

## COMMUNICATIONS TO PROCEEDINGS: INDEX OF SUBJECTS, 1964

## A

- Acetanilide**, *o*-*t*-butyl-*N*-nitroso-, anomalous decomposition: evidence for participation of an aryne, 338.
- Acetyl group**, formation in phosphoketolase reaction, model for, 61.
- Acetylacetone**, reaction with oct-1-ene, 142.
- Acetylene**, cyclic complex of hexacarbonyldicobalt, (CO)<sub>3</sub>CoCaF<sub>6</sub>Co(CO)<sub>3</sub>, 401.
- Acetylenedicarboxylic ester**, structure of adducts of triphenylphosphinimines with, 87.
- Acetylenedicarboxylate**, dimethyl, formation of cyclopenta[*c*]-quinolizines from 3-1'-dimethylaminovinylindolizines and, 330.
- Acid chlorides**,  $\alpha\beta$ -unsaturated, reaction with enamines, 287.
- Acidity functions**, determination in alkaline media, choice of indicators: mode of ionisation of aromatic amines, 298.
- Acylation**, bimolecular, mechanism, 268.
- Aeruginosin B**, naturally occurring phenazinesulphonic acid, 19.
- Alcohols**, saturated, oxidation by manganese dioxide, 110. spin-spin coupling with the hydroxyl-protons of, 290.
- Aldofuranosides** and acyclic aldose acetals, nuclear magnetic resonance, 369.
- Alkali-metal**, derivatives of dimethyl sulphoxides, 108. trifluoromethoxides, 416.
- Alkyl cations**, tertiary, proton magnetic resonance spectra, 147.
- Allene**, synthesis, light-induced diene migration, 17. Perfluoroallene-, ionic reactions, 121.
- Allyl bromide**, free radicals in pyrolytic carbon from, 418.
- Alumina surfaces**, electron transfer at, 139.
- Amaryllidaceae alkaloids**, biosynthesis. Part V. Caffeic acid and protocatechic aldehyde as C<sub>6</sub>—C<sub>1</sub> precursors of hemanthamine and lycorine, 422.
- Amide**, protecting group in phosphate ester synthesis, 394.
- Amines**, aromatic, mode of ionisation: determination of acidity functions in alkaline media, choice of indicators, 298. metal, as reagents for the synthesis of organometallic compounds, 22. triboryl, 20.
- Amino-acids**, polycrystalline aliphatic, radical formation by photolysis of, 360.
- Aniline**, *N,N*-dimethyl-, reaction with benzoyl peroxide, 236.
- Anions**, deuterium oxide solvent effects on ultraviolet absorption of, 261.
- [14] **Annulene**, conformational isomers, 299.
- [14] **Annulene** and [18] **annulene**: nuclear magnetic resonance, temperature dependence, 397.
- [18] **Annulene**, symmetrical 5,11,17-trisdehydro-, structure, 356. trisulphide, synthesis, 82.
- Anthracene**, delayed fluorescence in pulse radiolysis of solutions in benzene, 114.
- Antimony**:  $\beta$ -Sb<sub>2</sub>O<sub>4</sub>: new polymorph, crystal structure, 400.
- Aromatic nitration**, substituent effects of positive poles in, 24.
- Arsenic**: Hexafluoroarsenate ion: probe for ion association, 147.  $\mu\mu'$ -*o*-Phenylenebisdimethylarsine-tetracarbonyl- $\pi$ -methylcyclopentadienyldimanganese(I), structure, 395.
- Aryne**, evidence for participation in anomalous decomposition of *o*-*t*-butyl-*N*-nitrosoacetanilide, 338.
- Azepine**, preparation and reactions of derivatives, 263.

