

CONTENTS

ABSORPTIOMETRY (GAMMA) IN URANIUM ANALYSIS, <i>R. E. Connally</i>	1
ABSORPTIOMETRY, X-RAY, OF OSSEOUS TISSUE, <i>G. P. Vose</i>	3
ABSORPTION ANALYSIS (MONOCHROMATIC X-RAY), <i>J. H. Stewart, Jr.</i>	7
ABSORPTION ANALYSIS, MONOCHROMATIC X-RAY, OF THORIUM, <i>J. H. Stewart, Jr.</i>	8
ABSORPTION COEFFICIENTS (MASS): EMPIRICAL DETERMINATION BETWEEN 1 AND 50 KEV, <i>J. Leroux</i>	9
ABSORPTION EDGE ANALYSIS, <i>H. W. Dunn</i>	16
ABSORPTION EDGE ANALYSIS: APPLICATIONS OF SECONDARY TARGETS, <i>E. A. Hakkila</i>	18
ACCELERATORS, MICROWAVE LINEAR ELECTRON, AND X-RAY GENERATORS, <i>E. A. Burrill</i>	21
ACIDS, STRAIGHT-CHAIN CARBOXYLIC (C ₁ TO C ₁₄): X-RAY DIFFRACTION STUDY, <i>W. L. Baun</i>	23
ADHESIVE LAYERS, RADIOGRAPHIC EXAMINATION OF, <i>H. Tarkow and R. F. Blomquist</i>	30
ALKALOID STRUCTURES: DETERMINATION BY DIFFRACTION, <i>A. W. Sangster</i>	32
ALLOYS: (COPPER-GOLD), <i>R. E. Scott</i>	41
ALLOYS IN SOLUTION, X-RAY SPECTROGRAPHIC ANALYSIS, <i>W. W. Houk</i>	50
AMALGAM, DENTAL, STRUCTURE, <i>G. Ryge and C. W. Fairhurst</i>	53
AMINO ACIDS AND PROTEINS IN SOLUTION: RADIATION CHEMISTRY, <i>A. L. Tappel</i>	54
AMMONIUM PERCHLORATE: EFFECTS OF X- AND GAMMA RADIATION ON CHEMICAL REACTIVITY, <i>E. S. Freeman</i>	56
AMORPHOUS SOLIDS: DIFFRACTION EFFECTS, <i>F. Schossberger</i>	60
ANTIBIOTICS IN RADIOBIOLOGICAL EXPERIMENTS, <i>D. S. Grosch</i>	62
AQUEOUS SOLUTION METHOD OF ALLOY ANALYSIS BY FLUORESCENCE SPECTROMETRY, <i>L. Silverman</i>	63
ASPHALTENES (PETROLEUM) AND RELATED SUBSTANCES: X-RAY DIFFRACTION, <i>Teh Fu Yen and J. G. Erdman</i>	65
ATTENUATION, X-RAY, <i>G. D. Adams</i>	69
AUSTENITE RETAINED IN HARDENED STEELS: QUANTITATIVE DETERMINATION BY X-RAY DIFFRACTION TECHNIQUES, <i>K. E. Beu</i>	71
AUTOMATIC DIFFRACTION INTENSITY DATA REDUCTION, <i>H. G. Norment</i>	77
AUTORADIOGRAPHY OF TISSUE, <i>N. L. Dockum</i>	79
AUTOMETER: MULTIELEMENT AUTOMATIC X-RAY SPECTROGRAPH (<i>Norelco</i>), <i>Philips Electronic Instruments</i>	89
BARBITURIC ACID DERIVATIVES: POWDER DIFFRACTION IDENTIFICATION, <i>Philips Electronic Instruments (Norelco)</i>	91
BERYLLIUM COMPOUNDS CALCINATION PRODUCTS, <i>J. A. Carrabine</i>	91
BETATRON, <i>G. D. Adams</i>	92
BIOLOGICAL CONSEQUENCES OF EXPOSURE TO IONIZING RADIATION, <i>S. Tsuda</i>	94
BIOLOGY, X-RAY FLUORESCENCE ANALYSIS IN, <i>T. Hall</i>	96
BIOLOGY AND MEDICINE: X-RAY SPECTROGRAPHY IN, <i>P. K. Lund and J. C. Mathies</i>	98
BOND LENGTHS, FROM X-RAY DIFFRACTION, <i>L. H. Jensen</i>	100
BONE MINERAL CONTENT: X-RAY DETERMINATION OF, <i>E. Ackerman</i>	103
BONE AND TOOTH "MINERAL": CRYSTALLOGRAPHIC INVESTIGATIONS, <i>D. McConnell</i>	106
BUILDING MATERIAL INDUSTRY: X-RAY APPLICATIONS, <i>J. Chi-Sun Yang</i>	108

CAMERAS, SMALL (POWDER), FOR RECORDING LOW ANGLE LINES, <i>R. K. Sorem</i>	112
CARBON AND HYDROGEN DETERMINATION USING INTENSITY RATIOS OF COHERENT TO INCOHERENT SCATTERING OF X-RAYS, <i>C. W. Dwiggins, Jr.</i>	113
CATALYSTS (INCLUDING ENZYMES): PHYSICAL AND CHEMICAL PROPERTIES REVEALED BY X-RAYS, <i>F. H. Herbstein</i>	115
CATALYSTS: STRUCTURAL PROPERTIES, <i>W. L. Kehl</i>	120
CELLULOSE: POLYMORPHIC AND MULTIPHASE STRUCTURES, <i>Ø. Ellefsen, K. Kringstad, and B. A. Tønnesen</i>	122
CEMENT INDUSTRY: X-RAY SPECTROGRAPHY, <i>W. G. Hime</i>	133
CHELATE COMPOUNDS, METAL: IDENTIFICATION AND STRUCTURES BY X-RAY DIFFRACTION, <i>R. G. Charles</i>	134
CHEMICAL EFFECT ON X-RAY SPECTRA, <i>E. White and H. A. McKinstry</i>	137
CHLOROFORM: COMPARISON OF RADIATION CHEMISTRY AND THERMAL GAS-PHASE DECOMPOSITION, <i>M. Ottolenghi</i>	140
CHLOROFORM: GAMMA (AND BETA) RADIOLYSIS, <i>B. G. Harper and J. B. Gardner</i>	141
