

Index

- A horizons, 30–31, 38–39, 422, 491–492, 617
- A index, 563
- Absorbed soil water, 85
- Accelerated erosion, 451
- Accelerator mass spectrometry (AMS), 582–583
- Accreting zones, 449
- Accretion gley, 505
- Accumulation index, 549, 551–552
- Accuracy in dating, 577
- Acid ammonium oxalate extraction, 428–429
- Acid dissociation constant, 72–73
- Acid sulfate soils, 433–435
- Acidification, 324, 336, 341, 346, 421
- Acidocomplexolysis, 325
- Acids, metals as, 74
- Acids, organic, 74
- Acids in soils, 71–74
- Actinolite, 167
- Actinomycetes, 99, 329
- Active layer, 257, 264
- Additions to soils, 300–302, 308
- Adsorbed soil water, 85
- Adsorption isotherms, 82–83
- Adsorption reactions, 82–84
- Aeroturbation, 233–234, 238
- Afton paleosol, 505–514
- Agric horizons, 119, 280
- ²⁶Al, 594–596
- Albans, 486–487
- Albedo, 91
- Albic horizons, 119, 123, 422
- Albic neoskeletans, 486–487
- Albite, 173, 175
- Alfisols, 122–123, 337–346
- Algae, 95
- Alkalinity, 74–75
- Alkalinolysis, 326
- Alkalization, 326, 404–405
- Allitization, 325
- Allophane, 218, 423–427
- Alluvial soils (1938 classification system), 117, 124
- Alluviation, 323
- Alluvium, 199–202
- Almandine garnet, 167
- Alpine Meadow soils (1938 classification system), 116, 124
- Alpine soils, 293–297
- Aluminum oxide minerals, 51–52, 69–70
- Amino acid racemization, 527
- Amoebae, 102
- Amphibians, 100
- Amphiboles, 56–58, 507, 561–562
- Amphipods, 100
- Anatase, 167, 364
- Andalusite, 167
- Andisols, 122–123, 216–218
- Andic properties, 123
- Anion exchange capacity, 77
- Anion exchange reactions, 82
- Andisolization, 324
- Ando soils, 124
- Anecic earthworms, 105
- Anomalous fading, 603–604
- Anthric saturation, 481
- Apatite, 55, 167
- Apparent water table, 479–490
- Anthropic epipedon, 119, 123, 298
- Anthrosols, 297–300
- Anthroturbation, 233–234, 279–280, 297–300
- Ants, 100, 240–241, 244
- Ap horizons, 38–39
- Apatite, 167
- Aquaturbation, 233–234
- Aquic conditions, 121, 479–490
- Arboturbation, 252
- Archaea, 95
- Arenization, 184, 190, 325
- Argillans, 339–343, 551, 624–625
- Argillation, 338
- Argillic horizons, 119, 123, 337–346, 377
- Argilliturbation, 65, 233–234, 269–279
- Argilluviation, 327, 337
- Aridisols, 122–123, 375–419, 494–496, 619
- Arthropods, 102–103
- Artifacts, human, 236–237, 246–247, 250, 411, 518, 521–525
- Ash, volcanic, 216–218
- Aspect, slope, 463–467
- Associative pedogenesis, 323
- Augite, 167, 561
- Autotrophic bacteria, 97
- Azonal soils, 113–114, 117
- B horizons, 30–33, 39–40, 422
- Degraded, 39
- B index, 563
- Bacteria, 97–99, 329
- Barrier islands, 201–202
- Basalt, 189–190, 192
- Base cations, bases, 71–75, 79–82, 172, 192, 332–338, 341–342, 364–366
- Base cycling, 192, 332, 336–337, 347–348, 431
- Basin and Range province, 382–383
- Bauxite, 184, 186–187
- Bayerite, 51–52
- ¹⁰Be, 180, 596–599, 615–616
- Bees, 100
- Beetles, 100
- Beidelite, 60–61, 65
- Beta horizons, 342–343
- Biocrusts, 415–416
- Biocycling, 308, 323, 333–336
- Biogeochemical cycling, 323, 333–336
- Biological weathering, 170–171, 175–176
- Biomantles, 224, 236–238, 248, 516–525
- Biomechanical soil processes, 287, 456–459, 516–525, 639
- Biopores, 19
- Biosequences, 291–292
- Biotite, 60–63, 167, 173, 190, 192
- Bioturbation, 38, 185–186, 233–235, 238–254, 456–457, 523–525
- Birds, 100, 107
- Birkeland, P. v., 445, 640
- Bisequal soils, 33, 40, 348–349
- Bishop ash, 581–582
- Bisiallization, 325
- Black soils (Canadian system), 145
- Black alkalai soils, 403
- Block diagrams (of soil landscapes), 155
- Blocky structure, 21–22
- Bog soils (1938 classification system), 116, 124
- Boehmite, 51–52, 54, 186
- Bomb carbon, 589–590
- Bomburbation, 233–234, 280–281
- Boreal forest, 261
- Boulders, 9–10
- Bowl and chimney morphology (Vertisols), 273–277
- Braunification, brunification, 322, 326, 362–363, 374–375, 431–432
- Breccia, 191
- Bristletails, 100
- Brown soils (Canadian system), 145
- Brown Forest soils (1938 classification system), 117, 124
- Brown Podzolic soils (1938 classification system), 115, 124
- Brown soils (1938 classification system), 115, 124
- Brunhes-Matuyama boundary, 501, 578
- Brunisolic soils (Canadian system), 145
- Brunizems, 125
- Bulk density, 19, 251, 349–350, 439–440
- Buntley-Westin index, 554
- Buried soils/paleosols, 40, 42, 607–608
- ¹³C, 614, 627–633
- C horizons, 30, 33, 40–42, 181–182, 639
- C3 pathway, 629, 635
- C4 (Hatch-Slack) pathway, 629, 635
- C:N ratio, 331

- Calcic horizons, 120, 123, 377–381, 385–391, 495–496
- Calcification, 268, 323, 338, 377–395
- Calcified filaments, 392–393