## B

- Benzene**, absence of a primary hydrogen isotope effect in the sulphonation and sulphonylation of, 14. delayed fluorescence in pulse radiolysis of anthracene solutions in, 114. photochemical reaction with boron trihalides, 15. wave function and chemical formula: correction, 173. *o*-Substituted *t*-butylbenzenes, structure of organocobalt intermediate in synthesis of, 187. 1,2,4,5-Tetramethylthiobenzene cation-radical, 417.
- Benzoate**, sodium, reaction with tosyl derivatives of inositols in dimethylformamide, 331.
- Benzoyl peroxide**, reaction with *NN*-dimethylaniline, 236.
- Benzylidene derivatives**, carbohydrate, absolute configuration of some, 118.
- Benzynes**, new synthesis, 296.
- Berberine**, incorporation of dopamine into, 223.
- Beryllium**: Alkylberyllium hydride, derivatives of, 59.
- Bicyclobutane**, formation: carbenoid decomposition of cyclopropanecarboxaldehyde tosylhydrazone, 144.
- Bicyclo[3,3,1]nonane system**, conformation of, 57.
- Biphenylene**, 1- and 2-lithio-, and derived compounds, 414.
- Bond dissociation energies**, Pauling's electronegativities for Me, Ph, CN, CF<sub>3</sub>, and OH groups from, 290.
- Boron**: monoxide and diborane, high-temperature routes to, 242. trihalides, photochemical reaction of benzene with, 15.
- Boron-11** nuclear magnetic resonance spectra of two boron hydrides at 60 Mc./sec., 402. Difluoroborane, preparation and properties, 25. Novel silicoboron halide, SiBCl<sub>5</sub>. 1,2-Tetrakis(dichloroboryl)ethane, 286. Triborylamines, 120.
- Braude's relationship**, experimental verification, 232.
- Butadiene**, reaction with phenyl- and methyl-manganese carbonyl, 370.
- Butene**, isomerisation on cobalt catalysts, mechanism, 222.

## C

- Caffeic acid and protocatechic aldehyde**, C<sub>6</sub>—C<sub>1</sub> precursors of hemanthamine and lycorine; Amaryllidaceae alkaloids, biosynthesis. Part V, 422.
- Cannabigerol**, new hashish constituent, structure and synthesis, 82.
- Carabrone**, from *Carpesium abrotanoids* Linn, structure, 120.
- Carbinols**, aromatic, catalytic dehydration by acids, 113.
- Carbohydrate derivatives**, oxidation with ruthenium tetroxide, 342. benzylidene derivatives, absolute configuration of some, 118. Carbon, pyrolytic, from allyl bromide, free-radicals in, 418.
- Carbonium ion salts**, initiators for vinyl polymerisations, 391.
- Carbonyl**, mixed-metal, metal-metal bonding, 232.
- Carboxylato-groups**, transfer of three from cobalt(III) to chromium(II), 109.
- Carboxylic acids and stannic chloride**, equilibria between, Brønsted activity of such dual-acid systems, 405.

**Catechin series**, novel rearrangement in, 84.  
 Tetramethyl-(+)-catechin, conversion into 2-chlorotetramethyl-(-)-isocatechin, neighbouring group effect, 138.

**Cell division**, factor inducing: structure of zeatin, 230.

**Cephalin analogues**, 2-aminoethylphosphonate-containing, synthesis, 358.

**Cephalochromin**, structure, 195.

**Chemiluminescence**, from reaction of aqueous hydrogen peroxide with chlorine, 117.

**Chlorine**: Chemiluminescence from reaction of aqueous hydrogen peroxide with chlorine, 117.  
 Interaction between perchloric acid and styrene in methylene dichloride, 240.  
 Reactions of cobalt(III) with chloride, 113.

**Chloroform**, dioxodi-8-quinolinolato-8-quinolinoluranium-(VI)-, structure, 21.

**Chromium**: Direct substitution of I<sup>-</sup> by Cl<sup>-</sup> in Cr(H<sub>2</sub>O)<sub>5</sub>I<sup>2+</sup>, 333.  
 Reductions of rhodium(III) and iridium(III) complexes by chromium(II), 116.  
 Transfer of three carboxylato-groups from cobalt(III) to chromium(III), 109.

**Claisen rearrangements**, novel abnormal products, 228.

**Cobalt**: complexes, square-planar, singlet and triplet spin states, 110.  
 Butene isomerisation on cobalt catalysts, mechanism, 222.  
 Cobalt(III), reactions with chloride, 113.  
 Hexacarbonyldicobalt, (CO)<sub>2</sub>C<sub>6</sub>F<sub>6</sub>Co(CO)<sub>2</sub>, cyclic acetylene complex of, 401.  
 Structure of organocobalt intermediary in synthesis of *o*-substituted *t*-butylbenzenes, 187.  
 Transfer of three carboxylato-groups from cobalt(III) to chromium(II), 109.  
 Trisdiaminecobalt(III) ion-pairs, structure, 339.