CINERADIOGRAPHY WITH MULTIPLE FIELD-EMISSION TUBES, <i>W. P. Dyke, et al.</i>	142
CIRCUITS, ELECTRICAL, FOR ENERGIZING X-RAY TUBES, <i>T. H. Rogers</i>	146
COATING ON PAPER: MEASUREMENTS BY X-RAY ABSORPTION, <i>H. H. Murray</i>	149
COATING THICKNESS MEASUREMENT AND CHEMICAL ANALYSIS BY RADIOISOTOPE X-RAY SPECTROMETRY, <i>J. F. Cameron and J. R. Rhodes</i>	150
COLOR RADIOGRAPHY, <i>A. Bryce</i>	156
COLOR RADIOGRAPHY AT ARGONNE NATIONAL LABORATORY, <i>Chemical & Engineering News</i>	157
COMPUTERS, ELECTRONIC DIGITAL, IN THE INTERPRETATION OF X-RAY POWDER DIAGRAMS, ESPECIALLY IN PbF_2 , <i>K. Terada and F. W. Cagle, Jr.</i>	159
COMPUTERS, HIGH SPEED APPLICATION TO THE ANALYSIS OF COMPLEX GAMMA SPECTRA, <i>R. J. Kofoed, Jr.</i>	161
COMPUTERS, OPTICAL ANALOG, AS AIDS IN X-RAY STRUCTURE INVESTIGATIONS, <i>K. Lemm</i>	163
COMPUTER TECHNIQUES IN PROCESSING ALL TYPES OF X-RAY DIFFRACTION DATA, <i>J. R. Holland and J. R. Brathovde</i>	170
CONCRETIONS, PATHOLOGICAL, INCLUDING URINARY "STONES," ORAL CALCULUS, AND GALLSTONES: DIFFRACTION ANALYSIS, <i>D. McConnell</i>	178
CRYSTAL HABIT, <i>A. Hoffer</i>	179
CRYSTAL STRUCTURE SYNTHESIS: BASIC THEORY AND PROCEDURES, <i>A. E. Attard</i>	181
CRYSTALLITE SIZE ANALYSIS BY X-RAY DIFFRACTION LINE-BROADENING: ROUTINE METHODS AND APPLICATION TO BeO , <i>R. C. Rau</i>	184
CRYSTALLITE SIZE DETERMINATION IN MICROSCOPIC AND COLLOIDAL RANGES, <i>R. R. Ferguson and M. L. Nielsen</i>	191
DEFECTS IN IONIC CRYSTAL LATTICES, <i>H. Rabin</i>	195
DEFORMATION OF METALS AT HIGH VELOCITY: APPLICATION OF X-RAYS, <i>M. K. Gainer and C. M. Glass</i>	203
DEFORMATIONS OF STRUCTURE IN ANTIFERROMAGNETIC MONOXIDES OF NICKEL, IRON, COBALT, AND MANGANESE, <i>H. P. Rooksby</i>	212
DENSITIES IN FLUIDIZED AND STATIC BED SYSTEMS: MEASUREMENT BY RADIATION ATTENUATION METHODS, <i>E. W. Grohse</i>	213
DENTAL ROENTGENOGRAPHIC INTERPRETATION, <i>T. R. Abbott</i>	221
DENTAL X-RAY TECHNIQUES—1962, <i>J. J. Dean</i>	222
DEOXYRIBONUCLEIC ACID METABOLISM: IRRADIATION EFFECTS, <i>R. B. Painter</i>	222

DETECTORS OF RADIATION, <i>G. D. Adams</i>	225
DETECTORS OF X-RADIATION (NORELCO), <i>Philips Electronic Instruments</i>	228
DIAMOND, NATURAL AND SYNTHETIC: X-RAY STUDIES, <i>J. A. Kohn</i>	230
DIAMOND SYNTHESIS, <i>A. A. Giardini</i>	234
DIFFRACTION OF X-RAYS: BASIC APPARATUS AND TECHNIQUES, <i>A. E. Attard</i>	242
DIFFRACTION OF X-RAYS: DETECTION AND MEASUREMENT, <i>A. E. Attard</i>	245
DIFFRACTOMETERS: PROGRAMMED AUTOMATIC, <i>S. C. Abrahams</i>	247
DIFFUSION COUPLES (AL-NI), ANALYSIS BY X-RAY ABSORPTION, <i>P. Lublin</i>	248
DIFFUSION MEASUREMENTS BY X-RAY DIFFRACTION, <i>P. S. Rudman</i>	253
DISCRIMINATION IN X-RAY SPECTROGRAPHIC ANALYSIS, <i>P. Lublin</i>	255
DISLOCATION MOVEMENT AND ALIGNMENT AS AFFECTED BY MAGNETIC FLUX: OBSERVATIONS BY X-RAY DIFFRACTION TOPOGRAPHY, <i>A. C. Eckert, Jr.</i>	258
DISORDERED LATTICES: X-RAY-DIFFRACTION EFFECTS, <i>F. Schossberger</i>	269
DISPERSING DEVICES (POSSIBLE ORGANIC COMPOUNDS) FOR LONG WAVELENGTH X-RAYS, <i>W. L. Baun</i>	269
DOSE RATE METERS, P-N JUNCTION, <i>C. H. Hertz</i>	272
DOSIMETERS: RECENT DEVELOPMENTS, <i>A. T. Krebs</i>	274
DOSIMETERS, SILVER-ACTIVATED GLASS BLOCK: LOW-ENERGY X-RAY INTENSITY MEASUREMENTS, <i>V. H. Ritz</i>	277
DOSIMETERS, SOLID "PHANTOM", <i>M. S. Potsaid</i>	279
DOSIMETRY, CHEMICAL, <i>G. D. Adams</i>	290
DOSIMETRY: ENERGY-INDEPENDENT ROENTGEN ELEMENTS, <i>H. F. H. Warrikhoff</i>	290
DOSIMETRY, GAMMA: A COMPARISON OF ALL KNOWN METHODS, <i>S. Tsuda</i>	291
DOSIMETRY, GAMMA RAY, BY RECOIL ELECTRON CURRENTS IN SOLID DIELECTRICS, <i>P. V. Murphy</i>	304