- Calcisols, 124
- Calcite, 167, 173, 195–198
- Calcium carbonate, carbonates, 55, 124, 250
- Calcium Carbonate Solonchaks, 124, 402
- Calibrated ages, 526, 584
- CAM pathway, 629
- Cambic horizons, 120, 123, 330, 377, 431
- Canopy interception, 460–461
- Capillary fringe, 377
- Carbonate stages (in soils), 385–391
- Carbonates, 375–384
- Dating using radiocarbon, 591–592
- ¹³C content and fractionation, 631–633
- Carbonation, 378–379
- Carbonic acid, 73–74, 173, 175, 380
- Carboxyl groups, 74, 78–79
- Carpetolith, 514
- Catenas, 153, 290–291
- Cation exchange capacity, 63, 76, 79–82, 363–365, 491
- Cation exchange reactions, 80–81
- Cations in soils, 72
- Cation ratio dating, 419, 531, 543
- Canadian System of Soil Classification, 144–145, 338
- Carbon sequestration, 332–333
- Carbonate minerals, 55
- Carbonate pendants, 389
- Catenas, 493–500
- Catena concept, 452–455
- Celadonite, 60–61, 63
- Cemented horizons, 25
- Cenozoic era, 500
- Centipedes, 100
- Channers, 10
- Chelates and chelation, 75–76, 175, 326
- Chelate-complex model, 424–427
- Cheluviation, 328, 424–427
- Chemical index of alteration, 563
- Chemical index of weathering, 563, 610
- Chemical proxy of alteration, 563, 610
- Chemical weathering, 172–178, 325, 367, 425
- Chemisorption, 82
- Chernozems (1938 classification system), 115, 124
- Chernozemic soils (Canadian system), 145
- Chert, 191
- Chestnut soils (1938 classification system), 115, 124
- Chloride minerals/salts, 55, 375–377, 395
- Chlorite, 61, 64–66, 621–624
- Chloritization, 327
- Chronofunctions, 36, 288–290, 315–316, 569–577
- Chronosequences, 288, 312, 426, 432–433, 568–577
- Chronostratigraphic unit, 526
- Chrysotile, 62
- ³⁶Cl, 592, 594–596
- Clast sound velocity dating, 531, 535
- Clay, 11, 337–346
- Clay accumulation index, 559
- Clay domains, 340
- Clay-free particle size fraction, 226–227
- Clay minerals/mineralogy, 11–12, 531, 620–624
- Cleavage, 168
- Climosequences, 292–297, 621–623
- Clods, 19
- Coagulation. *See Flocculation*
- Coalluvium, 221
- Coarse fragments, 9–12, 227, 232, 236–238, 254, 278–279, 328–329, 387
- Coastal plain deposits, 201–202
- Cobbles, 9–10
- Cockroaches, 100
- COLE, 20, 269, 353
- Collembola, 37
- Colluviation, 219, 453
- Colluvium, 219–223
- Columnar structure, 21–22, 405, 497
- Complex soils, 436
- Compound soils, 436
- Conceptual models of pedogenesis, 283–319
- Conglomerate, 191
- Congruent dissolution, 172
- Consistence, 22
- Constructional surfaces, 447
- Coordination number, 51
- Corrasion, 165
- Correlated age methods/dating, 528–529
- Cosmogenic nuclides – dating, 592–598
- Cratermakers, 239
- Cratons, 187
- Crickets, 100
- Cross-dating (of tree rings), 546–548
- Crumb structure, 20
- Cryoturbation, 233–235, 255–269
- Cryostatic suction, 256
- Crystallurbation, 233–234, 281–282
- Cumulization, 183, 212, 324, 435–437, 523
- Cutans, 15–16, 22, 24–25, 328, 427–428, 624–625
- Cyanobacteria, 95–96
- Cyclosilicates, 56
- d*-spacing, 66–69
- D horizons, 30, 43, 45, 181
- Daddy longlegs, 100
- Darcy's Law, 89
- Dark Brown soils (Canadian system), 145
- Dark Gray soils (Canadian system), 145
- Darwin, C., 4–5, 236, 516–517, 640
- Dealkalization, 326, 405–406
- Debris flux, 453–460
- Decalcification, decarbonation, 40–41, 325, 336, 341
- Decomposers, 99, 103–104
- Decomposition (chemical weathering), 172–178, 325
- Decomposition, litter, 104
- Deflation, 202
- Deforestation, 298
- Degradation of argillic horizons, 346–350
- Degraded Chernozems (1938 classification system), 115, 124
- Deltas, 202
- Dendrochronology, 527, 546–548, 585
- Dendrogeomorphology, 546–548
- Denitrification, 147
- Denudation, 180
- Depodzolization, 326, 429
- Depth plot, 14, 22–23
- Desalinization, 326, 404–405
- Desert pavement, 268, 409, 411–415, 531, 533–534
- Desert Project, The, 385–390
- Desert soils (1938 classification system), 115, 124
- Desert varnish. *See Rock varnish*
- Desilication, 325, 367, 371–375, 559
- Deterministic chaos, 318–319
- Developmental upbuilding, 304–309, 324, 435–437, 523
- Diagnostic horizons, 118–121, 123
- Diaspore, 51–52, 54
- Dickite, 59–61
- Differential thermal analysis, 70
- Diffractograms, X-ray, 67–69
- Diffusion coefficient, 93
- Digital soil mapping, 157–159
- Diapirs, 262–263
- Diffuse layer, 341
- Dilation, 166, 186, 324, 439, 553
- Diocahedral sheet, 59–66
- Diopside, 167
- Diorite, 189, 192
- Diplurans, 100
- Dirt cracking, 171
- Disintegration (of rocks), 166–172, 325
- Dispersion, 340–341
- Dissociative pedogenesis, 323
- Dokuchaev, V., 4–5, 113, 284–285, 306, 640
- Dolomite, 55, 191, 195–198
