

Subject Index

- Absorbance, 59
 additivity of, 66
 relative, 74
- Absorptiometer, 76
- Absorptiometry, 50
 experiments, 570, 572-575, 577, 578, 580
- Absorption of radiation, 48
- Absorption coefficient (x-ray), linear, 197
 mass, 198
- Absorption spectra, 13
- Absorptivity, 59
- Accuracy, 518
- Acetone, determined by absorptiometry, 93
- Actinometer, 38
- Activation analysis, 372
 sensitivity of, 517
- Acton Infrared Spectrophotometer, 133
- Alpha particles, absorption of, 371
- Alumina, as ultraviolet material, 26
- Aluminum, determined by absorptometry, 95
 determined by fluorimetry, 115
- Aminco-Bowman Spectrophotofluorometer, 111
- Aminco-Chance Dual-Wavelength Spectrophotometer, 89
- Aminco Titra-Thermo-Mat, 430
- Amperometric titration, 305, 309
 experiments, 589, 593, 597
- Amperometry, 247
- Amplification, transistor, 535
 vacuum-tube, 528
- Amplification factor, 525, 535
- Amplifiers, alternating current, 542
 direct current, 545
 electrometer, 544
 logarithmic, 551
 operational, 293, 294, 340, 548
 voltage follower, 543
- Anacon Differential Refractometer, 476
- Analog computers, 557
- Angstrom unit, 7
- Anode, electrochemical, 235
 in vacuum tubes, 525
- Antimony electrode, 254
- Anti-Stokes lines, 14
- Argon detector (GC), 460
- Arsenic, determined by absorptiometry, 95
- Aspirators, flame, 179
- Aspirin, determined by phosphorimetry, 117
- Astigmatism, 33
- Atlas Tast Polarograph, 281
- Atomic absorption, 178
 experiment, 586
 sensitivity of, 517
 sources, 183
 spectrophotometers, 187
- Atomic spectra, 9
- Attenuated total reflection, 143
- Autoradiography, 358
- Auxochrome, 51
- Background (radioactivity), 366
- Band-width, effective, 33
- Base-line technique, 137
- Bausch & Lomb spectrographs, 34
- Bausch & Lomb Spectronic-20, 34, 82
- Bausch & Lomb Spectronic-505, 34
- Bausch & Lomb Spectrophor-I, 508
- Beckman Automatic Titrator, 288
- Beckman ion-selective electrodes, 257, 259
- Beckman paper electrophoresis, 510
- Beckman Ratio Fluorometer, 110
- Beckman spectrophotometers, Infrared-Rapid Scan, 470
 Microspec, 134
 Model B, 34
 Model DU, 34, 83
 Model FS-620, 135
 Model IR-4, 34, 127, 134
 Model IR-5A, 132
 Model IR-8, 132, 134

