - albedo, 94–96
 - aluminous, 98, 99, 241, 242, 245
 - basin relations, 223, 232–235, 238–245, 258, 259, 269, 276–280, pl. 4
 - buried, 156, 190, 243, 245, 278, 279
 - chemistry, orbital, 97, 139, 143, 156, 190, 198, 241, 245, 258
 - color (spectral reflectance), 86, 96, 235, 238–245, 258, 259, 262, 279–281, pl. 4
 - crater frequencies, 130, 136, 160, 229–235, 238, 252, 259, 271–273
 - D_L values, 130, 136, 230–233, 243, 259, 271–273
 - “eastern” and “western,” 259
 - eruption rates, 86, 238–241
 - extent, 86, 127, 232, 233, 277
 - farside, 3, 85, 103, 233, 245, 280, pls. 4, 9–12
 - flows, 83, 86, 127
 - geologic mapping, 86, 94, 95, 125, 174, 232, 236, pls. 4, 9–12

Mare units—Continued

- KREEP-rich, 156, 190, 245
- mapping properties, 86–99
- Mg-rich, 100, 241
- oldest, 76, 197, 223
- radioactivity, 96–99, 245, 259
- remote-sensing properties, 94–99
- sources, 102, 103, 240, 259
- stratigraphic relations. *See* Superpositions and individual *maria*
 - subdivision, 85, 86, 94–96, 232–235
 - thickness, 86, 99, 153, 238–241, 261
 - Ti-poor (low-Ti) and Ti-rich (high-Ti), 96, 99, 101–103, 235, 238–245, 258–262, pl. 4
 - youngest, 197
- Mare Vaporum, 86, 92, 99, 127, 214, 244, pls. 9, 10
- Marginis basin, 65, 148, 179, pls. 3, 6
- Marius Hills, 86, 88, 89, 244, 258, pl. 4
- Mascons, 77, 99, 100, 112, 115, 117, 171, 235, 238–245, 269, 277
- Mass wasting. *See* Downslope movement, Slumping, Talus, Terraces
- Massifs. *See* Basin materials
- “Material of Montes Apenninus,” 15, 73, 200–203, pl. 8
- Maunder, 30, 33, 40, 69, 76, 253, pl. 10
- Maunder Formation, 69, 76, 82, 164, 174, 198, 216, pl. 8
- Maupertuis, 34, 221, 224, pls. 5, 8
- Maurolycus, 155, 214, pl. 7
- Maxwell, pls. 4, 7
- McCauley, J.F., vii, 66–77
- McClure, 40
- Mechnikov, 180, 183, pl. 7
- Megaregolith, 45
- Megaterracing, 78, 79, 81
- Member, defined, 123
- Mendel-Rydberg basin, 11, 61, 64, 148, 178, 179, 186, 278, 293, pls. 3, 4, 7
- Mendeleev basin, 6, 59, 64, 85, 117, 120, 148, 179, 186, 188, 219, 230, 293, 25 pls. 3, 7
- Mercator, 112, pl. 7
- Mersenius, 180, 187, pls. 5, 7
- Messala, 166, pl. 6
- Messier and Messier A, 32, 38, 171, 173, 265
- Metamorphism
 - Apollonian, 212
 - shock, 45–48, 211
 - textures, 46, 141
 - thermal, 46, 157, 165
- Meteor Crater, Ariz., vii
- Meteorites, 101, 141, 142, 277. *See also* Projectiles
- Metius, 147, 180, pl. 7
- Mg suite, 141–144, 156, 157, 174, 201
- Middle Crescent Crater, 259, 261
- Milichius domes, 86, 87
- Milne, 5, 58, 65, 145–149, 154, pl. 6
- Minerals. *See also* Ilmenite, Olivine, Plagioclase, Pyroxene, Spinel
 - crustal, 140
 - mare-basalt, 101
 - minor, 101, 140
 - silica, 140
- Mixing models, 142
- Modal mineral (mode), defined, 102, 140
- Modification stage, craters, 43
- Moho (crust-mantle boundary), 12, 77–81, 102, 115, 120, 143, 229, 240, 245, 262, 274–278
- Mohorovičić A, 152
- “Moldings,” debris, 110, 111
- Mons (pl., montes), defined, 3
- Mons Rümker, 86, 244
- Montes Alpes, 8, 9, 81, 125, 198, 199
- Montes Apenninus, 8, 9, 13, 15, 22, 36, 81, 90, 108, 193, 197, pl. 8. *See also* “Material of Montes Apenninus”
 - crater frequency, 136, 197, 222, 230
 - samples, 19, 23, 49, 82, 140, 143, 144, 195, 198, 224, 278, 279
 - slumps, 81, 193, 198, 200
- Montes Archimedes, 113, 193, 198
- Montes Carpatum, 197, 198, 204, 207, 211, 272
- Montes Caucasus, 8, 9, 81, 198, 199, 202
- Montes Cordillera, 66–73, 76–81, 179, 197
- Montes Haemus, 9, 171, 174, 205, 218
- Montes Harbinger, 89, 91, 233, 251, 258
- Montes Recti, 224
- Montes Rhiphaeus, 90, 112, pl. 6
- Montes Rook, 66, 68–70, 73, 76, 77, 80, 171
- Montes Rook Formation, 69, 164, 168, 171–174, 203, pl. 8
- Montes Taurus, 171–176
- Monzodiorite, 140, 223, 269
- Moon
 - age, 156, 157, 277
 - astronomic properties, vii
 - comparative planetology, vii, 280
 - cooling and contraction (global), 115, 269, 280
 - geologic style, viii, 276, 277
 - global properties, 12, 13
 - origin, vii, 156, 157, 280
 - subsurface, 12–14, 274, 275
 - surface, 1–13
 - surface area, 180
- Moonquakes, 13, 115, 269, 280
- Moscoviense basin, 59, 64, 81, 82, 148, 171, 178, 179, 186, 245, 257, 293, pls. 3, 7
- Mösting, 128, 252