**Cockroach**, American, structure of the sex-attractant of, 368.

**Colchicine**, 260.  
 biosynthesis, 86.

**Complex formation**, in dimethyl sulphoxide, 415.

**Configuration**, absolute, inconsistency of empirical criteria for, 259.

**Copper**: Copper-catalysed hydrogen-transfer reactions, 409.  
 Cupric halides, point-charge crystal-field calculations for, 18.  
 Glycylglycylglycylglycinocuprate(II) decahydrate, disodium, crystal structure: new metal compound for metal-protein interaction, 88.

**Corrin**, 1,19-disubstituted tetrahydro-, complexes with nickel, 359.  
 pentahydro-, 89.

**Corrole**. See pentadehydrocorrin, 89.

**Coumalin**, 2,4-dimethyl-, photodimerisation: synthesis of 1,3,5,7-tetramethylcyclo-octotetraene, 84.

**Crotonosine**, constitution, 261.

**Crystals**, mixed, triplet-triplet polarisation measurements, 176.

**Crystal-field**, point-charge calculations for cupric halides, 18.

**Cyclobutane-1,3-dione**, tetramethyl-, photo-decarbonylation, 144.

**Cyclodecane derivatives**, unsaturated, conformation: enthalpy of hydrogenation of alkyl-cyclodecenes and -cyclodecynes, 237.

**Cycloheptatrienes**, alkoxy-, thermal isomerisation, 59.

**Cyclohexane**, ring inversion, 145.  
 undecadeutero-, conformational isomerisation, 146.

**Cyclohexanones**, reduction to axial alcohols *via* iridium-containing catalysts, 361.

**Cyclo-octane**, evidence for saddle conformation, 190.

**Cyclo-octatetraene**, octaphenyl-, 357.  
 1,3,5,7-tetramethyl-, synthesis; photo-dimerisation of 2,4-dimethylcoumalin, 84.

**Cyclo-octatrienes**, photoisomerisations, 235.

**Cyclopenta[c]quinolizines**, formation from 3-1'-dimethylamino-vinylindolizines and dimethyl acetylenedicarboxylate, 330.

**Cyclopropane**, *cis*-1-methyl-2-vinyl-, thermal isomerisation, 221.

**Cyclopropanecarboxaldehyde tosylhydrazone**, carbenoid decomposition of; formation of bicyclobutane, 144.

**Cyclopropanecarboxylates**, methyl *cis*-2-alkyl-, thermal rearrangement, 415.

## D

**Dehydration**, catalytic, of aromatic carbinols by acids, 113.

**Dibenzothiophen anion-radicals**, effect of changes in the oxidation state upon the e.p.r. spectra of, 22.

**Diels-Alder system**, effect of light on, 195.

**Diene**, light-induced migration: an allene synthesis, 17.

**$\beta$ -Diketones**, thio-derivatives, 111.

**Diphenylcarbene**, reactions, 192.

**Diphenylmethyl chlorides**, linear free-energy relations for rates of ionisation, 115.

**Diterpenoid resin acids**, palladium-charcoal induced isomerisation, 336.

**Dopamine**, incorporation into berberine, 223.

**Dual-acid systems**, Brønsted activity: equilibria between carboxylic acids and stannic chloride, 405.

## E

**Electronegativities**, Pauling's, for Me, Ph, CN, CF<sub>3</sub>, and OH groups from bond dissociation energies, 290.

**Electrons**, slow, drift velocities in polyatomic gases, 219.  
 donors in solution, organic radicals as, 225.  
 hydrated, probable relaxation time of the ionic atmosphere of, 219.

**Elimination reaction**, bimolecular, of 2-arylethylammonium ions, mechanism, 366.  
 of trimethyl- $\alpha$ -methylbenzylammonium and -phenethylammonium ions, extent of hydrogen-isotope exchange in: correction, 365.