DOSIMETRY: MYLAR FILM, <i>V. H. Ritz</i>	305
DOSIMETRY PHOTOGRAPHIC, MEGAROENTGEN RANGE, <i>W. L. McLaughlin</i>	307
DOSIMETRY: POLYMER DEGRADATION, <i>A. L. Boni</i>	308
DOSIMETRY OF RADIATION (GAMMA AND NEUTRON) IN HIROSHIMA AND NAGASAKI ATOMIC BOMB SURVIVORS, <i>S. Tsuda</i>	311
DOSIMETRY, RADIATION, AND UNITS, <i>J. E. Roberts</i>	313
DOSIMETRY: THERMOLUMINESCENCE, <i>F. Daniels</i>	316
DOUBLY BRAGG REFLECTED (DBR) X-RAYS IN CRYSTAL ORIENTATION CORRELATION STUDIES IN COLD-WORKED METALS, <i>R. L. Wild and W. T. Ogier</i>	318
DRUGS: APPLICATIONS OF X-RAY POWDER DIFFRACTION, <i>J. A. R. Cloutier</i>	320
EFFLORESCENCE IN CONSTRUCTION BRICK: X-RAY DIFFRACTION ANALYSIS OF EFFECT OF BaCO_3 , <i>Tin Boo Yee</i>	322
ELECTRODEPOSITED TIN STRUCTURE, <i>E. Schwartz</i>	324
ELECTRON TRANSFER (ISOTOPIC EXCHANGE), GAMMA COUNTING IN, <i>L. Silverman</i>	325
ELECTRORETINOGRAM IN RESPONSE TO X-RAYS, <i>C. S. Bachofer</i>	326
EMBRYO (CHICKEN): REACTION TO X-IRRADIATION, <i>R. E. Moreng</i>	331
EMISSION FROM X-RAY TUBES, EVALUATION OF, <i>P. Vuorinen</i>	333
ENERGIES OF X-RAY K AND L EMISSION LINES AND CRITICAL ABSORPTION EDGES FOR ALL THE ELEMENTS, <i>S. Fine and C. F. Hendee</i>	334
ENZYMES AS CATALYSTS: MECHANISMS OF RADIATION EFFECTS, <i>D. J. Fluke</i>	337
ENZYMES: RADIOSENSITIVITY IN RELATION TO PROTEIN STRUCTURES, <i>L. A. Mounter</i> ..	340
EQUIPMENT, FOR X-RAY DIFFRACTION AND SPECTROSCOPY, SIEMENS AND HALSKE, <i>V. E. Buhrke</i>	345
EQUIPMENT, PICKER, ESPECIALLY BIPLANE DIFFRACTOMETER, <i>T. C. Furnas, Jr.</i>	349

FATIGUE IN METALS: X-RAY SCATTERING STUDIES, <i>J. C. Grosskreutz</i>	351
FERROCENES: IDENTIFICATION OF, BY X-RAY DIFFRACTION, <i>W. L. Baun</i>	352
FIBERS: X-RAY DIFFRACTION ANALYSIS, <i>A. N. J. Heyn</i>	356
FIBRILLAR STRUCTURES, <i>R. Bonart</i>	365
FIFTY YEARS OF X-RAY CRYSTAL ANALYSIS, <i>Endeavor</i>	372
FILM DEPTH AND PARTICLE SIZE IN X-RAY FLUORESCENCE ANALYSIS, <i>E. L. Gunn</i>	373
FILM, X-RAY, <i>G. M. Corney</i>	375
FILMS, THIN: DIFFRACTION EFFECTS IN, <i>F. Schossberger</i>	381
FILMS, THIN: GAMMA SPECTROMETRY, <i>B. A. Thompson</i>	385
FILTERS FOR ENERGY SELECTION IN RADIOISOTOPE X-RAY TECHNIQUES, <i>J. F. Cameron and J. R. Rhodes</i>	387
FLUORESCENCE SPECTROCHEMICAL ANALYSIS: PRINCIPLES, <i>C. L. Winchester</i>	392
FLUORIDATION OF DENTAL ENAMEL, <i>R. B. Fischer</i>	394
FLUOROSCOPY: NONDESTRUCTIVE APPLICATIONS, <i>O. Renius</i>	395
FLUOROSCOPY, REMOTE, IN THE 2-MEV RANGE, <i>A. F. Wegener and E. A. Burrill</i>	398
FOLD (CONVOLUTION, FALTUNGS) INTEGRALS IN THE THEORY OF X-RAY INTERFERENCES, <i>R. Bonart</i>	399
FOOD PRESERVATION BY IRRADIATION, <i>G. L. Clark</i>	406
GAMMA SCINTILLATION SPECTROMETRY: DETERMINATION OF URANIUM-235, <i>J. F. Cosgrove and G. H. Morrison</i>	410
GASOLINE ANALYSIS BY X-RAY EMISSION SPECTROGRAPHY, <i>R. A. Jones</i>	410
GAUGES, X-RAY, OF UNCONVENTIONAL TYPES, <i>C. A. Ziegler</i>	412
GENERATION OF X-RAYS, <i>D. W. Bowman</i>	416
GENERATORS, HIGH-VOLTAGE, FOR X-RAY DIFFRACTION WORK, <i>G. D. A. Hoekstra</i>	421
GEOCHRONOMETRY BY X-RAY FLUORESCENCE SPECTROMETRY, <i>L. F. Herzog, II</i>	423
GHOST REFLECTIONS, <i>F. Schossberger</i>	426
GLASS, PLATE AND CONTAINER: X-RAY SPECTROGRAPHIC ANALYSIS, <i>S. H. Laning</i>	427
GLASSES, SILICATE: STRUCTURE, <i>L. W. Tilton</i>	430
GONIOMETER, FULL CIRCLE, FOR SINGLE-CRYSTAL X-RAY DIFFRACTION, <i>J. Intrater and G. Bertoldo</i>	436
GONIOMETER: LOW ANGLE SCATTERING, <i>D. J. Evins</i>	437
GRAPHITE AND GRAPHITIC CARBONS: X-RAY APPLICATIONS, <i>G. L. Clark</i>	439
HALOGENS—STRUCTURE, BONDING, <i>G. B. Carpenter</i>	444
HAZARDS OF RADIATION IN REALISTIC PERSPECTIVE, <i>L. S. Taylor</i>	445