“Mug shot,” defined, 23
 Müller chain, 41, 115
 Multi-ringed basin, defined, 3. *See also basin headings and basins listed on p. 64*, 65, 148, 179
 Multispectral images, 99
 Mutus, 155, pl. 6
 Mutus-Vlacq basin, 65, 145–148, 155, 164, 179, 190, 244, pls. 3, 6

N

Nansen, 199, pl. 7
 Nearch, 147, 149, pl. 6
 Nearside
 defined, 2, 3
 mass offset, 103
 Nectarian Period
 defined, 121, 163
 duration, 157, 190, 278
 geologic history, 190, 191, 277–279
 igneous activity, 190, 277–279
 impact rate, 151, 157, 160, 180, 190, 191, 246, 277–280
 Nectarian System, 161, 278, 279, pl. 7
 basin materials, 161, 276–278, pls. 3, 7
 chronology, 190, 277–279
 crater frequency, 130, 136, 160, 178–180, 186, 191, 197, 230
 crater materials, 130, 136, 149, 180, 246, 278, pl. 7
 defined, 121–125, 163
 distribution, 163, pl. 7
 plains materials, 154–156, 163–167, 184, 188–191, 217, 219, 230, pl. 7
 structures, 278
 type area, 146, 147
 volcanic rocks, 190, 243, 278
 Nectaris basin, 1, 3, 62, 64, 146, 161, 179, 238, pls. 3, 5, 7, 12
 age, 168, 178, 179, 186, 190, 278
 composition, 143, 144
 crater frequency, 136, 160, 179, 197, 293
 deposits, 64, 161, 189, 219, 220, 232, pls. 3, 7, 12
 impact angle, 82
 impact melt, 164
 knobby terrain, 168
 mascon, 117, 238
 Orientale basin, comparison, 163, 164, 168
 radials, 7, 131, 143, 189
 rim and rings, 22, 36, 64, 81, 155, 163, 235, pl. 3
 samples, 82, 163, 216, 220, 276
 secondary craters, 36, 37, 64, 74, 131, 143, 161
 stratigraphic relations, 121–125, 131, 143, 161, 179, 189, 192, 235, 243, 276–280, pls. 3, 7, 12
 stratigraphic significance, 3, 121–125, 143, 145, 163, 280
 structures, tectonic, 112, 115, 117, 238, pl. 5
 Neper, 166, 180, pls. 4, 7, 9
 Nernst, pls. 5, 7
 Nicolai, 37, 164
 Nishina, pls. 4, 9
 Nomenclature
 petrologic, 12, 101, 102, 139–142, 156
 selenographic, 3
 stratigraphic, 121–125
 Nonproportional growth, of craters, 43, 44
 Norite, 140–142, 157, 174, 201, 203
 Normal albedo, defined, 94
 Normative mineral (norm), defined, 102
 North Complex, 91
 North Massif, 174, 175
 North Ray Crater, 165, 168–171, 269, 270, 273
 Nubium basin, 65, 103, 146, 148, 153, 179, 244, pls. 3, 6

O

Oceanus Procellarum, 11, 103, 115, 145, 153, 244, pls. 4, 5, 9–12
 color (spectral reflectance), 96, 99, 232, 244, 258, 259, 269, pl. 4
 crater frequency, 250–252, 266
 dark-mantling material, 89, 234
 elevation, 120
 landforms, 86, 89, 110
 localization factors, 103, 115, 145
 mascons, 99, 115, 244
 stratigraphy, 121–127, 135, 196–198, 232–234, 244, 250, 265, 269–271, pls. 9–12
 structures, 107, 110, 115, 118, 196, pl. 5
 thickness, 99, 100, 153
 Olbers and Olbers A, 197, 265, pls. 5, 7, 11
 Olivine, 101, 102, 140–142, 259
 Olivine (olivine-normative) basalt, 101, 237, 239, 242–244, 261, 278
 Ophitic texture, 23, 46, 174, 235
 Oppenheimer, 160, pls. 5, 7
 Orbital geochemistry. *See* Chemistry, orbital
 Orientale basin, 3, 11, 55, 196, 279, pls. 3, 8, 12. *See also* Hevelius Formation, Maunder Formation, Montes Rook Formation
 age, 178, 186, 196, 224, 245, 277, 279
 antipode, 67, 76
 central uplift, 69, 81
 concentric facies, 66, 73
 corrugated facies, 73, 76
 crater frequency, 135, 136, 197, 216, 219–222, 230, 293
 D_L value, 216, 230
 domical facies, 73