- Dose rate (in luminescence dating), 600–602
- Drainage classes. *See Soil drainage classes*
- Drainage index, 142, 147, 162–163, 489–490
- Dunes, 203–206, 496–497
- Dunite, 192–193
- Duricrust, 372–374
- Duripans, 121, 123, 396–398

- Dust, eolian, 215–216, 382–384, 393, 410–411, 494–498
- Dynamic Denudation, 516–522
- Dystric Brunisols (Canadian system), 145
- E horizons, 17, 30, 39, 328, 336–346, 422, 426, 492
- Earthworms, 35–38, 100, 104–106, 241–244, 246–247, 518–520
- Earthworm middens, 106
- Earwigs, 100
- Eccentricity of the orbit, 501–502
- Ectomycorrhizae, 176
- Edge effect, 488
- Electrical conductivity, 399
- Elementary soil areal, 160
- Eluvial/illuvial coefficient, 568–569
- Eluviation, 39, 322–323, 327–328, 343–344
- Enchytraeid worms, 100
- Endogeic earthworms, 105
- Endosaturation, 479–490, 484–487
- Energy dispersive X-ray analysis, 26, 419
- Energy model, 302–304, 490
- Entisols, 122–123, 377
- Eolian sand, 203–206
- Eolian systems, 202–215
- Epigeic earthworms, 105
- Epidote, 167, 561
- Epimorphic processes, epimorphism, 459
- Epipedons, 118
- Episaturation, 480–490
- Erosion, 178–180, 411–413
- Erosional surfaces, 447, 511–517
- Estuaries, 202
- Eukaryotes, 95
- Eutric Brunisols (Canadian system), 145
- Excessively drained soils, 482–483
- Exfoliation, 166
- Exhumed paleosols, 607–608
- Exudates, root, 96
- Factorial model of soil development, 5–7, 284–293
- Factors of Soil Formation*, 5
- Faunalturbation, 233, 239–252
- Fairy circles, 103
- Fe concentrations, 358, 483–485
- Fe depletions, 358, 483–485
- Fe nodules, 486–487
- Feedbacks in soil systems, 308–317
- Feldspars, 56, 58, 188–190, 507, 561–562
- Ferrallitization, 324, 368–371, 374–375
- Ferriargillans, 486–487
- Ferrans, 486–487
- Fericrete, 372–374, 518
- Ferrihydrite, 53, 70, 366
- Ferrimagnets, 626
- Ferripyrophyllite, 6
- Ferritization, 326
- Ferrollysis, 327, 343, 358–361
- Ferro-Humic Podzols (Canadian system), 145
- Ferrugination, 326, 374–375
- Fersialitization, 325, 374–375
- Fibric materials, 35
- Fibrisols (Canadian system), 145
- Fick's Law of Diffusion, 93
- Field capacity, 87
- Fine earth fraction, 9–13
- Fission track dating, 527
- Flagstones, 10
- Flaking, 166
- Flatworms, 100
- Flocculation, 340–341
- Floralturbation, 233–234, 252–254
- Flux density, 19
- Folisols (Canadian system), 145
- Folistic epipedon, 119, 123
- Folists, 199, 331–332
- Food web, soil, 97
- Forams, 503–504
- Fragipans, 121, 123, 346–356
- Freeze-thaw activity, 168, 170, 255–269
- Freezing front, 94, 255
- Frost heave, 257
- Frost-pull process, 256
- Frost shattering, 170
- Fulvic acid, 329, 424–427
- Fungi, 99–101, 176, 329, 392–393, 418–419
- Gabbro, 189–192
- Garnet, 167, 561–562
- Gas tortuosity factor, 93
- Gastroliths, 236
- Gelic materials, 121, 123, 263
- Gelifraction, 170
- Gelisols, 122–123, 255–269, 420, 606, 619
- Geoarchaeology, 521–525
- Geochronometric unit, 526
- Geographic information systems, 147–148, 490
- Geologic erosion, 451
- Geomorphic surface, 446–452, 526–529
- Geopedology, 3
- Geophagy, 66–67
- Geosols, 42, 526
- Geostatistics, 159–160
- Gibbsite, 51–52, 54, 167, 186, 188–189, 364–366, 621–623
- Gilgai, 271–273
- Gilman Canyon Formation, 508, 630
- Glacials, 502–503
- Glaciation and glacial geology, 501
- Glacic horizons, 120
- Glacier Peak ashfall, 581–582
- Glauconite, 60, 63
- Gleization, 326
- Gleyed conditions, 17, 358, 483–488
- Gleysols (Canadian system), 145
- Gleysolic soils (Canadian system), 145
- Gleyzation, 326
- Glinka, K., 5
- Glossic horizons, 120, 343, 346–348
- Gneiss, 190–191
- Goethite, 52–54, 175, 188, 364–366, 370–371, 621–623
- Grade (soil structure), 20
- Grainy gray ped coatings, 486
- Granite, 190–192
- Granular structure, 20–21, 333, 366
- Grasshoppers, 100
- Gravel, 9, 227
- Gravimetric water content, 85–86
- Gravitational potential, soil water, 86–87
- Gravitational water, 87
- Graviturbation, 233–234, 278–279
- Gray Brown Luvisols (Canadian system), 145
- Gray Luvisols (Canadian system), 145
- Gray Wooded soils, 124
- Gray-Brown Podzolic soils (1938 classification system), 116, 124
- Great period (in lichen growth), 544
- Gross precipitation, 460–461
- Ground ice, 256
- Groundsurface, 449
- Groundwater, 477–479, 493–494
- Groundwater Laterites (1938 classification system), 117, 124
- Groundwater Podzols (1938 classification system), 116, 124
- Grumosols, 124
- Grus, 192
- Gumbotil, 505
- Gypsic horizons, 120, 123, 377, 393–395, 495–496
- Gypsification, 327, 393–395
- Gypsum, 55, 167, 191, 380, 384–385, 393–395
- Half Bog soils (1938 classification system), 116, 124
- Halloysite, 61–62, 64, 188, 621–624