HIGH-TEMPERATURE X-RAY DIFFRACTION	
I. GENERAL SURVEY, <i>F. Schossberger</i>	450
II. COMPARISON OF INSTRUMENTS AND TECHNIQUES, <i>H. Warlimont</i>	454
III. REVIEW, ILLUSTRATIONS AND BIBLIOGRAPHY TO DATE, <i>W. L. Baun</i>	461
HISTORICAL MILESTONES FOR X-RAYS AND GAMMA RAYS (1600–1962), <i>G. L. Clark</i>	471
IMAGE-CONVERTER TUBES, <i>A. F. Wegener</i>	476
IMPERFECT CRYSTALS: THEORY AND PRACTICE OF PRECISION MEASUREMENT OF INTERPLANAR SPACINGS, <i>R. M. Asimow</i>	479
INCISOR OF THE RAT AS A TEST OBJECT OF RADIOBIOLOGICAL AND CHEMICAL PROTECTIVE EFFECTS, <i>G. Pliess</i>	484
INFORMATION THEORY: USE IN X-RAY CRYSTALLOGRAPHY, <i>D. McLachlan, Jr.</i>	
I. INTRODUCTION AND GENERAL CONCEPTS	484
II. CRYSTAL STRUCTURE AND INFORMATION THEORY	489

III. APPROXIMATE METHODS IN DETERMINATION OF CRYSTAL STRUCTURES	490
IV. THE ROLE OF PATTERN RECOGNITION IN CRYSTAL STRUCTURE DETERMINATION	495
V. COMPLETE BIBLIOGRAPHY FOR ARTICLES I-IV	502
INTENSIFICATION OF X-RAY IMAGES BY ELECTRONIC MEANS, <i>E. P. Bertin</i>	
I. GENERAL PRINCIPLES	502
II. THE ELECTRON-OPTIC IMAGE INTENSIFIER	506
III. MECHANO-ELECTRONIC AND FLYING-SPOT INTENSIFIERS	510
IV. TELEVISION SYSTEMS AND PICK-UP TUBES	513
V. INTENSIFICATION OF X-RAY DIFFRACTION IMAGES	518
VI. A COMPREHENSIVE BIBLIOGRAPHY	523
INTENSIFYING PANELS, SOLID-STATE, FOR IMAGES IN RADIOLOGY, <i>J. F. Fowler</i>	527
INTENSITIES, INTEGRATED X-RAY DIFFRACTION, <i>H. Chessin</i>	528
INTERELEMENT EFFECTS IN X-RAY FLUORESCENCE SPECTROMETRY, <i>B. J. Mitchell</i>	531
ION EXCHANGE COMBINED WITH X-RAY FLUORESCENCE ANALYSIS, <i>R. L. Collin</i>	536
K-CAPTURE SPECTROSCOPY: PRINCIPLES, SOURCES AND APPLICATIONS, <i>W. Seaman</i>	537
K-CAPTURE X-RAY ABSORPTION ANALYSIS: INSTRUMENTATION AND TECHNIQUES, <i>L. H. Griffin</i>	539
K-LINE QUANTUM YIELDS FROM THE LIGHT ELEMENTS, <i>R. M. Dolby</i>	541
LAMINOGRAPHY, AXIAL TRANSVERSE, <i>S. Takahashi</i>	543
LAYER-LATTICE SILICATES: IDENTIFICATION AND ANALYSIS BY X-RAY DIFFRACTION, <i>J. L. White</i>	544
LAYER-LATTICE SILICATE MINERALS: STRUCTURES BY X-RAY DIFFRACTION, <i>J. L. White</i>	546
LAYER MINERALS, RANDOMLY INTERSTRATIFIED, <i>W. F. Bradley</i>	550
LINE BREADTH ANALYSIS: THEORY AND PRACTICE, <i>P. S. Rudman</i>	551
LINEAR ENERGY TRANSFER (LET), <i>G. W. Barendsen</i>	555
LIPIDS: EFFECT ON SURVIVAL OF MICE AFTER LETHAL X-IRRADIATION, <i>J. K. Ashikawa</i>	557
LIPIDS AND LIPOPROTEINS (PLASMA): EFFECT OF X-IRRADIATION, <i>N. R. DiLuzio</i>	560
LIQUID DENSITIES: MEASUREMENTS WITH X-RAYS AT HIGH TEMPERATURES AND PRESSURES, <i>N. A. Krohn and R. G. Wymer</i>	561
MAGNESIUM ALLOYS: RAPID, AUTOMATIC X-RAY ANALYSIS, <i>G. A. Stoner</i>	564
MAGNIFIED X-RAY IMAGES IN MEDICINE AND BIOLOGY (MICRO-MACRO-RADIOGRAPHY AND HISTORADIOGRAPHY), <i>F. Bohatirchuk</i>	567
MAIZE SEEDS, X-IRRADIATED: PHYSIOLOGICAL AND BIOCHEMICAL ASPECTS OF GROWTH, <i>J. H. Cherry and R. H. Hageman</i>	572
MALFORMATIONS, CONGENITAL, INDUCED BY RADIATION, <i>E. Hammer-Jacobsen</i>	575
MANAGEMENT OF THE ANALYTICAL FUNCTION IN RESEARCH LABORATORIES, <i>E. F. Kaelble and C. F. Callis</i>	579
MARTENSITIC PHASE TRANSFORMATION: APPLICATION OF HIGH-TEMPERATURE DIFFRACTOMETRY, <i>G. M. Wolten</i>	580
MATRIX (INTERELEMENT) EFFECT IN SPECTROMETRY: MASSIVE SPECIMENS; MIXABLE SPECIMENS; THICK SPECIMENS; THIN FILMS, <i>J. Sherman</i>	583
MEDICAL PROBLEMS: APPLICATION OF X-RAY DIFFRACTION ANALYSIS, <i>J. Parsons</i>	588
METALLURGY, X-RAY, <i>B. D. Cullity</i>	590
METALS: ISOLATION AND DETECTION OF MINOR CONSTITUENTS BY X-RAY DIFFRACTION, <i>L. Silverman</i>	592
METHODS, X-RAY, <i>Philips Electronic Instruments</i>	593