Orientale basin—Continued
 dunelike deposits, 67, 71, 130, 218
 exterior, 66, 81, 82
 fissured facies, 66, 73
 formation, 78–82
 geologic maps, 76, pls. 3, 8, 12
 global effects, 67, 72, 190, 216, 220, 223
 gravity structure, 77, 80, 117
 grooved facies, 67, 73
 impact angle, 82
 impact melt, 66–72, 76, 77, 82, 212
 interior, 68–73, 76–82
 mare fill, 190, 245, 279, pls. 4, 9. *See also* Mare Orientale
 massifs, 66, 69, 73, 79, 80
 model for basins, 65, 66, 73, 77–82, 279
 pitted terrain, 67, 71
 plains, 3, 71, 128, 164, 179, 182, 184, 190, 197, 204, 213, 224, 279, pl. 8
 radial facies, 73
 “rays,” 66, 74, 75, 127
 rings, 64–73, 77, pl. 3. *See also* Montes Cordillera, Montes Rook
 secondary craters, 32, 35, 66, 86, 127, 128, 151, 158, 159, 181–183, 188, 196, 205, 224, 225, 233, pls. 3, 8
 stratigraphic relations, 127, 128, 148, 158, 159, 179–183, 188, 196, 224, 225, 233, 277, pls. 3, 8, 12
 stratigraphic significance, 121–123, 195, 196, 221, 229, 279
 structures, tectonic, 117, 243, 245, pl. 5
 topography, 77, 280
 Orientale Group, defined, 66, 72
 Origin, meanings, 19, 21, 139, 163
 Orontius, 10, 20, 149, pl. 6
 Orthopyroxene, 140–142
 Oscillatory uplift, 78–81
 “Overturned flap,” ejecta, 42, 73

P

Palus, defined, 3
 Palus Putredinis, 8, 22, 113, 200, 243, pls. 4, 9
 age, 243, 244
 color and composition, 243
 crater frequency and *D_L* values, 136, 197, 230, 243
 elevation, 120
 samples, 243, 276–279
 Parry, 22, 208, pl. 7
 Partial melting, 101, 102, 140
 Paschen, 183, pl. 6
 Pasteur, 4, 120, 149, 154, 191, pl. 6
 Pauli, 5, pls. 4, 8, 9
 Pavlov, 5, pl. 7
 Peak rings, 28, 50, 58, 65, 77–81
 Peaks. *See* Basin materials, massifs; Crater materials, peak; Crater processes, peak formation
 Peirce, 100, 172
 Peirescius, 147, 149, pl. 6
 Period, defined, 123
 Petavius, 32, 58, 102, 113, 167, 232, pls. 4, 5, 8
 Petavius B, 252, 265, 267, pl.11
 Petrogenesis, early impacts, 157, 277
 Petrologic nomenclature, 139, 140, 156
 Philolaus, 252, pl. 11
 Phocylides, pl. 7, 8
 Photogeology, vii, 17, 72, 139, 143, 280
 Photographs
 identification scheme, 4, 5, pls. 1, 2
 lighting effects, 2, 86, 94, 110, 133–135, 173, 219–221, 250
 quality, 145, 265, 280, pl. 2
 resolution effects, 12, 13
 Picard, 100, 172, 241
 Piccolomini, 231–233, pl. 9
 Pictet, 20
 Pigeonite, 101, 102, 140, 243, 259
 Pigeonite basalt, 101, 102, 237, 243, 259, 278
 Pingré-Hausen basin, 65, 148, 179, pls. 3, 6
 Pitatus, 10, 116, 180, 215, pls. 5, 7
 Pitiscus, 164, 180, pl. 7
 Plagioclase. *See also* Anorthosite
 composition, 140, 142
 mare basalt, 101
 terra crust, 12, 140, 142
 textures, 23, 46, 141, 171
 Plains (light plains, terra plains), 3, 4, 10, 11, 21, 71, 113, 128, 131, 154–156, 164, 172, 184, 188, 197, 200, 204, 213, 215, 276, 279, pls. 7, 8, 12
 crater frequencies, 191, 197, 216, 219, 222, 230
 distribution, 3, 15, 21, 169, 190, 215, 217, 276, pls. 7, 8
 D_L values, 136, 216
 Imbrian, 15, 156, 191, 198, 208, 213–224, 279, pl. 8. *See also* Apennine Bench Formation; Cayley Formation; Imbrium basin, plains; Lower Imbrian Series, plains; Orientale basin, plains
 Nectarian, 154–156, 163, 164, 167, 184, 188–191, 217, 219, 230, pl. 7
 pitted, 146, 164
 pre-Nectarian, 146, 154, 156
 secondary-crater relations, 67, 71, 72, 128, 146, 164, 190, 213–220, 224
 volcanic, buried, 139, 146, 190, 191, 243, 245, 279
 Planck basin, 5–7, 59, 64, 103, 147, 148, pls. 3, 4, 6, 9
 Planetology, defined, vii