- Beckman spectrophotometers, Model IR-11, 133, 134
 Model IR-102, 140
- Beer's law, 58
 deviations from, 63, 65
 for x-rays, 197
- Bendix Time-of-Flight Mass Spectrometer, 390, 472
- Benzoic acid, determined by absorptiometry, 93
- Beta particles, absorption of, 371
- Birefringence, 17
 circular, 230
- Bismuth, determined by photometric titration, 99
- Black-body radiation, 18
- Blaze of a grating, 31
- Block Interferometer Spectrometer, 135
- Bolometer, 44
- Bouguer-Beer law, 58
- Bragg equation, 205
- Brice-Phoenix Light Scattering Photometer, 157
- Bubbles, fractionation by, 502
- Buffers, pH, standard, 252
 radiation, 189
- Burners, flame, 179
- Calcium, determined by absorptiometry, 93
- Calorimetry, scanning, 429
- Capillary, polarographic, 280
- Capillary GC column, 452
- Carbon arc, 165, 167
- Cary Raman Spectrometer, 160
- Cary spectrophotometers, 34, 86
- Cary Spectropolarimeter, 231
- Cathode, electrochemical, 235
 in vacuum tube, 525
- Charging current, 283
- Chemical shift in NMR, 408
- Chemiluminescence, 179
- Chlorine, determined by x-ray absorption, 203
- Chopper amplifiers, 546
- Chromate-dichromate, ultraviolet-visible absorption, 64
- Chromatography, 443
 gas, 450
 liquid, 475
- Chromatography, paper, 487
 recycling, 486
 thin-layer, 492
(See also Electrochromatography)
- Chromium, determined by absorptiometry, 94
- Chromophore, 50
- Chronoamperometry, 246, 278
- Chronopotentiometry, 246, 310
- Circular birefringence, 230
- Circular dichroism, 229
 photometer, 232
- Cobalt, determined by absorptiometry, 94
- Coincidence circuit, 361
- Coincidences, 368
- Color, wavelengths of, 49
- Colorimeters, 76
- Colorimetry, 50
- Complex, determination of ligand ratio, 90
 experiment, 574
- Computers, analog, 557
- Concentration cell, 250
- Conductance, 335
 measurement, by bridge, 338
 electrodeless, 340
 by operational amplifier, 552
- Conductimetry, 247, 335
- Conductometric titration, 343
 experiment, 600
- Consolidated Electrodynamics Mass Spectrometers, 387
- Continuous variations method, 90
- Copper, determined by absorptiometry, 94
 determined by photometric titration, 99
- Corning glass filters, 23, 114
- Corning ion-selective electrodes, 257, 259
- Cornu prism, 27
- Cotton effect, 230
- Coulometers, 324
(See also Integrator)
- Coulometry, 247, 323
 controlled-potential, 558
- Countercurrent extraction, 497
- Critical absorption edge, 198
 analysis by, 203
- Crosscurrent separations, 438
- Current measurement by operational amplifier, 554

- Cuvet, 44
Cyclic voltammetry, 302
Czerny-Turner mounting, 32
- Debyc-Scherrer powder camera, 207
Deltatherm Dynamic Adiabatic Calorimeter, 430
Densitometer, 36
Derivative thermogravimetric analysis, 425
Detectors, GC, 456
 of radiant energy, infrared, 128
 ionisation (of a gas), 362
 photochemical, 35
 photographic, 35
 semiconductor, 41, 129, 218, 365, 555
of radioactivity, 356
 ionization (of a gas), 362
 lithium drifted Ge or Si, 365
 scintillation, 358
- Deuterium lamp, 20
Dichroism, circular, 229
Dichromate-chromate, ultraviolet-visible absorption, 64
Dichromatic titrator, 96
Differential thermal analysis, 425
 calorimetric, 429
Differentiation with operational amplifier, 550
Diffraction, neutron, 370
 x-ray, 205
Diffraction gratings, 28
Diffusion coefficient, 278
Diffusion current, 278, 283
Diffusion current constant, 299
Dilution correction in titration, 97, 306
Diodes, crystal (Ge or Si), 531
 gas, 528
 vacuum, 524
1,1-Diphenyl-2-picrylhydrazyl, ESR standard, 415
Dispersion, refractive, 15
 rotatory, 228
 of spectrograph, 33
 x-ray, 215
Distillation, simulated (GC), 469
Distribution coefficient, 496
Distribution ratio, 437
 experiment, 605
- Dithizone, 94
Double refraction, 17
Dropping mercury electrode, 278
Duboscq comparator, 78
Duochromator, 90
DuPont DTA Apparatus, 430
DuPont Photometric Analyzer, 80
DuPont Turbidimeter, 156
Durrum-Jasco Spectropolarimeter, 231
Durrum Stopped-Flow Spectrophotometer, 34
- Ebert mounting, 32
Echelette grating, 31
Echelle grating, 31
Edge, critical absorption, 198
 analysis by, 203
EDTA reagent, 99
 potentiometric titration with, 261
 thermometric titration with, 431
 experiment, 601
Electrocapillary maximum, 281
Electrochromatography, 508
Electrode potentials, standard, 609
Electrodeposition, 316
 controlled potential, 319
 experiments, 594, 596
Electrodes, bimetallic pairs, 270
 classes of, 242
 dropping mercury, 278
 electrochemical, 234
 reference, 242
 rotating, 307
 spectrographic, 167
Electrometers, 544
Electron capture, GC detector, 460
 x-ray source, 202
Electron microprobe, 220
Electron spin resonance, 414
Electron-volt, 7
Electronic Associates Mass Spectrometer, 392, 471
Electroosmosis, 507
Electrophoresis, gel, 507
 moving boundary, 505
 paper, 506
Emission spectrography, 164
 experiment, 582
 sensitivity of, 517
Emission spectroscopy (x-ray), 214