MICROANGIOGRAPHY, <i>L. F. A. Peterson and P. J. Kelly</i>	595
MICRO-CONSTITUENTS IN STEEL AND OTHER COMPLEX ALLOYS: X-RAY ANALYSIS, <i>K. W. Andrews and H. Hughes</i>	597
MICRODIFFRACTION, <i>M. E. Bergmann</i>	600
MICRORADIOGRAPHIC SURVEYS AS A PRELIMINARY TO ELECTRON MICROSCOPY, <i>D. B. Scott</i>	604
MICRORADIOGRAPHY, DICHROMATIC, IN QUANTITATIVE DETERMINATION OF ORGANIC AND INORGANIC MATERIAL IN MINERALIZED TISSUES, <i>B. Lindström and K.-Å. Omnell</i>	606
MICRORADIOGRAPHY IN BIOLOGY, <i>G. A. G. Mitchell</i>	607
MICRORADIOGRAPHY, IRON AND STEEL APPLICATIONS OF, <i>K. W. Andrews and W. Johnson</i>	618
MONITORING OF RADIATION, <i>G. D. Adams</i>	621
MOSAIC BLOCK SIZES FROM X-RAY INTENSITY MEASUREMENTS, <i>Y. Hiki</i>	622
MOVING FILM DIFFRACTION METHODS FOR SINGLE CRYSTALS, <i>G. P. Mohanty</i>	624
MUTATIONS AND EVOLUTION, <i>R. Zdansky</i>	631
MUTATIONS INDUCED BY X-RAYS IN A MORNING GLORY, <i>Tin Boo Yee</i>	634
MYOGLOBIN AND HEMOGLOBIN STRUCTURAL RESEARCH AWARDS TO KENDREW AND PERUTZ OF THE 1962 NOBEL PRIZE IN CHEMISTRY, <i>D. Harker</i>	638
NERVES, X-RAY EFFECTS ON BIOELECTRIC ACTIVITY, <i>C. S. Bachofer</i>	641
NEUTRON ACTIVATION ANALYSIS, <i>C. W. Tittle</i>	643
NEUTRON RADIOACTIVATION ANALYSIS OF MINOR ELEMENTS IN ULTRAPURE BERYLLIUM AND ITS COMPOUNDS, <i>W. T. Mullins, J. F. Emery, L. C. Bate, and G. W. Leddicotte</i>	648
NONDISPERSIVE X-RAY FLUORESCENCE SPECTROMETRY, <i>T. Hall</i>	653
NUCLEAR DECAY SCHEME STUDIES BY GAMMA-RAY SPECTROSCOPY, <i>R. Gunnink</i>	655
ON-STREAM FLUORESCENCE ANALYSIS, <i>Chemical & Engineering News</i>	657
OPTICS, TOTAL REFLECTION X-RAY, <i>J. F. McGee</i>	657
ORGANIC COMPOUNDS: CHARACTERIZATION OF DERIVATIVES BY DIFFRACTION, <i>K. J. Garska</i>	663
ORIENTATION DISTRIBUTIONS OF CRYSTALLITES IN POLYETHYLENE TEREPHTHALATE FILMS, X-RAY DETERMINATION OF, <i>R. L. Burton and C. J. Heffelfinger</i>	666
ORIENTATION OF CRYSTALLINE MATERIAL IN SHEETS, ESPECIALLY PAPER, <i>W. Prins</i> ..	674
ORIENTATION OF LARGE SINGLE CRYSTALS BY MEANS OF X-RAY DIFFRACTION, APPARATUS FOR, <i>H. P. Leighly, Jr.</i>	676
OXIDE MIXTURE ANALYSES FOR V, CU, MO, TI, CO AND NI BY FLUORESCENCE SPECTROMETRY, <i>E. D. Pierron and R. H. Munch</i>	679
OXIDES: NONSTOICHIOMETRIC AND MIXED VALENCE, <i>W. D. Johnston</i>	681
PALEONTOLOGY, RADIOGRAPHY IN, <i>W. K. Hamblin and J. Van Sant</i>	684
PARACRYSTALS, <i>R. Bonart</i>	686
PARAMETERS OF CRYSTAL LATTICES	
I. DEFINITIONS AND GENERAL RELATIONSHIPS, <i>M. E. Straumanis</i>	696
II. HIGH-PRECISION MEASUREMENTS BY THE ASYMMETRIC DIFFRACTION METHOD, <i>M. E. Straumanis</i>	700
III. X-RAY DIFFRACTION METHODS WITH ESTIMATES OF ACCURACY AND PRECISION OF THESE METHODS, <i>K. E. Beu</i>	709

PARTICLE SIZE ANALYSIS BY GAMMA-RAY ABSORPTIOMETRY, <i>C. P. Ross</i>	727
PARTICLE SIZE BY X-RAYS—STATISTICS, <i>P. M. deWolff</i>	727
PARTICLES, SMALL: DIFFRACTION EFFECTS, <i>F. Schossberger</i>	728
PERFECTION OF CRYSTALLINE STRUCTURES FROM LATTICE CONSTANT AND DENSITY MEASUREMENTS, <i>M. E. Straumanis</i>	733
PETROLEUM FIELD APPLICATIONS OF X-RAY EMISSION SPECTROMETRIC ANALYSIS AND THE SOLUTION OF MATRIX PROBLEMS, <i>Chia-chen Chu Kang</i>	738
PETROLEUM REFINING: QUALITY CONTROL BY X-RAY ABSORPTION AND EMISSION METHODS, <i>F. W. Porsche</i>	740
PHARMACEUTICAL AND FINE CHEMICALS RESEARCH AND QUALITY CONTROL WITH X-RAY METHODS, <i>D. E. Williams</i>	746
PHARMACEUTICAL RESEARCH USES OF X-RAY DIFFRACTION AND SPECTROGRAPHY, <i>R. B. Scott and J. M. Vandenberg</i>	747
PHASE PROBLEM IN CRYSTAL STRUCTURE ANALYSIS, <i>H. Hauptman</i>	749
PHASES, NONMETALLIC CHEMICALLY EXTRACTED, DIFFRACTION ANALYSIS, <i>R. H. Hiltz and D. P. Laverty</i>	754