**Enamines**, reaction with  $\alpha\beta$ -unsaturated acid chlorides, 287.

**Esters**, papain- and ficin-catalysed hydrolyses, direct evidence of an acetylated thiol intermediate, 140.

**Ethane**, dissociation, 392.

**Ethanol**, complexes with stannic fluoride, stereochemistry, 194.

**Ethylene**, 1,2-dibenzoyl-, solid-state, *cis-trans* photoisomerisation, mechanism, 337.

## F

**Favorsky rearrangement**, stereospecific, 148.

**Fluorenes**, 9-bromo-,  $\alpha$ -elimination from, 283.

**Fluorescence**, delayed, in pulse radiolysis of anthracene solutions in benzene, 114.

**Fluorine**: Hexafluoroarsenate ion: probe for ion association, 147.  
 Hydrotetrafluorotrifluoromethylphosphate anion: CF<sub>3</sub>.PF<sub>4</sub>H<sup>-</sup>, 229.

**Friedel-Crafts reactions**, formation of free-radicals in, 396.

**Fucoxanthin**, 419.

## G

**Galanthamine methiodide**, structure, 357.

**Gases**, polyatomic, drift velocities of slow electrons in, 219.

**Germanium**: Silicon and germanium tetrahalides, relative acceptor powers toward pyridine and isoquinoline, 290.

**Grignard addition** to cyclic ketals, 416.

## H

**Haemanthamine and lycorine**, caffeic acid and protocatechuic aldehyde as C<sub>6</sub>-C<sub>1</sub> precursors of: Amaryllidaceae alkaloids, biosynthesis, Part V, 422.

**Halides**, organic, substitution and elimination reactions in the catalytic hydrogenation of, 297.

- Hashish**, new constituent of: structure and synthesis of cannabigerol, 82.
- Heterocycles**, conformational analysis, steric requirements of free and solvated lone-pairs, 257.
- Himbosine hydrobromide**, crystal structure, 58.
- Humilic acid A**, acid-catalysed isomerisation; novel rearrangement, 220.
- Hydrides**: Alkylberyllium, derivatives, 59.  
Lead hydride of high stability, 173.
- Hydrogen**, molecular, activation by complexes of rhodium(III), 284.  
isotope exchange, extent in elimination reactions of trimethyl- $\alpha$ -methylbenzylammonium and -phenethylammonium ions; correction, 365.  
Hydrogen-bond stretching vibration, 370.  
Hydrogen-transfer reactions, copper-catalysed, 409.
- Hydrogen peroxide**, aqueous, chemiluminescence from reaction with chlorine, 117.
- Hydrolysis**, aqueous alkaline ester, temperature dependence of the secondary isotope effect, 174.
- Hydroxyl radical**, transient spectra of inorganic radical anions produced by reactions of, 411.  
spectroscopic studies of reactions, 112.

## I

- Iminoxy-radicals**: hyperfine splitting in electron spin resonance spectra due to 1,6-interactions, 234.
- Indoles and indolenines**, 2-ethoxy-; case of indole-indolenine tautomerism, 368.
- Indolizines**, 3-1'-dimethylaminovinyl-, formation of cyclopenta[*c*]quinolizines from dimethyl acetylenedicarboxylate and, 330.
- Inorganic radical anions**, produced by reactions of hydroxyl radical, transient spectra, 411.
- Inositols**, tosyl derivatives, reaction with sodium benzoate in dimethylformamide, 331.
- Iodine**: Direct substitution of I<sup>-</sup> by Cl<sup>-</sup> in Cr(H<sub>2</sub>O)<sub>5</sub>I<sup>2+</sup>, 333.
- Ions**, negative, formation by field ionisation, 286.
- Iridium**: catalysts: Reduction of cyclohexanones to axial alcohols, 361.  
chromium(II) reductions of rhodium(III) and iridium(III) complexes, 116.
- Iron**: Tricarbonyloctafluorocyclohexa-1,3-dieneiron, molecular structure, 226.
- Isocyanine**, pseudo-, helical polymerisation, 119.
- ( $\pm$ )-**Isothebaine**, synthesis, 85.

## K

- Ketals**, cyclic, Grignard addition to, 416.
- Ketones**,  $\beta\gamma$ -unsaturated, optical activity in, 61.  
optical activity in, simple model for, 60.  
Reactivities of  $n-\pi$ - and charge-transfer states in photopinacolisation of ketones, 191.