- Haploidization concepts, 307–311, 323
- Harden index. *See Profile development index*
- Harvestmen, 100
- ³He, 592, 594–596
- Head slope, 451
- Heat flow/transport, 91–92
- Heavy minerals, 227
- Hectorite, 61
- Henry's Law constant, 73
- Hematite, 52–54, 167, 189, 364–366, 370–371, 623
- Hemic materials, 35
- Hemlock, 429
- Henderson-Hasselbalch equation, 72–73
- Heterotrophic bacteria, 97
- Hilgard, E., 5
- Histic epipedon, 119, 123
- Histosols, 122–123, 198–199, 330–332, 500

- Hjulstrom diagram, 200
 Hole, F. v., 232, 336, 548, 640
 Holocene, 503
 Horizonation concepts, 307–311, 323
 Hornblende, 57–58, 167, 190, 192, 561–562
 Hornblende etching, 531, 541–542
 Huckleberry Ridge (Yellowstone) ashfall, 581–582
 Humic acids, 329, 424–427
 Humic Ferruginous Latosols, 124
 Humic Gley soils, 124
 Humic Gleysol soils (Canadian system), 145
 Humic Latosols, 125
 Humic Podzols (Canadian system), 145
 Humification, 36–38, 268, 326, 328–330
 Humisols (Canadian system), 145
 Humo-Ferric Podzols (Canadian system), 145
 Humped soil production function, 178–180
 Humus, 38, 329–333
 Humus index, 35
 Hurst index, 554
 Hydric soils, 477–493
 Hydroconsolidation model, 353
 Hydrolysis, 173
 Hydromorphism, 326
 Hydrophilic ions, 71
 Hydrostatic potential, 89–90
 Hydrous mica, 63, 167
 Hydroxy-interlayered vermiculite and smectite, 61, 64–66, 69
 Hypersthene, 167
 Hyphae, fungal, 176
 Hysteresis effect, 88
- I/E index, 340
 Ice crystal growth, 168
 Ice segregations, 255–256, 265
 Ice wedges, 257–261
 Illimerization, 325
 Illite, 60–61, 63, 80, 621–623
 Illuviation, 39, 322–323, 327–328
 Ilmenite, 167, 364, 439–442, 561
 Imogolite type materials (ITM), 423–427
 Impacturbation, 233, 281–282
 Imperfectly drained, 482
 Inceptisols, 122–123
 Incongruent dissolution, 172
 Index B, 563
 Index of desilication, 559
 Index minerals, 439–442, 561–568
 Index of profile anisotropy, 557
 Infauna, 236
 Infiltration (of soil water), 88–90, 366, 454–455, 460–461, 491
 Inosilicates, 56–58
 Insects, 100
 Insolation weathering, 170
 Interflow, 461
 Interglacials, 502–503
 Interlayer hydroxy polymer, 61
 Interlayer K, 61, 63, 80
 Interlayer Mg, 61, 63
 Interlayer water, 61, 65
 Interstadials, 502
 Intrazonal soils, 113–114, 116–117
 Ion activity product, 84
 Ionic bonding, 50
 Ionic potential, 172, 562
 Iowa, 504–517
 Iowan erosion surface, 505, 511–514, 530
 Iron oxide minerals, 52–54, 69–70
 Ironstone, 372–374
 Irrigation, 298
 Isolated paleosols, 607–608
 Isomorphous substitution, 59–66, 76
 Isopods, 100
 Isoquartz, 438–440
 Isotopes in soils, 383
 Isovolumetric weathering, 439
- Jarosite, 55, 433–435
 Jenny, H., 4–5, 285–288
 Johnson, D. v., 517, 640
- K cycle, 449–450
 K horizons, 378
 K-Ar dating, 385
 K-feldspar, 56, 58, 167, 192
 Kandic horizons, 120, 123, 338
 Kaolinite, 59–61, 64, 69, 76–77, 80, 167, 186–190, 364, 621–624
 Kaolinitization, 325
 Karst, 174
 Kauri, 429
 Kellogg, C., 515
 Krotovinas, 241–242, 244
 K_{sat} , 89
 Kyanite, 167, 561–562
- L horizons, 30
 Lacustrine deposits, 200–201
 Lag concentrate, 183, 411–413, 511–514
 Lamellae, 121, 206, 344–346
 Lapilli, 216
 Laser diffraction, 13–15
 Laterite, 187, 189, 372–374
 Laterite soils (1938 classification system), 116, 125, 367–374
 Laterization, 325, 368–374, 500
 Late Sangamon Erosion Surface, 506–514
 Latosolic Brown Forest soils, 125
 Latosolization, 324, 368–371
 Latosols, 125, 188
 Lava, 216
 Lava Creek ashfalls, 581–582
 Layer charge, 59–66
 Layer silicates, 56–69
 Leaching, leached zone, 40–41, 143, 302–304, 323, 334–337, 340–341, 375–377, 464, 531
 Lead profile dating, 419
- Legumes, 99
 Lepidocrocite, 52–54, 366, 370
 Lepidolite, 60
 Lessivage, 325, 337–346
 Leucinization, 326, 336–337, 343–344
 Lichen, 95–96, 98, 176
 Lichenometry, 527, 531, 533, 543–546
 Ligand, 75
 Limestone, 191, 195–198
 Limonite, 188
 Liquid phase in soils, 71
 Lithofunctions, 288–289
 Lithologic discontinuities, 33–34, 41, 90, 222–231, 342–343, 351–354, 618–619
 Lithosequences, 288–290, 431–432
 Lithosols (1938 classification system), 117, 125
 Lithotrophic bacteria, 98
 Litter, 35–38
 Litter interception loss, 460–461
 Littering, 326, 328–330
 Lixivation, 324
 Lizardite, 59, 62
 Loess, 206–216, 225, 352, 436, 506–514
 Loess Plateau, Chinese, 211, 501, 627
 Loveland Loess, 505–513
 Low Humic Gleys, 125
 Low Humic Latosols, 125
 Low molecular weight organic acids, 424–427
 Luminescence dating, 458, 527, 587, 598–604
 Luvisols (Canadian system), 145
 Luvisols, Luvisolic soils, 145
- M horizons, 30, 518–522
 Macrofossils (of plants), 636–637
 Macropores, 19
 Mafic rocks, 190–191