PHOSPHENES, X-RAY AND RADIUM, <i>A. T. Krebs</i>	755
PHOSPHOR INDUSTRY AND X-RAY DIFFRACTION ANALYSIS, <i>C. W. W. Hoffman and R. C. Ropp</i>	756
PHOTOSOMMATEUR, VON ELLER, <i>G. D. A. Hoekstra</i>	765
PLANTS: EFFECTS OF X-RAYS AND GAMMA RAYS, <i>P. Pureau-Leroy</i>	766
PLASTICS AND POLYMERS: EFFECTS OF X- OR GAMMA RADIATIONS, <i>A. Charlesby</i>	768
PLATING THICKNESS MEASURED BY X-RAYS, <i>R. H. Zimmerman</i>	772
POLARIZATION OF X-RAYS, <i>H. Cole</i>	774
POLE FIGURES, <i>J. R. Holland</i>	776
POLYMER CHARACTERIZATION BY X-RAY TECHNIQUES, <i>W. O. Statton</i>	779
POLYMER CRYSTALLINITY DETERMINATION BY X-RAYS, <i>V. D. Gupta and R. B. Beevers</i>	783
POLYMER PREFERRED ORIENTATION, MEASUREMENT BY X-RAY DIFFRACTION: THEORY AND PRACTICE, <i>Z. W. Wilchinsky</i>	789
POLYMERS, SEMICRYSTALLINE: APPLICATIONS OF MICROBEAM AND SMALL-ANGLE DIFFRACTION METHODS, <i>H. D. Keith</i>	792
POLYMERIZATION BY GAMMA RAYS OF CARBOHYDRATES AND RELATED COMPOUNDS, <i>A. J. Bailey</i>	793
POROSITY MEASUREMENT BY RADIATION ABSORPTION, <i>G. L. Clark</i>	795
PORPHYRIN IDENTIFICATION BY X-RAY POWDER PATTERNS, <i>E. F. G. Klesper</i>	797
PORTLAND CEMENT COMPOUNDS: CRYSTAL STRUCTURES, <i>J. Chi-Sun Yang</i>	800
PORTLAND CEMENT, QUANTITATIVE X-RAY DIFFRACTION ANALYSIS OF, <i>S. Brunauer and L. E. Copeland</i>	810
POWDER DIFFRACTION: INFLUENCE OF GONIOMETRIC ARRANGEMENT AND ABSORPTION, <i>J. Leroux</i>	812
POWDER DIFFRACTION: NEW DIMENSIONS, <i>T. Zoltai and I. Jahanbagloo</i>	814
PROBE (ELECTRON): MICROANALYSIS PRINCIPLES, <i>C. L. Winchester</i>	817
PROBE (ELECTRON): MICROANALYZER DESIGNS, <i>P. Duncumb</i>	818
PROBE (ELECTRON): QUANTITATIVE MICROANALYSIS, <i>P. Duncumb and P. K. Shields</i> ..	824
PROBE (ELECTRON): SCANNING AND POINT MICROANALYZER APPLICATIONS ESPECIALLY IN METALLURGY, <i>P. Duncumb and D. A. Melford</i>	830
PROBE, INTERMEDIATE X-RAY, <i>I. Adler</i>	834
PROBE (MICRO) ELECTRON: ELECTRON, X-RAY AND LIGHT OPTICS, <i>L. S. Birks</i>	840
PRODUCTION OF X-RAYS, <i>G. D. Adams</i>	845

PROJECTION MICROSCOPY, <i>Ong Sing Poen</i>	846
PROTECTANTS, CHEMICAL, <i>T. R. Noonan</i>	851
PROTECTION, RADIATION WITH BACTERIAL PYROGENS, <i>E. J. Ainsworth</i>	852
PROTECTION AGAINST RADIATION: CURRENT STATUS, <i>J. F. Thompson</i>	853
PROTECTION SURVEY, <i>G. D. Adams</i>	854
PROTECTIVE EFFECTS OF A PHENANTHRENE DERIVATIVE (WITH SEX DIFFERENCES), <i>W. H. Rooks, II</i>	855
PROTECTIVE EFFECTS OF THIOL COMPOUNDS IN MAMMALIAN SYSTEMS, <i>E. E. Schwartz</i>	855
PROTECTIVE ENCLOSURES, DESIGN OF, <i>G. D. Adams</i>	857
PROTEIN FIBER STRUCTURES, ESPECIALLY KERATINS: CONTRIBUTIONS OF X-RAY DIFFRACTION, <i>G. L. Clark</i>	859
PROTEINS: ENERGY REQUIREMENTS FOR INACTIVATION, <i>D. E. Wilson, Jr.</i>	864
PULP AND PAPER INDUSTRY: APPLICATIONS OF X-RAY TECHNIQUES, <i>D. Harper</i>	865
PURINE NUCLEOSIDES, ETC., IRRADIATION, <i>G. Hems</i>	871
QUALITY, X-RAY, <i>G. D. Adams</i>	874
QUANTITATIVE ANALYSIS BY X-RAY DIFFRACTION, <i>L. E. Copeland</i>	875
QUANTITATIVE ANALYSIS OF MIXTURES BY A RECORDING POWDER DIFFRACTOMETER, <i>R. R. Ferguson and M. L. Nielsen</i>	877
RADIAL DISTRIBUTION ANALYSIS OF DIFFRACTOMETER DATA FOR AMORPHOUS MATERIALS, <i>H. E. Robson and L. Broussard</i>	881
RADIATION CHEMISTRY OF GASES, LIQUIDS AND SOLIDS: THE ELEMENTARY PROCESSES, <i>M. Burton</i>	884
RADIATION EFFECTS ON THE INSECT OVARY, <i>D. S. Grosch</i>	888
RADIOACTIVE MATERIALS, ANALYSIS BY X-RAY FLUORESCENCE SPECTROMETRY, <i>R. J.</i> <i>Kofoed, Jr.</i>	889
RADIOBOTANY, <i>J. H. Cherry</i>	891
RADIOGRAPHIC ANALYSIS AND VISUALIZATION USING X-RAY SPECTRAL INFORMATION, <i>R. S. MacKay</i>	896