## L

- Lactones**, dehydrogenation: new synthesis of  $\alpha$ -pyrones, 215.  
optical rotatory dispersion, 412.  
Structure and absolute configuration of rosololactone and related diterpenoid, 19.
- Lauryl sulphate**, sodium, catalyst for methyl orthobenzoate hydrolysis, 224.
- Lead**: hydride of high stability, 173.
- Leucodrin**, constitution, 62.  
dibromo-, structure, 63.
- Lewis acids**, Brønsted relation, 362.
- Linearisine and homolinearisine**, constitution, 261.
- Lithium**: Lithium aluminium hydride, asymmetric reductions with, 227.  
1- and 2-Lithiobiphenylene and derived compounds, 414.

## M

- Manganese**: carbonyl, compounds isostructural with, 175.  
phenyl- and methyl-, reaction with butadiene, 370.  
dioxide, oxidation of saturated alcohols by, 110.  
 $\mu\mu'$ -*o*-Phenylenebisdimethylarsine-tetracarbonyl- $\pi$ -methylcyclopentadienyldimanganese(I), structure, 395.
- Mercury**: Mercury 2537 Å resonance radiation, quenching by fluorinated olefins, 335.  
Di-*p*-tolylmercury, crystal structure, 414.
- Metal-metal bonds**, uncatalysed hydrogenolysis, 143.  
in a mixed-metal carbonyl, 232.
- Metal-protein interaction**, metal compounds for: crystal structure of disodium glycylglycylglycylglycinocuprate(II) decahydrate, 88.
- Methanol and 2-methyltetrahydrofuran**, pulse radiolysis and matrix isolation data, 265.
- Methoxides**, trifluoro-, of alkali metals, 416.
- Methoxyl fluoride**, trifluoro-, photochemical formation, 341.
- 2-Methyltetrahydrofuran**, pulse radiolysis and matrix isolation data for methanol and, 265.
- Mycinoase**, synthesis, 83.

## N

- Nickel**: planar chelates, reaction with pyridine, 228.  
Bis-( $\beta$ -ketoamine)nickel(II) complexes, synthesis and solution equilibria of, 238.  
Dinitrobis-(*NN*-dimethylethylenediamine)nickel(II), structure, 363.  
1,19-Disubstituted tetrahydrocorrin-nickel complexes, 359.
- Nitrate groups**, bidentate, NO<sub>3</sub> radical mechanism for oxidation of: structure and reactivity of titanium(IV) nitrate, 367.
- Nitration**, aromatic, substituent effects of positive poles in, 24.
- Nitrogen**, active, behaviour of CN radicals in, 410.
- Nitrosobenzene and phenylhydroxylamine**, free radicals derived from, 230.

## O

- Oct-1-ene**, reaction of acetylacetone with, 142.
- Olefins**, catalysed photochemical isomerisation, 408.  
fluorinated, quenching of mercury 2537 Å resonance radiation by, 335.  
orientation of free-radical addition to, 420.  
photoaddition of *p*-quinones to; new synthesis of oxetans and phenols, 87.  
reaction with atomic selenium, absolute rate constants, 296.
- Organometallic compounds**, metal amines as reagents for synthesis of, 22.
- Orthobenzoate**, methyl, sodium lauryl sulphate catalyst for hydrolysis of, 224.
- Orthoformate**, new sugar derivatives, 399.
- Oxetans and phenols**, synthesis: photoaddition of *p*-quinones to olefins, 87.

## P

- Palladium**: Bis-(2,2-dipyridyliminato)palladium(II), crystal structure, 258.  
New fluorides: palladium(II) hexafluoropalladate(IV) and related compounds and palladium tetrafluoride, 393.  
Palladium-charcoal induced isomerisation of diterpenoid resin acids, 336.
- Pentadehydrocorrins** (corrole), ring system, 89.
- Phalenen-1-one**, photochemistry, 332.
- Phenazinesulphonic acid**, aeruginosin B, naturally occurring, 19.
- Phenols**, synthesis of oxetans and: photoaddition of *p*-quinones to olefins, 87.
- Phenyl**, spectrum, 288.
- Phenylhydroxylamine**, free radicals derived from nitrosobenzene and, 231.