 Maghemite, 364–366, 370
 Magnetic susceptibility, 227, 567, 613, 625–627
 Magnetite, 53–54, 167, 561
 Magnetostratigraphy, 578
 Mammals, 100, 107
 Manganese oxide minerals, 54–55
 Map scale (order), 148
 Marble, 191
 Marbut, C., 4–5, 113
 Marine isotope stages/record, 501, 503–504
 Marl, 201
 Mass balance, 186, 339, 437–442, 552–553, 564–568
 Mass wasting, 278–279
 Matric potential, soil water, 86–88
 Maturation (of litter), 328, 331
 Maximum-limiting age, 527, 586–587
 Mazama-Crate Lake ashfall, 581–582
 Mean residence time date/dating, 587–591, 616

- Mechanical weathering, 166–172
 Melanic Brunisols (Canadian system), 145
 Melanic epipedon, 119, 123
 Melanization, 38, 104, 326, 329–333, 344
 Mesa Falls ashfall, 582
 Mesisols (Canadian system), 145
 Metal oxide minerals, 50–55
 Mica, 61–64, 69, 76–77, 188–191, 621–624
 Microclimate, 463–467
 Microhighs and microlows (Vertisols), 273–277, 493
 Micropores, 19
 Microrelief, 490–493
 Milankovitch cycles, 501–503
 Millipedes, 100, 103
 Milne, G., 452
 Mima mounds, 247–248
 Mineral precipitation reactions, 84
 Mineral resistance to weathering, 167
 Mineral solubility, 172
 Mineral structures, 50–51
 Mineralization (of organic matter), 328
 Mineralogical maturity, 204–205
 Minerals in soils, 50–70, 167, 188, 205–206
 Minimum-limiting ages, 586–587
 Minnesotaite, 60
 Mites, 100, 102
 Mixmasters, 239
 Mn nodules, 486–487
 Moder, 36
 Moderately well drained soils, 482–484
 Moisture characteristic function, 87–88
 Moisture flux, 453–454, 460–461
 Mollic epipedon, 119, 123, 332
 Mollisols, 122–123, 332, 493–494, 619
 Monazite, 167
 Monosiallitization, 325
 Montmorillonite, 60–61, 64–65, 167
 Mor, 35, 421
 Mössbauer spectroscopy, 70
 Mottling, 358, 479–484
 Moundmakers, 238–239, 242–252
 Mt St Helens ashfall, 581
 Mull, 35
 Munsell system, 16–17, 484–485
 Muscovite, 60–62, 69, 167
 Mutualists, 98
 Mycelia, 99, 101, 176, 421
 Mycorrhizae, 100–101
- N-fixation, 99
 Nacrite, 59–61
 National Cooperative Soil Survey program, 445
 Natric horizons, 120, 123, 346–347, 377, 403–406
 Natural Resources Conservation Service, 146
²¹Ne, 592, 594–596
 Nematodes, 100, 102
 Neof ormation, 325, 337
- Nesosilicates, 56
 Net precipitation, 460–461
 Nitrate minerals/salts, 375–377
 Nitrite minerals/salts, 375–377
 Noncalcic Brown soils (1938 classification system), 115, 125
 Nontronite, 60–61, 65
 Nordstrandite, 51–52
 Normal soil concept, 113, 304–306
 Nose slope, 451
 Numerical dating, 526–529, 577–604
- O horizons, 30–31, 34–38, 329–333, 421, 490–492
 Obliquity of the orbit, 501–502
 Obsidian, 192
 Obsidian hydration dating, 527, 531, 540–541
 Ochric epipedon, 119, 123
 Octahedra, 50–51
 Octahedral sheet, 57–66
 Olivine, 56, 167, 190, 192
 Opal phytoliths, 336, 633–635
 Organic acids, 175–176, 336
 Organic matter/carbon, 35–38, 82, 251–252, 264, 329–333, 427, 460, 491, 619–620
 Organic matter – dating by radiocarbon, 586–591
 Organic soils. *See Histosols*
 Canadian system, 145
 Organotrophic bacteria, 98
 Organs, 331
 Ornithogenic soils, 107
 Ortstein, 121, 423
 Osmotic potential, soil water, 86–87
 Outwash, glacial, 219–220, 225
 Oxidic horizons, 120, 123, 363–364
 Oxidation-reduction reactions, 356–362
 Oxide minerals, oxides, 50–55, 77–78, 186, 364–371
 Aluminum oxides, 51–52
 Iron oxides, 52–54, 190, 362–363, 431
 Manganese oxides, 54–55
 Oxisols, 122–123, 188–190, 363–375, 498–500, 619
 Oxygen isotope stages. *See Marine isotope stages*
- P waves (as dating tool), 535, 538
 Paha, 511–514
 Paleomagnetism, 501, 577–578
 Paleopedology, 605
 Paleosols, 42, 436–437, 504–514, 524–525, 553, 605–637
 Diagenesis, alteration after burial, 608–611
 Palimpsest, 605–606, 624
 Palouse Hills, 466
 Paludification, paludization, 326, 331
 Palynology, 615–637
 Panspots, 406–409
- Parent material (for soils). *See Soil parent materials*
 Parker index, 563
 Parna, 206
 Partial bleaching, 600–601
 Particle size analysis, 13–15
 Pathogens, 88
 Patterned ground, 257–261
 Pebbles, 10
 Pedalfers, 113, 338
 Pediments, Pedimentation, 510, 514–519
 Pedis ediment, 509–514
 Pedocals, 113, 338, 377–378
 Pedodiagenesis, 610–611
 Pedogenesis, 143, 283–442
 Pedogenic chlorite, 65
 Pedogenic discontinuities, 224
 Pedogenic models, 283–319
 Pedogenic pathways, 306–317, 335, 429, 624–625
 Pedologic diversity, 164
 Pedology, 3–6
 Pedometrics, 159–160
 Pedon, 46, 48, 112, 151
 Pedoplas mation, 186
 Pedoturbation, 143, 232–282, 325, 329, 421
 Proanisotropic, 232–236, 308, 325
 Proisotropic, 232–236, 308, 325
 Perched water table, 347, 349, 359–361, 479–490
 Percolation (of soil water), 88–90, 341–342