- Equivalent conductance, 336
 Exposure (photographic), 36
 Extinction coefficient, 60
 Extraction, countercurrent, 497
 solvent, 494
 experiment, 577
- Faraday cell (optical), 231
 Faraday constant, 323
 Faraday's laws, 323
 Farrand Fluorometer, 108
 Feussner circuit, 166
 Fick's law, 278
 Filters, electronic, 539
 twin-tee, 560
 optical, 23
 in fluorimetry, 108
 interference, 23
 x-ray, 201
 Fisher Nefluoro-Photometer, 81
 Flame chemistry, 176
 Flame-emission detector (GC), 463
 Flame-ionization detector (GC), 462
 Flame photometry, 178, 188
 experiment, 584
 sensitivity of, 517
 Flip-flop, 561
 Flow counter, 365
 Fluorescence, 13
 atomic (flames), 190
 resonance, 193
 generator, 109
 nuclear (Mössbauer), 376
 ultraviolet photoplates, 38
 ultraviolet-visible, 105
 experiment, 594
 sensitivity of, 517
 x-ray, 214
 Fluorimeters, 107
 Fluorimetry, 105
 Foam fractionation, 503
 Foreprism, 30
 Formal potentials, 238
 Fourier spectrometers, 135
 Fragmentation pattern, 396
 Free radicals, determined by ESR, 416
 Frequency units, 7
 Fresnel rhomb, 232
 Fuel gases, 182
 Gain of amplifier, 528, 535, 549
 Gamma radiation, 202
 Gas, ionization of, 362
 Gas analyzers, infrared, 130
 mass, 395
 Gas chromatography, 450
 combined with infrared, 470
 combined with mass, 472
 experiment, 602
 Gaussian distribution, 442
 Geiger counter, 363
 Gel permeation chromatography, 481
 General Electric X-Ray Powder Camera, 208
 Gilford photometer, 85
 Glass electrodes, for pH, 254
 for other than pH, 257
 Globar, 19, 128
 Glow-transfer tube, 366
 Glow tube, 528, 540
 Glower, Nernst, 18, 128
 Golay detector, 129
 Goniometer (x-ray), 209
 Gradient elution analysis, 478
 Gratings, diffraction, 28, 32, 33
 Gyromagnetic ratio, 405
- Hach Nephelometers, 156
 Hafnium, determined by x-ray emission, 217
 Half-cell potentials, 237
 Half-cells, reference, 307
 Half-life (radioactivity), 356
 Half-wave potential, 284
 Halogens, determined by x-ray absorption, 203, 217
 Helium detector (GC), 460
 Hertz (unit), 7
 Heterometry, 158
 HETP, 445
 Hilger Steeloscope, 169
 Hollow-cathode lamps, 21, 184
 Hydrogen electrode, 238
 Hydrogen ion measurement, 251
 Hydrogen lamp, 20
 8-Hydroxyquinoline, 95
- Iirković equation, 281
 Impedance conversion, 544