- Phosphorus:** 2-Aminoethylphosphonate-containing cephalin analogues, synthesis, 359.  
Di(alkylamino)phenylphosphines, effect of heat on, 403.  
Hydrotetrafluoro-trifluoromethylphosphate anion:  $\text{CF}_3 \cdot \text{PF}_4\text{H}^-$ , 229.  
Hypophosphates, tetra-alkyl, novel synthesis, 80.  
**Phosphate**, ester synthesis, amide as a protecting group, 394.  
Phosphazene-1'-yl cyclotriphosphazatrienes, 137.  
Phosphoketolase reaction, formation of acetyl group, model for, 61.  
Triphenylphosphine, oxidation with hydrogen peroxide, 300.  
Triphenylphosphinimines, structure of adducts with acetyl-enedicarboxylic ester, 87.  
**Platinum:** Complexes between trimethylplatinum(IV) and (a) salicylaldehyde and (b) 8-quinolinol, crystal structures, 193.  
Reduced platinum-ruthenium oxides, catalytic activity, 398.  
**Polymeric radicals**, photochemical space intermittency and diffusion coefficients, 141.  
**Polymerisation**, helical, of pseudoisocyanine, 119.  
**Porphyrins**, and reduced porphyrins, hydrogen exchange at the *meso*-positions of, 291.  
oxidation with hydrogen peroxide in sulphuric acid, 371.  
Octaethylporphyrin, nitration of, 80.  
**Promethium**, selective absorption on to surfaces from aqueous solution, 185.  
**Propan-2-one**, 1-(1,2-diphenylcyclopropenyl)-3-diazo-, photolysis, 298.  
**Protein**, interaction with metal, metal compounds for: crystal structure of disodium glycylglycylglycylglycinocuprate(II) decahydrate, 88.  
**Proton-transfer reactions**, rate and product isotope effects, 295.  
**Pulse radiolysis**, of water, solute isotope and pH effects, 266.  
of anthracene solutions in benzene, delayed fluorescence, 114.  
**Pyridine**, reaction with planar nickel chelates, 228.  
and isoquinoline, relative acceptor powers of silicon and germanium tetrahalides toward, 290.  
Pentafluoro- and chlorofluoro-pyridines, 83.  
**2-Pyridone**, 1-methyl-, crystal structure of photodimer of, 343.  
 $\alpha$ -**Pyrones**, new synthesis: dehydrogenation of lactones, 215.  
**Pyrrolene to pyridine**, new rearrangement, 217.

## Q

- 8-Quinolinol**, complexes with trimethylplatinum(IV), 193.  
*p*-**Quinones**: photoaddition to olefins: new synthesis of oxetans and phenols, 87.

## R

- Radicals**, organic, as electron donors in solution, 225.  
**Reductions**, asymmetric, with lithium aluminium hydride, 227.  
**Rhenium**: Tervalent rhenium, halogeno-anions of, 189.  
Occurrence of  $\text{Re}_3\text{Cl}_9$  clusters in hexagonal rhenium(III) chloride, 233.  
**Rhodium**: Activation of molecular hydrogen by complexes of rhodium(III), 284.  
Rhodium(III) and iridium(III) complexes, chromium(II) reductions, 116.  
**Ribonucleoside derivatives**, monoacylation *via* ortho-ester exchange, 144.  
**Rosololactone and related diterpenoid lactones**, structure and absolute configuration of, 19.  
**Ruthenium**: Dichloro(dodeca-2,6,10-triene-1,12-diyl) ruthenium(IV), formation and crystal structure, 421.  
Oxidation of carbohydrate derivatives with ruthenium tetroxide, 342.  
Reduced platinum-ruthenium oxides, catalytic activity, 398.

## S

- Salicylaldehyde**, complexes with trimethylplatinum(IV), 193.  
**Selenium**: Reaction of atomic selenium with olefins, absolute rate constants, 296.