Planté, 8, pl. 10
 Plato, 8, 125, 221, 224, 231, 259, pls. 4, 9, 10
 Playfair and Playfair C, 10, 189, pls. 6, 7
 Plinius, 93, 253, pl. 10
 Plutonic rocks, 140–143, 156, 157, 278
 Pohn-Offield crater classification, 129–131, 143
 Poikilitic texture, 23, 46, 165, 168, 174, 177
 Poincaré basin, 6, 7, 59, 64, 103, 146, 148, pls. 3, 6
 Pontecoulant, 167, 180, pl. 7
 Posidonius, 9, 22, 93, 113, 231, pls. 5, 9
 Potassium, 98, 99, 102, 140, 190. *See also* KREEP; Mare-basalt samples, high-K, low-K
 Pratt model of isostasy, 143
 Pre-Imbrian (materials and time), 143–145, 196
 Pre-Nectarian period
 defined, 121–125, 139, 145
 duration, 157, 278
 geologic history, 156, 157, 277
 igneous activity, 139–143, 156, 157, 190, 277, 278
 impact rate, 151, 157, 160, 180, 191, 246, 277–280
 Pre-Nectarian system, 137, 277, 278, pl. 6
 basin materials, 139, 143, 178, 180, 277, 278, pls. 3, 6
 chronology, 156, 277, 278
 crater frequency, superposed, 130, 136, 145–149, 186, 197
 crater materials, 130, 136, 139, 145, 180, 186–189, 278, pl. 6
 defined, 121–123, 125, 139, 143, 145
 distribution, 139, pl. 6
 plutonic rocks, 141–143, 156, 157, 278
 recognition criteria, 145–147
 samples, 139–143, 156, 157, 163, 195
 structures, 139, 278
 type area, 146, 147
 typical terrain, 137
 volcanic rocks, 156, 190, 238, 278, 279
 Primary-impact crater, defined, 17
 Prinz, 91, 125, pl. 8
 Pristine rocks, 141–144, 156, 157
 Procellarian System, 124, 125
 Procellarum basin, 65, 103, 115, 120, 145, 153, pls. 3–6
 age, 157, 277, 278
 crust and lithosphere, 77, 103, 115, 120, 143, 235, 238–245, 259, 262, 278, 279
 depth, 80, 120, 143–145, 192
 hemispheric asymmetry, 103, 143, 145
 maria, 99, 103, 115, 145, 232–245, 259, 262, 278, 279
 rings and troughs, 65, 81, 103, 112, 115, 120, 145, 153, 171–173, 207, 227, 240, 243, 244, 278, pls. 3, 5
 structures, tectonic, 107, 112, 115, 145, 238, pl. 5
 volcanic filling, early, 156, 190, 211
 Procellarum Group, 125
 Proclus, 51, 172, 175, 265
 Projectiles
 basin association, 143
 density, 43, 47
 ejection, 41
 mass-frequency distribution, 18, 129
 melting, 40
 multiple, 19, 30–33
 penetration, 40–44, 81
 present-day, 280
 secondary, 29, 211
 size effects, 43, 77, 81, 177
 velocities, 17, 18, 29, 177
 Promontorium, defined, 3
 Proportional growth, craters, 43
 Protogoras, 204
 Ptolemaeus, 10, 32, 128, 155, 213, 219, pls. 6, 8
 Purbach, 10, 128, 149, pl. 6
 Pyroclastic material. *See* Dark-mantling material, Glass
 Pyroxene
 augite, 140, 143
 clinopyroxene, 101, 102, 140
 high-Ca, 97, 140
 low-Ca, 97, 102, 140
 orthopyroxene, 140–142
 pigeonite, 101, 102, 140, 243, 259
 textures, 23, 46, 141, 171, 177
 Pythagoras, 8, 196, 258, pl. 10
 Pytheas, 30, 121, 125

Q, R

Quartz, 140
 Quartz monzodiorite, 140, 223, 269
 Quartz-normative basalt, 102
 Rabbi Levi, 232, pl. 6
 Radar, 99, 100
 Radioactivity, 98, 99, 143, 190, 198, 212, 259, 280
 Ranger missions (U.S.A.), 12, 90, 125, pl. 2
 Rare-earth elements, 101, 140, 142. *See also* Europium anomaly, KREEP
 Raspletin, 31
 Rays, 249–257, 265–267
 albedo, 94–96, 249, 250, 256, 265–267, 279
 asymmetric, 32, 38, 39, 266
 basins, 74, 75, 82, 127
 fading, 95, 96, 249, 256, 279
 length, 3, 29
 offcenter relation to primary crater, 29, 30
 origin, 29–32, 42, 48