- Indicator, pK from absorbance, 55
experiment, 578
- Infrared absorption, 119
combined with GC, 470
detectors, 128
experiment, 580
materials, 127
photometers, 129
quantitative analysis, 136
sources, 128
spectrophotometers, 131, 134, 138
- Integration, in GC detectors, 470
operational amplifiers, 550, 556
- Integrator, operational amplifier, 294, 325
for x-ray emission, 218
- Interference fringes, 137
- Interferometry, 135
- Internal standards, 171
- Ion exchange, chromatography, 483
experiment, 603
liquids, 257
membranes, 327
- Ionization of gases, 38, 363
- Ionization chamber, 363
- Iosbestic point, 55
- Isotope dilution, mass, 401, 402
radioactivity, 374
- Jackson turbidity unit, 156
- Job's method, 90
experiment, 574
- Kaiser (unit), 7
- Karaoglanoff equation, 311
- Katharometer, 460
- Ketones, unsaturated, 53
- Klett-Summerson colorimeter, 80
- Kováts retention index, 469
- Lambert-Beer law, 58
- Lanthanides, determined by absorption, 93
- Larmor frequency, 405
- Lasers, 21
in emission spectroscopy, 167
in Raman spectroscopy, 159
as spectrophotometric source, 65
- Lead in gasoline, determined by x-ray absorption, 203
determined by x-ray emission, 217
- Lead sulfide infrared detector, 129
- Leeds & Northrup pH Indicator, 546
- Leeds & Northrup Type K-3 Potentiometer, 265
- LEP Spectrophotometer, 34
- Lithium drifted detectors, 365
- Littrow mount, grating, 32
prism, 27
- Logarithm, by operational amplifier, 551
- Lumetron Colorimeter, 79
- McPherson Vacuum Monochromator, 34
- Magnetic resonance, 404
- Magnetogyric ratio, 405
- Manganese, determined by absorption, 94
- Maez spectrometers, 380
electromagnetic focusing, 382
cycloidal, 386
double focus, 386
ion-resonant, 393
quadrupole, 391
radio-frequency, 393
time-of-flight, 388
- Mass spectrometry, 380
combined with GC, 472
sensitivity of, 517
- Mattauch-Herzog mass spectrometer, 386
- Maxima, polarographic, 288
- Membrane electrode, 257
- Mercury cathode, electrolysis at, 322
experiment, 594
- Mercury lamp, 20, 128
- Mercury-vapor detector, 187
- Meters, electric, 567
- Micron (unit), 7
- Microprobe, electron, 220
- Micro-Tek GC detectors, 461, 463
- Microwave absorption, 145
- Migration current, 282
- Mine Safety Appliances "Billion-Aire," 371
- Mobility of ions, 337
- Modulator, electro-optic, 232

- Mole-ratio method, 90
 Molecular sieve, 481
 Molecular spectra, 11
 Molecular weights, determined by light scattering, 155
 Monochromators, 25
 x-ray, 201
 Mössbauer spectroscopy, 376
 Mull technique, 143
 Multivibrator, 562
- Nanometer (unit), 7
 Nephelometers, 156
 Nephelometry, 152
 Nernst equation, 237
 Nernst glower, 18, 128
 Nessler tubes, 77
 Neutrons, absorption of, 371
 activation by, 372
 sensitivity of, 517
 counters for, 370
 Nitrophenols, determined by photometric titration, 97
 NMR spectrometers, high-resolution, 407
 wide-line, 406
 Noise, 518
 Nonaqueous solvents, titrations in, 262
 Nuclear magnetic resonance, 404
 Nuclear properties, 354
- Omegatron, 393
 Operational amplifiers, 548
 Optical activity, 17, 224
 Optical density, 36, 60
 Optical methods, 6
 Optical null, 131
 Optical rotatory dispersion, 228
 Optics, care of, 568
 Order of grating spectra, 29
 Order-Sorter, 30
 Orion ion-selective electrodes, 258
 Oscillators, 559
 Oscillography, 247, 349
 Overvoltage, 245, 276
 Oxidants for flames, 182
 Oxygen interference in polarography, 289
 Ozone, determined by absorptiometry, 93
- Particle size from light scattering, 155
 Penicillin, determined by polarimetry, 228
 Pentode, 526
 Perfluorokerosine, 397
 Perkin-Elmer Atomic Absorption Spectrophotometer, 187, 192
 Perkin-Elmer Differential Scanning Calorimeter, 429
 Perkin-Elmer spectrophotometers,
 Model 21, 134
 Model 137, 134
 Model 221, 127
 Model 301, 133
 Model 421, 134
 Model 450, 127
 Permanganate, visible absorption spectrum, 63, 72
 pH, 251
 pH meters, 266, 546
 pH-stat, 272
 coulometric, 330
 Phase detector, 547
 Phase titrations, 158
 Philips Interrupted Elution GC, 470
 Philips X-ray Goniometer, 210
 Philips X-ray Spectrometer, 215
 Phoenix Differential Refractometer, 476
 Phoenix Light-Scattering Photometer, 157
 Phoenix-Precision Dual Wavelength Spectrophotometer, 34
 Phosphorescence, 14, 105
 Phosphorimetry, 116
 Photocells, semiconductor, 41
 Photography, 35
 Photometer, filter, 78
 infrared nondispersive, 129
 optical rotatory dispersion, 231
 Photometric accuracy, 69
 Photometry, differential, 74
 precision, 72
 relative, 74
 single and double beam, 46
 Photomultipliers, 39
 in scintillation counting, 359, 361
 Phototubes, gas, 39
 vacuum, 38
 Photovolt Colorimeter, 79
 Picker-EAI Mass Spectrometers, 388
 Pilot-ion method, 299