- Senegenin**, 264.  
**Silicon**: Novel silicoboron halide,  $\text{SiBCl}_5$ , 284.  
Silicon and germanium tetrahalides, relative acceptor powers toward pyridine and isoquinoline, 290.  
**Simarolide**, bitter principle of *Simarouba amara*, structure, 292.  
constitution and absolute stereochemistry, 293.  
**Solids**, heats of wetting by non-aqueous solutions, 216.  
**Solvolytic reaction**, possible multiple bond fission: solvolysis of alkyl chlorosulphates, 406.  
**Spectra**: electron paramagnetic resonance: dibenzothiopen anion-radicals, effect of changes in the oxidation state of, 22.  
electron spin resonance: iminoxy-radicals, hyperfine splitting due to 1,6-interactions, 234.  
Mercury 2537 Å resonance radiation, quenching by fluorinated olefins, 335.  
nuclear magnetic resonance: aldofuranosides and acyclic aldose acetals, 369.  
[14]Annulene and [18]annulene, dependence of nuclear magnetic resonance spectra on temperature, 397.  
 $^{11}\text{B}$  nuclear magnetic resonance of two boron hydrides at 60 Mc./sec., 402.  
Fluorine nuclear magnetic resonance: hydroxy-fluorostannates, 407.  
Proton magnetic resonance: tertiary alkyl cations, 147.  
Spectrum of phenyl, 288.  
Transient spectra of some inorganic radical anions produced by reactions of the hydroxyl radical, 411.  
Ultraviolet absorption of anions, deuterium oxide solvent effects on, 261.  
**Spinasterol**, origin of the ethyl side-chain in, 16.  
**Steroids**, 1,5-hydrogen shifts in deamination reactions in, 241.  
 $\beta$ -substituted, conformational free-energy differences, 334.  
**Styrene**, interaction with perchloric acid in methylene dichloride, 240.  
**Substitution**, aromatic, light-catalysed, 213.  
**Sugars**, keto- new synthesis, 289.  
New sugar orthoformate, 399.  
**Sulphur**: Complexes of titanium, 362.  
Alkyl chlorosulphates, solvolysis: possible multiple bond fission solvolytic reaction, 406.  
Sulphonation and sulphonylation of benzene, absence of hydrogen isotope effect, 14.  
Sulphoxides, pyrolysis of: a steric effect, 81.  
Dimethyl sulphoxide: alkali-metal derivatives, 108.  
complex formation in, 415.  
Thermal equilibration of sulphoxide group, 56.  
Thio-derivatives of  $\beta$ -diketones, 111.  
Thiol, acetylated intermediate, in papain- and ficin-catalysed hydrolyses of esters, direct evidence for, 140.

## T

- Tetracyanoethylene oxide**, reactions, 185.  
**Tin**: Equilibria between carboxylic acids and stannic chloride: Brønsted activity of such dual-acid systems, 405.  
Hydroxyfluorostannates, fluorine nuclear magnetic resonance spectra, 407.  
Stannic fluoride-ethanol complex, stereochemistry, 194.  
**Titanium**: Sulphur complexes, 362.  
Titanium(IV) nitrate, structure and reactivity;  $\text{NO}_3$  radical mechanism for oxidation of bidentate nitrate groups, 367.  
*p*-**Toluidine**, acidolysis of dialkylzincs by, 175.  
*p*-**Tolylmercury**, di-, crystal structure, 414.  
**Transition-metal**, nitrosyl complexes, structure, 364.  
univalent ions, radiolytically produced; interaction with water, 23.  
*s*-**Triazolo[4,3-*a*]pyridine system**, rearrangement, 420.  
**Trichodermin**, new antibiotic related to trichothecin, 188.  
direct determination of molecular structure, 188.  
**Triplet-state relaxation**, kinetics, 109.

**U**

**Uranium:** Dioxodi-8-quinolinato-8-quinolinoluranium(VI)-chloroform, structure, 21.

**V**

**Vinyl,** polymerisations, stable carbonium ion salts as initiators for, 391.  
polymers, non-flexible, in solution, 404.

**W**

**Water,** primary species produced in pulse radiolysis of, solute isotope and pH effects, 266.

**Wetting of solids by non-aqueous solutions,** heats of, 216.

**X**

**Xenium:** Complex fluoroxenates(VI), 285.

**Z**

**Zeatin,** factor inducting cell division, structure, 230.  
synthesis, 231.

**Zinc:** Dialkylzincs, acidolysis by *p*-toluidine, 175.