 Peridotite, 189, 192
 Permafrost, 121, 257
 Permanent charge, 76
 Permanent wilting point, 87
 Pervection, 257, 325
 Petrocalcic horizons, 120, 123, 377–393, 389–390
 Petrogypsic horizons, 120, 123, 393, 396–398
 Petroplinthite, 373–374
 Petrosalic horizons, 402
 pH, 72–73, 491
 pH-dependent charge, 76–79
 Phenols, 78–79
 Phlogopite, 60
 Phosphate minerals, 55
 Phosphatization, 326
 Phosphorus, 251, 298, 367, 523–524, 549–550
 Phyllosilicates, 56–69
 1:1 type, 57–62
 2:1 type, 57–66
 Physical weathering, 166–172, 325
 Phytoliths. *See Opal phytoliths*
 Phytoturbation, 252
 Pill bugs, 100
 Pipette analysis, 13
 Pisgah Formation, 508

- Pisolites, pisoliths, 188, 374, 385–390
 Pit-mound topography, 253–254, 490–493
 Placic horizons, 120, 123, 422–423
 Plaggen epipedon, 119
 Plagioclase feldspars, 56, 58, 167, 190, 192
 Plagioclase index of alteration, 563
 Planosols (1938 classification system), 116, 125, 360–361
 Plinthite, 121, 123, 187, 369, 372–374
 Plinthization, 325
 Platy structure, 21–22
 Playas, 201
 Pleistocene epoch, 501–503
 Pocosins, 478
 POD index, 558
 Podzols (1938 classification system), 115, 125, 419–433
 Podzolic soils (Canadian system), 145
 Podzolization, 218, 268, 324, 338, 348–349, 419–433, 462–463
 Podzolization index, 559–560
 Point of zero proton charge, 78
 Pollen, 635–637
 Post-depositional modifications, 532
 Polygenetic soils, 183, 316–317, 607
 Polymorphic soils, 436
 Polypedon, 47–48, 112
 Poorly drained soils, 482–484
 Porosity, 166, 185, 491, 496
 Potassium feldspar, 56, 58
 Prairie soils (1938 classification system), 115, 125
 Precession of the equinoxes, 501–502
 Precision in dating, 577
 Preferential flow, 90
 Primary producers, 95–97
 Principle of ascendancy and descendancy, 448–449
 Principle of cross-cutting relationships, 528
 Principle of original horizontality, 528
 Principle of superposition, 528
 Prismatic structure, 21–22
 Process-systems model, 300–302
 Product index, 563
 Productivity index, 142, 147
 Profile darkness index, 554–555
 Profile development index, 555–558, 564
 Progressive pedogenesis, 305–312
 Prokaryotes, 95
 Proto-imogolite, 423–427
 Protonation, 173
 Protozoa, 102
 Proturans, 100
 Pseudoscorpions, 100
 Pumice, 216
 Pygmy Forest, 432–433
 Pyrite, 173
 Pyritization, 326, 433–435
 Pyroclastic materials, 216
 Pyrophyllite, 60–62
 Pyroxenes, 56–58, 192, 507, 561–562
 Quaternary period, 500–501
 Quartz, 56, 58, 167, 190–192, 197, 204–206, 439–442, 507, 561–562
 Quartzite, 189, 191
 R horizons, 30, 43
 Radiocarbon, radiocarbon dating, 278–279, 390, 527, 580–592
 Radiocarbon cycle, 583
 Radiometric/radioisotopic dating, 527, 579–599
 Rare earth elements, 439
 Recarbonation, 323
 Red Desert soils (1938 classification system), 115, 125
 Red Podzolics (1938 classification system), 116
 Reddish Brown soils, 125
 Reddish Brown Lateritic soils (1938 classification system), 116, 125
 Reddish Chestnut soils (1938 classification system), 115, 125
 Reddish Prairie soils (1938 classification system), 115, 125
 Redness rating, 364–365, 371, 554, 561
 Redoximorphic features/processes, 18, 123, 356–362, 423, 433–435, 479–490
 Regolith, 42–44, 178–180
 Regosolic soils (Canadian system), 145
 Regosols (1938 classification system), 125, 404
 (Canadian system), 145
 Regressive pedogenesis, 305–312
 Relative dating, 448–451, 528–543
 Relative profile development index, 555
 Relict paleosols, 607
 Relief, 290–291
 Remanent magnetism, 577
 Removals from soils, 300–302, 308–309
 Rendolls, 197–198
 Rendzinas (1938 classification system), 117, 125
 Reptiles, 100
 Residual zones, 449
 Residuum, 42, 183–199
 Resistant/weatherable mineral ratios, 507, 560–567
 Retardant upbuilding, 304–309, 324, 435–437, 523
 Rhizosphere, 96–97, 99
 Rhyolite, 192
 Ribbon worms, 100
 Ripening, 326
 Rise, 451–452
 Rock angularity, 531, 536–537
 Rock coatings, 538, 541–546
 Rock fragments, 10
 Rock pitting, 531, 534–536
 Rock types, 166
 Rock varnish, 418–421, 531
 Rock weathering and dating, 531, 534–541
 Root plates, 253–254
 Roots, 96, 101
 Rotifers, 100
 Roundness, 11
 Roxana silt, 508, 565
 Rubification, 195, 326, 361–365, 531, 554, 561
 Ruhe, R.V., 504–517
 Runoff, 454–455, 460–461
 Rutile, 167, 439–442, 561
 Ruxton ratio, 563
 S horizons, 518–522
 Salic horizons, 120, 123, 403–404
 Saline soils, 87, 400–411
 Salinization, 326, 400–411
 Salt crusts, 403
 Salt crystal growth, 168
 Salt weathering, 168–170
 Saltation, 202
 Sand mineralogy, 531
 Sandstone, 189–191, 194–195
 Sangamonian (time), 503
 Sangamon Geosol/paleosol, 337, 505–514, 565, 566–567, 587, 611–612, 614–615
 Saponite, 61