Rays—Continued
 primary-ejecta content, 48, 269, 270
 samples, 269, 270
 stratigraphic relations, 125–127, 249–252, 265–267
 Reduction, chemical, 101
 Regiomontanus, 10, 128, pl. 6
 Regolith (soil, surficial material), 12, 13, 95, 96
 age, 249
 agglutinates, 95, 96, 256, 266, 279
 albedo, 95, 96
 Apollo 11 landing site, 13, 235, 238
 Apollo 12 landing site, 259, 261, 269
 Apollo 14 landing site, 205
 Apollo 15 landing site, 13, 198, 243
 Apollo 16 landing site, 165, 168, 219, 220
 Apollo 17 landing site, 240, 241
 bedrock substrate, 12, 13, 21, 45
 blockiness, 99, 258
 breccia, 45
 buried, 238
 craters, 78, 132, 133, 258
 drainage, 269, 271
 formational rate, 280
 glasses, 95, 96, 101, 280
 Luna 16 landing site, 101, 241
 Luna 20 landing site, 171
 Luna 24 landing site, 101, 241, 242
 maturity, 95, 96
 origin, 17, 277
 sampling, 21, 249
 Surveyor 1 landing site, 258
 thickness, 12, 165, 205, 235, 239, 240, 258
 Reimar R, 147, 149
 Reiner, 258, pl. 10
 Reiner gamma, 256, 258, 269
 Reinhold, 253, 272, pl. 10
 Remote sensing, 94–99. *See also* Albedo; Chemistry, orbital; Color;
 Radar; Spectral reflectance
 defined, 86
 integration of types, 99
 Repsold and Repsold C, pls. 5, 6
 Residual liquids, 140
 Rheita, 147, 161, 164, 180, pl. 7
 Rhysling Crater, 243
 Riccioli, 67, 71, 197, pls. 4, 6
 Riccius, 37, 149, 214, 232, pl. 6
 Richardson, 156, pls. 4, 6, 9
 Ries Crater, Germany, vii, 43, 45, 73, 78, 165
 Rilles (rimae), 3, 86–93, 107, 167, 168, 239. *See also individual rimae*
 ages, 115, 127
 arcuate, 3, 107, 145
 distribution, 3, 107, 112, pl. 5
 sinuous, 3, 18, 77, 86, 200, 233, 247
 straight, 3, 107, 113, 127, 145, 167, 168
 Rima (pl., rimae), defined, 3
 Rima Bode II, 90, 115, pl. 5
 Rima Hadley, 13, 88, 91, 200, 201, 237, 243
 Rima Hyginus, 9, 50, 88, 90, 115, 118, 120, 127, 205, pl. 5
 Rima Sharp I, 117
 Rimae Ariadaeus, 115, 118, 220, pl. 5
 Rimae Cauchy, 115, 119, pl. 5
 Rimae Hypatia, 39, pl. 5
 Rimae Stadius, 30, 31
 Rimae Sulpicius Gallus, 93, 108, pl. 5
 Rimae Triesnecker, 115, 120, pl. 5
 Ringed basins. *See basin headings and basins listed on p. 64, 65, 148, 179*
 Ritter, 9, 32, 39, 113, pl. 8
 Rocca, 71, 180, pl. 7
 Roche, 5, pls. 4, 7
 Rock-stratigraphic units, 121–129. *See also* Basin materials, Crater materials, Mare units, Orientale Group, *and individual formations*
 defined and named, 123–125
 interfingering, 27, 121, 124
 lateral continuity, 17, 21, 27
 sample correlations, 21–23, 101, 139
 three-dimensionality, 17
 time-stratigraphic relations, 121–125
 Römer, 172, pl. 11
 Römer A, 173, 175
 Röntgen, 118, pl. 6
 Rosenberger, Rosenberger B, Rosenberger C, 147, 149, pl. 6
 Rothmann, 232, 233, pl. 10
 Rumford, pls. 4, 9
 Rümker hills, 86, 89, 244, pl. 4
 Rupes, defined, 3
 Rupes Altai, 131, 155, 164, 233
 Rupes Recta, 10, 115, pl. 5
 Rydberg, pl. 10

S

Sabine, 32, 39, 113, pl. 8
 Sacrobosco, 131, 149, pl. 6
 St. George Crater, 91
 Samples (material from Moon), vii, 17–23, 280. *See also samples listed on p. 168, 177, 200, 237, 253, 261*
 correlation with stratigraphic units, 21, 101, 139, 143, 276, 280

Samples (material from Moon)—Continued
 mare basalt, 101, 102, 276, 278
 numbering system, 23, 168, 177, 190, 200
 terra breccia, 21–23, 45–47, 139–143, 276–279
 10003, 236, 237
 10029, 236, 237
 10050, 235–238
 10062, 236–238, 245
 12002, 261
 12031, 261
 12032, 269
 12033, 269
 12038, 261
 12051, 23
 12065, 261
 14053, 190
 14063, 101, 190
 14066, 212
 14072, 190
 14073, 211, 212
 14161, 212
 14167, 212
 14276, 211, 212
 14306, 269
 14310, 23, 211, 212
 14321, 190, 210, 269
 15016, 244
 15382, 198, 200
 15386, 198, 200, 202
 15405, 269, 271
 15445, 23, 200, 201
 15455, 156, 200–203
 15538, 23
 15555, 244
 60025, 141
 60315, 170
 62195, 168
 67015, 171
 67016, 169
 67435, 141, 156
 67603, 169
 67667, 156
 68415, 220
 68416, 220
 72255, 156
 72275, 190
 72415–72418, 156, 157, 174
 72435, 178
 73215, 177
 73255, 156, 177, 178
 74001, 241
 74220, 241
 76215, 177
 76535, 141, 143, 156, 157, 174
 77215, 156, 174
 78236, 156
 Sarton, 158, 159, pl. 7
 Satellites craters, 30. *See also* Secondary-impact craters
 Saussure, 20
 “Scablands,” 86
 Scaling laws, impacts, 43, 81, 211, 212
 Schickard, 11, 128, pls. 4, 6, 9
 Schiller, 11, 32, 38, pl. 7
 Schiller C, 128
 Schiller-Zuechius basin, 11, 32, 38, 59, 64, 147, 148, 190, pls. 3, 6
 Schlesinger, 159, pl. 6
 Schlüter, 231, 232, pls. 4, 5, 9
 Schrödinger basin, 7, 59, 64, 67, 79–82, 148, 155, 179, 186, 222, 225, 279, 293, pls. 3, 5, 8
 Schwarzschild, 58, 65, 180, 199, pl. 7
 Sculptured hills, 174, 176
 Sechenov, 180, 183, pl. 7
 Secondary-impact craters, of basins. *See* Basin-secondary craters; Imbrium basin, secondary-craters; Nectaris basin, secondary craters; Orientale basin, secondary craters
 Secondary-impact craters, 3, 18, 19, 28, 125, 224, 226, 231, 247, 256–258, 276
 circularity, 29, 42, 130
 cratering process, 29, 31, 32
 endogenic hypotheses, 17, 29, 32
 formational sequence, 42, 48
 ground-surge relation, 42, 47
 impact velocities, 18, 29
 laboratory simulation, 31, 33
 primary-crater size, 29, 32, 211, 276
 primary-ejecta content, 42, 48, 276
 projectiles, 29, 42
 shock grades, 48
 size-frequency distribution, 29, 32, 129, 132, 276
 source direction, 125, 255
 spatial distribution, 18, 19, 29–35, 125, pls. 3, 6–11
 superpositions, 125–127. *See also* Superpositions
 target-structure influence, 29
 Seismic velocities, 12, 13, 205, 210
 Seismicity, 12, 13, 269
 Seleno-, vii
 Selenographic coordinates, 2
 Septa, 29, 32, 33, 37, 39, 214, 220
 Serenitatis basin, 3, 8, 61, 64, 93, 108, 109, 171, pls. 3, 5, 7
 age, absolute, 177, 190, 191, 278
 age, relative, 19, 173, 178–180, 190