- Plate, theoretical, 445
Pockets cell, 232
Polarimeters, 225
Polarimetry, 224
Polarization, electrochemical, 245
 molecular, 347
Polarized radiation, 16
Polarograph, 282
 alternating current, 304
 correction for resistance, 292
 manual, 291
 pulse, 304
 rapid-scan, 301
 recording, 292
 square-wave, 304
 Tast (strobe), 281
 three-electrode, 293
Polarography, 246, 275
 experiments, 590, 592
 organic, 300
Polaroid, 18
Potassium bromide pellet technique, 142
Potential measurement, by operational
 amplifiers, 554
 by potentiometer, 263
Potentiometric titration, 260
 experiments, 588, 589
Potentiometry, 246
Potentiostats, 321
Powder camera (x-ray), 207
Power of radiation, 8
Precision, 518
Prisms, dispersion by, 26
Proportional counters, 363
Pulse-height analysis, 368
Pungor ion-selective electrodes, 259
- Quantometer, 173
Quantovae, 173
Quartz, optical properties, 27
Quartz-iodine lamp, 19
Quenching of fluorescence, 113
Quinhydrone electrode, 253
- Radiant energy, 6
Radioactive sources, 202
Radioactivity, 355
 experiment, 605
Radioautography, 358
- Radiometric analysis, 376
Raman scattering, 159
Raman spectra, 14
Raman spectrometers, 160
Randles-Ševčík equation, 302
Ratio measurement, 552
Rayleigh scattering, 152
Rayleigh's criterion, 25
Reciprocity law, 37
Recorders, 563
Rectifiers, 538
Recycling chromatography, 486
Refraction, 15
Refractive index, 15
Refractometers, 477
Regulators (power-supply), 540, 556
Residual current, 283
 compensation for, 299
Resistance, measurement of, by bridge,
 338
 by operational amplifier, 552
Resolution, 26
 in chromatography, 446
 in mass spectrometry, 381
Resolvability in polarography, 305
Resolving power, 26
Resonance radiation, 11
Reststrahlen, 133
Retention time or volume (GC), 468
Reversal (photographic), 37
Reversibility, 244
Riboflavin, determined by fluorescence,
 115
Ringbom plot, 71
Rotatory dispersion, 17
Rowland circle, 33
 x-ray, 206
Rudolph Polarimeter, 226
Ruthenium, determined by fluorescence,
 114
- Sand equation, 311
Sapphire, as ultraviolet material, 26
Sargent-Malmstadt Titrator, 269
Sargent Polarographs, 282, 291
Sealer circuits, 562
Scattering, 151
Schumann plates, 38
Scintillation detectors, 43, 358
Secondary emission, 40, 526