RADIOGRAPHY, ISOTOPIC, OF PHYSIOLOGICAL HARD TISSUES, <i>H. D. Spangenberg, Jr.</i> <i>and M. L. Pool</i>	899
RADIOGRAPHY, LOW EXPOSURE, <i>C. Gianturco</i>	900
RADIOGRAPHY IN SUPERVOLTAGE AND HIGH-ENERGY RANGES, <i>E. A. Burrill</i>	902
RADIOLYSIS OF POLY(POTASSIUM ACRYLATE), <i>B. G. Harper and R. N. Bashaw</i>	904
RADIOLYSIS OF SIMPLE ORGANIC COMPOUNDS, <i>A. J. Swallow</i>	905
RADIOSENSITIVITY, COMPARATIVE, OF ORGANISMS, <i>A. H. Sparrow</i>	907
RADIOSENSITIVITY OF HUMAN ORGANS, <i>H. Sobel</i>	907
RADIOTHERAPY, ROTATORY CONFORMATION, <i>S. Takahashi</i>	910
RADIUS RATIO CORRELATION OF ABO ₄ COMPOUND STRUCTURES, <i>K. S. Vorres</i>	911
RARE EARTHS: X-RAY SPECTROMETRY, <i>K. R. Stever and H. H. Heady</i>	913
REACTIONS, RADIATION-INDUCED, OF CARBON DIOXIDE WITH ORGANIC COMPOUNDS, <i>C. E. Stoops and C. L. Furrow</i>	916
REACTOR FUEL ELEMENT LOADING DETERMINATION BY GAMMA MONITORING, <i>O.</i> <i>Renius</i>	918
RECIPROCAL LATTICE IN FIBER AND SINGLE-CRYSTAL ANALYSIS, <i>N. C. Schieltz</i>	920
RECOVERY, BIOLOGICAL, FROM RADIATION INJURY, <i>J. F. Spalding</i>	929
RECOVERY FROM RADIATION DAMAGE, <i>G. Sacher</i>	931
RELATIVE BIOLOGICAL EFFECTIVENESS (RBE), <i>G. W. Barendsen</i>	934

RETICULO-ENDOTHELIAL SYSTEM: EFFECT OF X-IRRADIATION, <i>N. R. DiLuzio</i>	937
ROCK ANALYSIS BY FLUORESCENT X-RAY SPECTROGRAPHY, <i>A. A. Chodos</i>	938
ROCK STRUCTURES, RADIOGRAPHY OF, <i>W. K. Hamblin</i>	940
ROENTGENOGRAPHY WITH DIRECTLY ENLARGED IMAGES, <i>S. Takahashi</i>	942
ROTATING AND OSCILLATING CRYSTAL DIFFRACTION METHODS, <i>G. P. Mohanty</i>	943
RUBBER MICRORADIOGRAPHY, <i>W. M. Hess</i>	947
SAMPLE PREPARATION FOR POWDER DIFFRACTION, <i>M. L. Nielsen and R. R. Ferguson</i>	952
SAMPLE PREPARATION FOR POWDER DIFFRACTION WITH MICRO QUANTITY OF MA- TERIAL, <i>R. K. Sorem</i>	954
SAMPLE PREPARATION FOR SPECTROMETRY: BORAX DISK, <i>D. R. Maneval and H. L.</i> <i>Lovell</i>	956
SAMPLE PREPARATION FOR SPECTROMETRY: BRIQUETTED COPPER ALLOY DRILLINGS, <i>T. J. Cullen</i>	957
SAMPLE PREPARATION FOR SPECTROMETRY: ORES AND MINERAL PRODUCTS, <i>R. E.</i> <i>Wood</i>	958
SAMPLE PREPARATION FOR SPECTROMETRY: POTASSIUM PYROSULFATE FUSION TECH- NIQUE, <i>T. J. Cullen</i>	960
SCATTERING, COHERENT AND COMPTON, INTERFERENCES IN X-RAY SPECTROMETRY, <i>C. M. Johnson</i>	962
SCATTERING AND DIFFRACTION OF X-RAYS AT SMALL ANGLES, ESPECIALLY BY FIBERS, <i>A. N. J. Heyn</i>	965
SCATTERING, SMALL-ANGLE, CRITICAL PHENOMENA STUDY, <i>H. Brumberger</i>	970
SCATTERING, SMALL ANGLE	
I. GENERAL PRINCIPLES AND APPLICATION TO PROTEINS, <i>P. W. Schmidt</i>	972
II. THEORY, HIGH PRECISION EXPERIMENT, AND QUANTITATIVE ANALYSIS OF DATA, <i>R. H. Bragg</i>	974
SCATTERING, SMALL ANGLE: VITREOUS SILICATES—CHARACTERIZATION, <i>W. O. Statton</i>	977
SCATTERING, THERMAL DIFFUSE, CORRECTIONS TO INTEGRATED DIFFRACTION IN- TENSITIES, <i>D. R. Chipman and A. Paskin</i>	977
SCATTERING OF X-RAYS AND GAMMA RAYS: THERMAL MOTION EFFECTS, <i>D. W.</i> <i>Berreman</i>	979
SCINTILLATION CRYSTALS, GAMMA RAY, CALIBRATION, <i>R. Gunnink</i>	980
SEGREGATED ELEMENTS IN HIGH-TEMPERATURE ALLOYS: X-RAY FLUORESCENCE ANALYSIS, <i>R. F. Stoops</i>	982
SEMICONDUCTORS AND SEMICONDUCTOR DEVICES: EFFECTS OF IRRADIATION, <i>W. C.</i> <i>Dunlap</i>	984
SHIELDING OF STRUCTURES FROM FALLOUT GAMMA RADIATION (ANALYSIS METH- ODOLOGY), <i>G. M. Clark</i>	990
SIEVES, SYNTHETIC MOLECULAR, STRUCTURES, <i>L. Broussard and D. P. Shoemaker</i> ..	994
SILVER HALIDES: STRUCTURES AND IMPERFECTIONS, <i>C. R. Berry</i>	997
SOLAR X-RAYS, <i>G. L. Clark</i>	1002
SOLID SOLUTIONS: DIFFRACTION ANALYSIS, <i>R. R. Ferguson and M. L. Nielsen</i>	1004