Serenitatis basin—Continued
 antipode, 181, 215
 cross section, 82, 192, 240, 243, 276
 deposits, 174, pl. 7
 Imbrium-basin interaction, 81, 192, 198, 201
 mare extrusion, 103, 279
 mascons, 117, 171
 modification, 173
 Orientale basin, comparison, 171, 173
 rim and rings, 64, 81, 110, 117, 171, 218, pl. 3. *See also* North Massif, South Massif
 samples, 82, 143, 144, 157, 163, 173, 201, 278
 secondary craters, 172, 175
 stratigraphic relations, 148, 164, 173, 175, 179, 192, 235, 238, 243, 276, pls. 7, 12
 structures, tectonic, 108, 109, 112, 117, pl. 5
 Series, defined, 123
 Sharonov, pl. 11
 Sharp, 34, pl. 9
 Sherlock Crater, 270
 Shield volcanos, 86
 Shirakatsi, 47, pl. 10
 Shock compression and decompression, 40–42
 Shock grade, in ejecta, 41, 42, 45–48, 211, 212, 219
 Shock melting. *See* Impact melt
 Shock pressures, 40, 211
 Shock waves, 40–42, 45, 80, 81
 Shoemaker, E.M., vii, viii
 Shoemaker-Hackman stratigraphic scheme, vii, 19, 123–125, 143, 249, 265
 Shorty Crater, 237–240, 269, 270, 273
 Siderophile elements, 101, 141, 143, 157, 198, 202
 Sikorsky-Rittenhouse basin, 7, 65, 148, 179, 180, 278, pls. 3, 7
 Silberschlag, 118
 Silica
 mare basalt, 101, 102
 orbital detection, 98
 terra rocks, 140
 Sills, 101, 102, 276
 Sinuous rilles, 3, 18, 77, 86, 200, 233, 247
 Sinus, defined, 3
 Sinus Aestuum, 92, 244, pls. 4, 9
 Sinus Amoris, 172, 235, pls. 4, 9
 Sinus Asperitatis, 120, 235, 238, 244, pls. 4, 9
 Sinus Iridum, 8, 34, pls. 4, 9. *See also* Iridum crater
 Sinus Medii, 81, 86, 95, 115, 213, 244, pls. 4, 5, 9
 Sinus Roris, 99, 117, 222, 243, 258, pls. 4, 9, 10
 Size-frequency distributions. *See* Crater frequencies
 Slope material, 49, 96, 110, 111
 Slumping, 48, 51, 81, 193, 198, 200. *See also* Downslope movement, Megaterracing, Terraces
 Smoky Mountain, 165, 170, 219
 Smythii basin, 7, 62, 64, 77, 112–117, 146, 148, 154, 179, 245, pls. 3–6
 Soda (sodium), mare basalt, 101
 Soderblom-Lebofsky crater-dating technique, 133. *See also* D_L method
 Soil, defined, 12. *See also* Regolith
 South Massif, 105, 174, 175, 240, 273
 South Pole-Aitken basin, 11, 65, 115, 143–148, 152, 181, 245, 278, pls. 3, 6
 age, 157, 277, 278
 crust and lithosphere, 115, 143, 245, 278
 deposits, 146, 278
 elevation, 120, 145
 mare extrusion, 103, 115, 245, 278
 rim and rings, 65, 145, 181, pl. 3
 stratigraphic relations, 145, 148
 South Ray Crater, 165, 168, 170, 269, 270, 273
 Spacecraft impacts, 266
 Spaceflights, 12
 Spalling, 81
 Spectral classes, 96, pl. 4
 hDG-, 96, pl. 4
 HDSA, 96, 99, 258, pl. 4
 hDSA, 96, 99, 258, pl. 4
 hDSP, 96, 99, pl. 4
 HDWA, 96, 99, pl. 4
 hDWA, 96, 99, 239, 244, pl. 4
 LBG-, 96, 99, 244, pl. 4
 LBSP, 96, pl. 4
 LIG-, 96, 99, pl. 4
 LISP, 96, 99, pl. 4
 mBG-, 96, 99, 238, pl. 4
 mIG-, 96, 99, 244, 259, 262, pl. 4
 mISP, 96, 99, 239, 244, pl. 4
 sampling, 101, 262
 symbols, defined, 96
 Spectral reflectance, 96–99, pl. 4
 craters, 266
 dark-mantling material, 97–99, 240
 maria, 96–99, 232, 235, 238–245, 258, 259, 269. *See also individual maria*
 terra soil, 97
 Spinel, 140–143
 Spur Crater, 203
 Stadius chains, 30, 31
 Steady state, cratering, 129–135, 157, 230
 Stearns, 257, pl. 10
 Stebbins, 149, 159, pl. 6
 Steinheil, 147, 180, pl. 7