 Sapric materials, 35
 Saprofite, 42–44, 176, 184–189, 250, 498–500, 518
 Saprofite, 184–186
 Saturated flow, 89
 Scanning electron microscopy (SEM), 25–27, 197, 207, 340, 353
 Schist, 190–191
 Schmidt hammer, 535–536, 538
 Scoria, 216
 Scorpions, 100
 Self-weight collapse, 325, 353–355
 Sequum concept, 33, 40
 Seismoturbation, 233–234
 Serpentine, 59, 61–62, 64, 69, 191, 193
 Serpentinite, 193
 Sesquioxidic nodules, 486
 Shadowing, 463
 Shale, 191, 194, 407–408
 Shape (soil structure), 20
 Sheet silicates, 56–69
 Sheeting, 166
 Short-range order minerals, 217–218
 Shrink-swell processes, 65
 Siallization, 327
 Sierozems (1938 classification system), 115, 125
 Silicate minerals, 55–69
 Silicate weathering, 172–175
 Silicification, 325, 395–398
 Sillimanite, 167, 561
 Silcretes, 396–398

- Single-grain luminescence dating, 601–603
 Size (soil structure), 20
 Slaking, 340, 349
 Slate, 191
 Slick spots, 406–409
 Slickensides, 123, 272–273
 Slope aspect. *See Aspect, slope*
 Slope elements, 451
 Slope gradient, 461–462
 Slopes, 184, 450–452, 493–494
 Slopes and slope failure, 221–222
 Slugs, 100
 Smectite, 60–61, 63–65, 69, 76–77, 80, 189, 269–279, 365, 621–624
 Smith, G.D., 117, 143, 445
 Snails, 100
 Snakes, 100
 Sodic soils, 400–409
 Sodication, 325, 404–405
 Sodicity, 403
 Sodium citrate-dithionite extraction, 428–429
 Sodium pyrophosphate extraction, 428–429
 Sodium salts, 399–409
 Soil-forming interval, 569, 605, 612, 615–617
 Soil air, 92–94
 Soil biology, 95–107
 Soil bodies, 48, 112, 160–164
 Soil chemistry, 71–84
 Soil classification, 47–48, 111–146
 1938 system, 113–117
 Soil color, 15–17
 Soil composition, 8–9
 Soil Conservation Service, 146, 640
 Soil crusts, 412, 415–416
 Soil deepening, 304–305, 307–308, 324
 Soil, definition, 8, 111, 520, 639
 Soil development, dating using, 527, 531, 548–568
 Soil development indices, 225, 553–568
 Soil drainage, 298
 Soil drainage classes, 153–154, 481–484
 Soil endemism, 321
 Soil enrichment, 324
 Soil erosion, removals, 324
 Soil evolution, 3, 304–317, 323, 516–522
 Soil evolution model, 304–317
 Soil extragrades (in Soil Taxonomy), 126, 134–136, 138
 Soil families (in Soil Taxonomy), 118, 128
 Soil fauna, 95–107
 Soil fertility, 246, 250–252
 Soil gas composition, 92–93
 Soil genesis. *See Pedogenesis*
 Soil geography, 3–4, 160–164
 Soil geomorphology, 445–525
 Soil great groups (in Soil Taxonomy), 118, 126, 130–131
 Soil hardening, 324
 Soil horizons, 29–49, 113
 Gradational horizons, 29–34
 Master horizons, 29–33
 Mixed horizons, 33–34
 Nomenclature, 30–34
 Thickness as a dating tool, 549–553
 Soil individuals, 46
 Soil infauna, 101
 Soil intergrades (in Soil Taxonomy), 126, 132–134, 137
 Soil landscape analysis, 160–164
 Soil landscapes, 3, 7, 112, 154, 160–164
 Soil liquids/water, 71
 Soil mapping, 111–112, 146–156, 639
 Soil maps, 146–164, 523
 Soil map units, 46, 48–49, 112, 148
 Associations, 149–150
 Complexes, 149–150
 Consociations, 149–151
 Error and uncertainty, 156–158
 Minor components, 148–151
 Soil micromorphology, 22–28
 Soil mineralogy, 50–70, 227
 Soil moisture control section, 128
 Soil moisture regimes, 128–131, 136, 138–140, 377
 Soil morphology, 8–28
 Soil orders (in Soil Taxonomy), 118–128, 143
 Soil organic matter, 78–79
 Soil parent materials, 40–42, 147–148, 181–231, 288–289
 Soil permeability, 19
 Soil phase, 113, 149
 Soil physics, 85–94
 Soil plasma, 24
 Soil porosity, 15, 18–19, 44, 246
 Soil production, 178–180
 Soil profile, 8–22, 45, 48
 Soil removals, erosion, 323
 Soil science, 4–6
 Soil series, 113, 118
 Soil skeleton, 24, 225–226
 Soil solution, 71–72, 427
 Soil structure, 19–22, 40
 Soil subgroups (in Soil Taxonomy), 118, 126, 132–138
 Soil suborders (in Soil Taxonomy), 118, 129
 Soil Taxonomy, 47, 111–146, 481, 484, 489, 639
 Soil temperature, 90–93, 490–492
 Soil temperature regimes, 140–142
 Soil texture, 9–15, 213–215
 Soil thickness, Soil thickness model, 304–305, 435–437
 Soil thinning, 304–305, 307
 Soil type, 113
 Soil upbuilding, 304–305, 323
 Soil water, 85–90
 Soil water potential, 86–87
 Movement, 88–90
 Soil welding, 436, 608
 Solods (including Canadian system Solods), 145, 401–409
 Solodization, 324, 360–361, 405–406
 Solodized Solonetz soils (including Canadian system Solodized Solonetz), 145, 401–409
 Solonchaks (1938 classification system), 116, 125, 401–409
 Solonization, 324, 404–405
 Solonetz soils, 401–409
 (1938 classification system), 116, 125
 (including Canadian system Solonetz), 145, 401–409
 Soloths (1938 classification system), 116, 126, 404–406
 Sols Bruns Acides, 126