- Semiconductors, 530
 - detectors (radioactivity), 365
 - x-ray, 218
 - diodes, 531
 - photocells, 41, 129, 555
 - transistors, 533
- Sensitivity, 514
- Separability (polarography), 305
- Separation factor, 437
- Separations, 436
 - countercurrent, 439
 - continuous, 443
 - crosscurrent, 438
- Servomechanisms, 562
- Sign conventions (potentials), 243
- Signal-to-noise ratio, 517
- Silica, as optical material, 26, 27, 128
- Slope-ratio method, 90
- Solvent extraction, 494
- Solvent sublation, 502
- Solvents, for infrared, 141
 - nonaqueous, titrations in, 262
 - for ultraviolet, 61
- Sonic energy, absorption of, 155
- Sonic nebulizer, 181
- Sources of radiation, continuous, 18
 - infrared, 128
 - line, 21
 - x-ray, 200
- Specific rotation, 224
- Spectrofluorimeters, 111
- Spectrographs, 26
 - photoelectric, 173
 - photographic, 172
- Spectrometers, mass, 380
 - neutron, 370
 - nuclear, 369
 - x-ray, 215
 - nondispersive, 218
- Spectronic-20, 34, 82
- Spectronic-505, 34
- Spectrophotometers, 26, 76
 - atomic absorption, 187
 - dual wavelength, 88
 - far-infrared, 133
 - infrared, 131
 - calibration of, 135
 - interferometric, 135
 - rapid-scan, 138
 - ultraviolet-visible, 83
- Spectrophotometry, 50
 - sensitivity of, 517
- Spectropolarimeters, 231
- Spectroscopy, emission, 164
- Spectrum, regions of, 8
- Spin-spin coupling, 410
 - decoupling, 412
- Standard addition, 299, 520
- Standard cell, 265
- Standard potentials, 237, 609
- Standards, 519
- Statistics of radioactivity, 367
- Steelescope, 169
- Stereospectrogram, 57
- Stokes lines, 14
- Stripping analysis, 330
- Structure, determined by infrared, 123
 - determined by polarography, 300
 - determined by ultraviolet, 53
- Sublation, solvent, 502
- Sucrose, determined by optical rotation, 227
- Summing junction, 550
- Supports (GC), 451
- Suppressor of polarographic maxima, 288
- Tantalum, determined by x-ray emission, 217
- Test Polarograph, 281
- Tellurium, determined by absorptiometry, 93
- Temperature programming (GC), 466
- Tetramethylsilane, NMR standard, 408
- Tetrode, gas, 529
 - vacuum, 525
- Theoretical plate, 445
- Thermal conductivity (GC detector), 457
- Thermal detectors of radiation, 44
- Thermistors, 538
- Thermobalance, 423
- Thermogravimetric analysis, 421
 - derivative, 425
- Thermopile, 44
- Thiamine, determined by fluorescence, 115
- Thyratron, 529
- Titration, 4, 519
 - amperometric, 305
 - experiment, 593

Titration, biamperometric, 309
 experiments, 589, 597
conductometric, 343
 experiment, 600
coulometric, 326
 experiment, 597
dead-stop, 309
enthalpy, 434
high-frequency, 347
oscillometric, 347
phase, 158
photometric, 95
potentiometric, 260
 derivative, 269
 experiments, 588, 589
thermometric, 430
 experiment, 601
turbidimetric, 157
Titrators, coulometric, 330
 potentiometric, 267, 268
Trace analysis, photometric, 74
 by stripping analysis, 332
Tracers, in mass spectrometry, 401
 radioactive, 371
Transducers, 552
Transfer plots, 527, 535
Transistors, field-effect (unipolar), 535
 insulated-gate, 537
 junction (bipolar), 533
Transition time in chronopotentiometry,
 311
Transmittance, 45
 relative, 74
Triangular wave, 302
Triodes, gas, 529
 transistor, 533
 vacuum, 525
Tubes, electronic, electrometer, 544
 gas, 528
 vacuum, 524
Tungsten lamp, 19
Turbidimeters, 155
Turbidimetry, 152
 experiment, 581

Turner Spectrofluorimeter, 113
Tyndall scattering, 152

Ultimate precision (photometry), 75
Ultrasonic detector (GC), 461
Ultraviolet absorption, 48
 experiment, 575
Uranium, determined by fluorescence,
 113
 determined by x-ray emission, 217

Vacuum tubes, 524
van Deemter equation, 446
Varian-Aerograph phosphorus GC
 detector, 463
Varian NMR Spectrometer, 407
Velocity of radiation, 7
Vibrating capacitor, 544
Voltammetry, 246, 275
 cyclic, 302
Voltmeter, electronic, 266

Wave number, 7
Wavelength, units, 7
Weston standard cell, 265
Wheatstone bridge, 337

Xenon lamp, 20
X-rays, 195
 absorption, 197, 202
 microprobe 220

Yoe-Jones method, 91
 experiment, 574

Zener diode, 533, 540
Zeolites, 481