Steno Crater, 239
Steptoes, 86, 110
Stevinus, 252, pl. 11
Stiborius, 232, 233, pl. 9
Stillwater Complex, Mont., 143
Stöfler, 10, 216, pl. 6
Stone Mountain, 165, 170, 218, 219, 237
Straight Range, 224
Straight Wall, 10, 115
Stratigraphic code, 123–125
Stratigraphic column, 121–125, 280
Stratigraphic units, 17. *See also* Rock-stratigraphic units, Time-stratigraphic units, Time units, and individual formations, series, and systems
Stratigraphy, *vii*, 15, 121. *See also* Superpositions
 basin-mare distinction, 19
 crater interpretation, 17–19
 defined, *vii*
 nomenclature, 121–125
 regional context, 21
 Shoemaker-Hackman scheme, *vii*, 19, 123–125, 143, 249, 265
 terra-material interpretation, 19–21
Stratovolcanoes, 86
Stratton, 25, pl. 7
Strength crater, 43, 81
Structures, tectonic, 105, 277, pl. 5. *See also* Faults, Fractures, Mare ridges, Rilles
 Copernican, 115, 269, 271
 crater-floor, 113–118, pl. 5
 distribution, 107, 112–115, pl. 5
 Eratosthenian, 279
 farside, 245
 Imbrian, 238, 241–245
 lithospheric thickness, 115, 277
 maria and basins, 107–115, pl. 5
 pre-Imbrian, 139, 278
Struve L, 35
Subophitic texture, 23, 46, 165, 168, 174, 177, 202, 235
Suevite, 45, 46, 73, 165
Sulpicius Gallus, 93
Superpositions (superpositional relations), 17, 125
 basin-basin, 127, 145, 175, 178, 192, 196, 199, 222, 225, 235, 240, 243, 276, pls. 3, 6–8, 12
 crater-basin, 127, 135–138, 145–151, 154–168, 172–175, 179–191, 193–199, 202–208, 213–234, 274, pls. 6–8, 12
 crater-crater, 18, 25–27, 31, 34, 47, 48, 125, 149, 180, 185, 189, 191, 196, 224, 226, 248–253, 256, 266–268, 273
 mare-basin, 19, 21, 77, 85, 94, 95, 108, 109, 115, 121, 153, 165–169, 174, 193–200, 209, 223–227, 231–245, 259, 274–279, pls. 4, 12
 mare-crater, 18, 21, 76, 85, 99, 121, 125, 131–135, 191, 197, 200, 204, 205, 223, 226, 231–234, 238, 239, 247–261, 265–272, pls. 9–12
 mare-mare, 94, 95, 109, 110, 226, 231–245, 247, 254–262, 269
Surficial layer. *See* Regolith
Surveyor Crater, 259–261
Surveyor missions (U.S.A.), 12
 chemical analyses, 12, 85, 139
 landing sites, 12, 254, 258, 259, pl. 2
System, defined, 123
Szilard, 156, pl. 6

T

Talus, 89, 93
Tamm, 117
Taruntius, 113, 116, 119, 166, 190, 265, 269, pls. 5, 11
Taruntius H, 28
Taurus-Littrow Valley, 22, 171, 175, 239, 240, 273, 279
Tectonism. *See* Structures
Tektites, 45
Terminator, defined, 2
Terra (pl., terrae) (highlands, uplands), 3, 12, 19–23. *See also* Crust
 “backbone,” 10, 19, 244, 258, 262