 Soluble salts, 376, 398–409
 Solum, solum thickness, 40, 48, 336, 531–532, 549
 Sombric Brunisols (Canadian system), 145
 Sombric horizons, 120, 123
 Somewhat excessively drained soils, 482–483
 Somewhat poorly drained soils, 482–484
 Sorosilicates, 56
 Sorption, 76–84
 Sparmicritization, 324, 390–391
 Sphericity, 11
 Spheroidal weathering, 168–170
 Spiders, 100
 Spodic horizons, 121, 123, 420, 426
 Spodosolization, 324
 Spodosols, 122–123, 218, 419–433, 500, 619
 Sphene, 167
 Springtails, 100, 102
 Stadials, 502
 Stages of carbonate accumulation, 385–391
 State factor model. *See Factorial model of soil development*
 Static pedogenesis, 305
 Staurolite, 167, 562
 Steady state, 35, 315–317, 571–572
 Stemflow, 460–461
 Stone lines, 183, 187, 236–238, 249–250, 278–279, 457–460, 509–525, 639
 Stones, 9–10
 Strain, 326, 439–442, 553
 Subaerial surfaces, 447
 Subaqueous surfaces, 447
 Subarctic Brown Forest soils, 126
 Sulfate minerals/salts, 55, 375–377, 395
 Sulfidic materials, 121
 Sulfidization, sulfidation, 202, 326, 433–435
 Sulfuric acid, 170
 Sulfuric horizons, 121
 Sulfuricization, 326, 433–435
 Superimposed soils, 436
 Surface area, 15, 166, 328–329
 Surface boulder frequency (as a dating tool), 533–534

- Surface exposure dating, 528–568
 Synthesis, 325
 Synthetic alpine slope model, 296–297
- Taenolite, 61
 Talc, 60–62
 Talf, 451–452
 Tanaisids, 100
 Tectosilicates, 56, 58
 Tephra, 216–218, 578–582
 Tephrochronology, 216, 578–582
 Termites, 100, 102, 244–252, 518–520
 Terra rossa, 195–198
 Terraces, alluvial, 200–201
 Terrestrialization, 326, 331–332
 Tetrahedra, silica, 50–51
 Tetrahedral sheet, 57–66
 Texture classes, 13–15
 Texture-contrast soils, 328, 455–460
 Textural triangle, 12
 Thermal conductivity, 92
 Thermal expansion (weathering), 170
 Thin sections of soils, 27–28
 Thresholds in soil systems, 311–317, 572
 Throughfall, 460–461
 Throughflow, 461, 496
 Till, glacial, 218–219, 225, 504–517
 Time_{zero}, 182–183, 576–577, 590, 616, 639
 Time transgressive concept/surface, 450–451, 526, 570
 Titanite, 439–442
 Titanium, 229, 565, 615
 Tongueing, 422
 Topaz, 167
 Top-down pedogenesis, 304
 Toposequences, 290–291, 452–455, 493–500
 Topsoil, 38
 Tourmaline, 167, 507, 561–568
 Transformations in soils, 300–302, 308
 Translocations (inter-horizon) in soils, 143, 300–302, 308
 Transmission electron microscopy (TEM), 27
- Transport-limited slopes, 184
 Treeline, 293
 Treethrow. *See Uprooting*
 Trioctahedral sheet, 59–66
 Triple planation model, 518–521
 Trophic levels, 97
 Tundra soils (1938 classification system), 115, 126, 420
- Ultisols, 122–123, 337–346, 500
 Ultramafic rocks, 189, 193–194
 Umbric epipedon, 119, 123
 Uncertainty in soil systems, 318–319, 575–576
 Uniformitarianism, 7
 Uniformity value, 229
 Unloading, 166
 Unsaturated flow, 89–90
 Upbuilding. *See Soil thickening or Retardant Upbuilding or Developmental upbuilding*
 Upfreezing, 256–257
 Uprooting, tree, 234, 252–254, 490–493
 Urban soils, 298–299
 Urbanthrotturbation, 280
- V horizons, 30, 39, 409–410
 Varnish. *See Rock varnish*
 Varves, 201, 527
 Vein height (as dating tool), 531, 533
 Ventifacts, 202–203
 Vermiculite, 60–61, 63–64, 76–77, 623–624
 Vertisolic Solonetz soils (Canadian system), 145
 Vertisols, 122–123, 269–279, 493, 619
 Very poorly drained soils, 482–484
 Vesicular porosity, 409–410
 Vetusol, 607
 Vogt's residual index, 563
 Volumetric water content, 86
- W horizons, 30, 518–522
 Wasps, 100
 Water table, 454, 477–493
- Weathering, 101, 143, 165–180, 183–199, 464
 Weathering-limited slopes, 184
 Weathering and climate, 176–178
 Weathering rinds, 531–533, 537–541
 Weathering front, 354–355, 518–521, 622
 Weathering indices, 559, 561–563
 Weathering intensity, 180
 Weathering products, 172, 176, 185
 Weathering profile, 42–45
 Weathering ratios, 507, 560–567
 Weathering resistance, 165–166
 Wedge-shaped aggregates, 272
 Welded soils/paleosols, 436, 608, 612, 630
 Well drained soils, 482–484
 Wentworth scale, 9
 Wetting-drying, 168, 171
 Wetting front, 87–90, 342, 379–380, 415
 White River ashfall, 582
 Wiesenböden soils (1938 classification system), 116
 Willemseite, 60
 Whitney, M., 5
 Whole regolith pedology, 41
 World Reference Base for Soil Resources, 144–146, 338
- X-ray diffraction, 63–64, 66–70
 Xerolysis, 326–327
- Yarmouth-Sangamon paleosol, 506–514
 Yellow Podzolics (1938 classification system), 116
 Yellowish Brown Lateritic soils (1938 classification system), 116
- Zeolites, 58
 Zircon, 167, 439–442, 507, 561–568
 Zirconium, 229
 Zoisite, 167
 Zonal soils, 5, 113–116, 304–306
 Zooflagellates, 102