SOLID SOLUTIONS: LOCAL ORDER AND ATOMIC SIZE FROM X-RAY DIFFUSE SCATTER- ING, <i>P. S. Rudman</i>	1005
SOLIDOGRAPHY, <i>S. Takahashi</i>	1009
SOLUTIONS: SPECTROMETRIC ANALYSIS WITH COHERENT SCATTERED RADIATIONS AS INTERNAL STANDARDS, <i>T. J. Cullen</i>	1010
SOURCE, INTENSE PULSED X-RAY, <i>V. E. Scherrer</i>	1012

SOURCES, RADIOISOTOPE X-RAY, <i>J. F. Cameron and J. R. Rhodes</i>	1013
SOYBEAN SEED BACTERIAL STERILIZATION BY X-RAYS, <i>G. L. Clark</i>	1015
SPECTRAL LINES, K, L AND M(2-10A): ANALYTICAL APPLICATIONS, <i>W. J. Campbell</i> ..	1016
SPINELS (NORMAL-INVERSE TYPES), ORDER-DISORDER IN, <i>R. K. Datta and R. Roy</i>	1018
STEAM VOIDS IN WATER: MEASUREMENT BY RADIATION ATTENUATION METHODS, <i>E. W. Grohse</i>	1022
STRESSES, RESIDUAL, IN HARDENED STEEL: DETERMINATION BY X-RAY DIFFRACTION, <i>K. E. Beu</i>	1027
SULFUR STRUCTURES, <i>A. G. Pinkus and J. L. McAtee, Jr.</i>	1033
SUPERSTRUCTURES: X-RAY EVIDENCE, <i>B. W. Batterman</i>	1038
SYNCHROTRON, <i>G. D. Adams</i>	1039
TEACHING X-RAY SPECTROSCOPY, <i>W. F. Loranger</i>	1041
TECHNIQUES FOR THE INVESTIGATION OF INDUSTRIAL MATERIALS, INTERRELATION OF, <i>K. W. Andrews</i>	1042
TEETH: EFFECTS OF IONIZING RADIATION, <i>D. J. Kimeldorf, D. C. L. Jones, and T. J. Castanera</i>	1043
THICKNESSES OF CLADDING OF NUCLEAR FUEL ELEMENTS DETERMINED BY X-RAYS, <i>P. Lublin</i>	1045
THX ₂ COMPOUND ALLOY CRYSTAL STRUCTURES, AND THE PROBABLE STRUCTURES OF THPB AND UPB, <i>A. Brown</i>	1049
TITANIA-OPACIFIED ENAMEL DIFFRACTION ANALYSIS, <i>Tin Boo Yee</i>	1052
TOPOGRAPHY, X-RAY DIFFRACTION, <i>A. R. Lang</i>	1053
TOPOGRAPHY, X-RAY DIFFRACTION, IN DISLOCATION STUDIES, <i>A. R. Lang</i>	1058
TRACE ANALYSES BY COMBINATION OF ION EXCHANGE AND X-RAY FLUORESCENCE, <i>J. N. Van Niekerk</i>	1063
TRACE ANALYSIS IN PETROLEUM PRODUCTS BY X-RAY EMISSION AND ABSORPTION SPECTROMETRY: INSTRUMENTATION, SAMPLES, METHODS AND SENSITIVITIES, <i>J. E. Shott, Jr.</i>	1064
TRACE LEVEL DETECTION OF ELEMENTS BY X-RAY FLUORESCENCE IN LOW ATOMIC NUMBER MATRICES, <i>C. C. Hale</i>	1067
TRACE METALS DETERMINATION IN PETROLEUM BY X-RAY SPECTROMETRY: STANDARDIZATION AND CORRECTION TECHNIQUES, <i>C. W. Dwiggin, Jr.</i>	1071
TRACER TECHNIQUES WITH RADIOISOTOPES IN MEDICINE, <i>K. E. Corrigan and H. Hayden</i>	1073
TRANSFORMS, OPTICAL, IN CRYSTAL STRUCTURE ANALYSIS, <i>S. F. Darlow</i>	1076
TRIGLYCERIDES, CRYSTAL STRUCTURES OF, <i>F. R. Paulicka and C. W. Hoerr</i>	1081
TUBES, FINEST-FOCUS X-RAY TRIODE WITH A DOUBLE LENS FOR CRYSTAL STRUCTURE ANALYSIS AND MEDICAL-DIAGNOSTIC PURPOSES, <i>L. Beitz</i>	1087
TUBES, X-RAY, <i>T. H. Rogers</i>	1090
TUBES, X-RAY, WITH FIELD EMISSION COLD CATHODES FOR FLASH RADIOGRAPHY, <i>W. P. Dyke</i>	1097
TUMORS IN PLANTS: EFFECT OF IONIZING RADIATION, <i>P. Manigault</i>	1098
UNITS AND MEASUREMENTS OF RADIATION, <i>G. D. Adams</i>	1100
UNITS, RADIATION: HISTORICAL DEVELOPMENT, <i>H. M. Parker and W. C. Roesch</i>	1102
URANIUM DIOXIDE IN STAINLESS STEEL: DETERMINATION IN SOLUTION BY X-RAY FLUORESCENCE SPECTROMETRY, <i>L. Silverman</i>	1107

URANIUM AND THE TRANSURANIUM ELEMENTS ANALYSIS BY X-RAY FLUORESCENCE SPECTROMETRY: HANFORD TECHNIQUES, <i>R. J. Kofoed</i>	1108
URANIUM X-RAY ANALYSES: GENERAL REVIEW, <i>D. W. Larson and A. B. VanCleave</i> ..	1110
VAN DE GRAAFF X-RAY GENERATORS AND PARTICLE ACCELERATORS, <i>E. A. Burrill</i> ..	1113
VIRUSES, RADIATION INACTIVATION OF, <i>D. E. Wilson, Jr.</i>	1115
WATER AND AQUEOUS SOLUTIONS: RADIATION CHEMISTRY, <i>E. J. Hart</i>	1117
WAVELENGTH TABLES, X-RAY, <i>J. W. Kemp</i>	1124
WEATHERING OF SOIL MINERALS, <i>J. L. White</i>	1136
INDEX.....	1141