Terra (pl., terrae) (highlands, uplands)—Continued
 defined, 3
 regional differences, 3
 volcanism, 21, 146, 190, 215, 222, 223, 280
Terra plains. *See* Plains
Terraces
 basins, 64, 78–81
 craters, 27–29, 43, 44, 48
Textures
 aphanitic, 23, 174, 177, 178
 breccia, 23, 45–47, 171, 174
 cooling-rate relation, 46, 102, 174, 259
 cumulus, 141–143, 174
 fragment-content relation, 46, 165, 174, 177, 212
 granoblastic and granulitic, 46, 157
 igneous, terra rocks, 23, 46, 47, 140, 141, 174, 198
 impact melt, 23, 46, 165, 174, 177
 intergranular, 165, 168
 intersertal, 23, 202, 238
 mare basalt, 23, 101, 102, 235–244, 259, 261
 metamorphic, 46, 141
 ophitic, 23, 46, 174, 235
 poikilitic, 23, 46, 165, 168, 174, 177
 seriate, 141, 171
 shock intensity, 45–47, 165, 211
 subophitic, 23, 46, 165, 168, 174, 177, 202, 235
 vitrophyric, 243
Thalassoid, defined, 3
Thebit, 128, pls. 5, 9
Theophilus, 45, 227, 235–238, 252–256, pl. 10
Thorium, 98, 99, 102, 140, 190, 198
Tidal bulge and deformation, 115
Timaeus, 204, pl. 9
Time-stratigraphic units, 121–125, 130, 133, 136. *See also* individual series and systems
 areal extent, 163, 195, 229, 249, 265, 276–280, pls. 3, 4, 6–12
 defined, 121–123
Time units, defined, 121–123. *See also* individual epochs and periods
Timiryazev, 180, 183, pl. 7
Timocharis, 8, 121, 125, 231, 250–253, pl. 10
Tisserand, 172
Titanium, 95–103, 243. *See also* Mare-basalt samples, Mare units
Tranquillitatis basin, 227, 238, pls. 3, 6
 mare fill, 103, 235, 238, 279, pl. 9
 mascon, 115, 117
 rings, 174, 235, pl. 3
 samples, 157
 stratigraphic relations, 103, 145–148, 179, pl. 6
 structures, tectonic, 112–117, 235, pl. 5
Transient crater, 43
Trask, N.J., 131–135. *See also* Crater dating, Trask's method
Triesnecker, crater and rille system, 115, 120, pl. 5
Troctolite, 140–143, 156, 157, 174, 201
True crater, 43
Tsander, 183, pl. 6
Tsiolkovskiy, 4–6, 47, 48, 120, 188, 231–233, 245, pls. 4, 9
Tsiolkovskiy-Stark basin, 65, 148, 245, pls. 3, 6
Tsunami mechanism, 78
Tycho, 1, 10, 20, 28, 265, 270, pl. 11
 age, 269, 270, 273, 278, 280
 albedo, 266
 crater frequency and D_L values, 252, 253, 266, 273
 impact melt and knobs, 28, 73, 76
 rays and secondary craters, 1, 20, 29, 32, 72, 125, 176, 240, 270, 273, 280
 stratigraphic relations, 20, 121, 125, 270, 273

U

Ukert, 193
Uniformitarianism, 19, 20, 265
Unnamed basin A. *See* Sikorsky-Rittenhouse basin
Unnamed basin B. *See* Coulomb-Sarton basin

Unnamed craters A and B, 219, 222
Upper Imbrian Series, 227, 279, pl. 9. *See also* Late Imbrian Epoch
 chronology, 245, 279
 crater frequency, 130, 135, 136, 160, 221, 222, 229
 crater materials, 130–136, 221, 222, 231, 246, 254–256, 279, pl. 9
 dark-mantling materials, 109, 174, 233–241, 244, 245, 269, 278, 279
 definition and type area, 121–123, 229–231
 D_L values, 125, 130, 136, 229–233, 243, 245, 249, 250, 273
 extent, 229, 279
 mare materials, 121, 125, 135, 160, 227, 252, 254, 256, 278, 279, pls. 9, 12. *See also* lacus, mare, and sinus headings
 structures, 245
Uranium, 98, 99, 140, 190

V

Vallis (pl., valles), defined, 3
Vallis Alpes, 113, 115, 116, 119, 204, pl. 5
Vallis Bohr, 35
Vallis Bouvard, 70, 73, 163, 187, 213
Vallis Palitzsch, 167, pl. 7
Vallis Rheita, 147, 161, 163, 164, 167
Vallis Schröteri, 91
Van de Graaff, 6, 39, 120, 180, 216, pls. 4, 7, 9
Van den Bos, 117
Vega, 147, 149, pl. 6
Vendelinus, pls. 4, 6
“Very high alumina (VHA) basalt,” 141, 165, 168
Very low titanium (VLT) basalt, 101, 237, 242, 278
Viscous relaxation, 113, 115
Vitello, 113, 116, 187, pls. 5, 8
Vitello Formation, 214
Vitruvius, 86, 175, 221, pl. 9
Vitruvius front, 171, 175
Vlacq, 147, 155, pl. 6
Volatiles, 101, 102, 243, 245, 277
Volcanic craters. *See* Endogenic craters
Volcanic plains, buried, 139, 156, 164, 190, 215, 232, 233, 238, 243, 245, 266, 276–281
Volcanic rocks. *See also* KREEP basalt, Mare-basalt samples
 Nectarian, 190, 243, 278
 pre-Nectarian, 156, 190, 243, 278
Volcanism, 19. *See also* Magma and mare headings
 eruptive styles, 86–89
 rates, 190, 238, 240, 241, 245, 278–280
 terra, 21, 146, 190, 215, 219, 222, 223, 280
Volcanotectonic craters, 32
Volta, pls. 5, 6
Von Kármán and Von Kármán M, 103, 160, pls. 4, 6, 9

W, X, Y, Z

W. Bond, 9, 199, 204, pl. 6
Wallace, 231
Walter, 10, pl. 7
Wargentín, 11, 72, pls. 7, 8
Water, 101
Waterdrop experiments, 80, 81
Werner, 10, 48, 127, 128, 155, 189, 253, pl. 10
Werner-Airy basin, 65, 145, 148, 155, 179, 244, pls. 3, 6
West Crater, 235–238, 270
Wrinkle ridges. *See* Mare ridges
X-ray-fluorescence spectrometer, 97–100
Young D, 147, 180, pl. 7
Zagut, 232, pl. 6
Zeno, 166, 171, pl. 7
Zero phase, 94
Zhukovskiy, 180, 184, pl. 7
Zond missions (U.S.S.R.), 12, 145
Zucchiús, 38, pl. 11