INDEX OF SUBJECTS, 1973

A

- Abieslactone, (23R)- 3α -methoxy- 5α , 9β -lanosta-7,24-diene-26,23-lactone, crystal and molecular structure, 498.
- Absolute configuration and crystal and molecular structures of triptolide and tripdiolide, two antileukaemic diterpenoid triepoxides, 816.
 - and molecular structure of vincamine and of its hydrobromide methanolate, X-ray determination of, 2001.
 - of I-phenylethyl p-tolyl sulphoxides and the stereochemistry in the oxidation of I-phenylethyl p-tolyl sulphide, 758.
- Absorption bands, contact charge-transfer, viscosity dependence of the intensity of. Charge-transfer complexes. Part XII, 1350.
- Acceptor properties of metal halides. Part VII, tin, zinc, and antimony halides as catalysts for the racemisation of α -methylbenzyl chloride in diethyl ether, 642.
- Acenaphthene-7,7,8,8-tetracyanoquinodimethane molecular complex, crystal and molecular structure. Molecular complexes. Part XIX, 727.
 - -trichloro-p-benzoquinone molecular complex, crystal and molecular structure. Molecular complexes. Part XVIII, 724.
- Acenaphthenes, the positive and negative mass spectra of some nitro- and polynitro-, 1167.
 - polynitro-, the electron spin resonance spectra of some symmetrically substituted. Studies on nitroaromatic compounds. Part V, 681.
- Acetamide, [15] trifluoro-, hindered internal rotation in, 771. Acetanilide, the acid-catalysed hydrolysis of, 220.
- Acetanilides, benzoyl-, dissociation constants of mono- and poly-substituted, 808.
 - kinetics of oxidative condensation of p-phenylenediamine with mono- and poly-substituted, 1766.
- Acetates and formates, isomeric propyl and butyl, infrared spectra of. Conformations of some saturated carbonyl compounds. Part III, 952.
- Acetates, boro-, β-diketone (diacetatopropenyleniumdioxyborates), 1796.
- Acetic acid, chlorofluoro-, absolute configuration and optical rotation, 292.
- Acetic acids, the decarboxylation of some heterocyclic. Part II, direct and indirect evidence for the zwitterionic mechanism, 557.
- Acetohydrazide, α-cyano-, crystal structure of, 1825.
- Acetone and chloroform, variation of the intensity of infrared bands with temperature, 957.
- Acetophenone, stereochemical factors in the cathodic pinacolisation of, at a mercury pool, 1410.
- Acetophenones and benzaldehydes, substituted, kinetics and mechanisms of the morpholine-borane reduction of, 1948.
- Acetylene—allene isomerisations. Part I, base catalysis by potassium t-butoxide in t-butyl alcohol, 668. Part II, base catalysis by sodium amide in liquid ammonia, 672. phenyl-, stereoselectivity of halogenoboronation of, 1989.

- Acetylenedicarboxylate, potassium hydrogen, the α-form, an X-ray study of. Crystal structure of the acid salts of some dibasic acids. Part VII, 703.
 - rubidium hydrogen, an X-ray study of the β -form of, and a comparison with the isomorphous α -forms of the potassium and rubidium salts. Crystal structures of the acid salts of some dibasic acids. Part VIII, 706.
- Acetylenedicarboxylic and propionic acids, acidity constants for. Studies of the rate of inversion of sucrose in aqueous solutions of some strongly dissociated acids. Part II, 102.
- Acetylenes and olefins, cycloadditions of to dimethylketen: evidence for the $[\pi^2 s + \pi^2 a]$ concerted mechanism, 166. arylhalogeno-, nucleophilic substitution of, by sodium toluene-p-thiolate in NN-dimethylformamide, kinetics and mechanism of, 63.
 - di-, metallation of. Metallation reactions. Part XV, 599.
 - radicals formed from, by high energy radiation and hydrogen atom bombardment: an electron spin resonance study, 1405.
- Acid-base behaviour of phorphoryl and sulphinyl groups in some organic bases, 531.
 - -catalysed hydration of sabinene and α-thujene, 665.
 - hydrolyses of some alkyl β-D-glycopyranosides, alkyloxygen versus glycosyl-oxygen fission in, 190.
 - hydrolysis of acetanilide, 220.
 - hydrolysis of acetylglycine and glycyltyrosine, 685.
 - hydrolysis of benzonitrile, 223.
 - hydrolysis of epoxides, activation parameters and mechanism of the, 452.
 - hydrolysis of ferrocenylmethyl β-**p**-glucopyranoside, a reinvestigation of bond cleavage in. Reactions at position 1 of carbohydrates. Part IX, 310.
 - hydrolysis of tetramethyloxiran: a re-investigation,
 - reactions, solvent effects on the rate of some, 20.
 - rearrangements of some N-substituted hydrazoarenes, kinetics, products and solvent isotope effects for. Mechanism of benzidine and semidine rearrangements. Part XXVII, 551.
 - catalysis, evidence for other than, in β-galactosidase-catalysed hydrolyses, 300.
- ionisation of porphyrins, a spectroscopic study of the, 414. Acidity constant measurements and ¹H nuclear magnetic resonance: intramolecular hydrogen bonds in aromatic sulphoxides, 848.
- Acidity constants for sucrose inversion in aqueous solutions of acetylenedicarboxylic and propionic acids. Studies of the rate of inversion of sucrose in aqueous solutions of some strongly dissociated acids. Part II, 102.
- Acids, 8-aroyl and 8-acyl-1-naphthoic. Ring-chain tautomerism. Part V, 1144.
- Acridones, some aryl N-arylbenzimidates, and Chapman rearrangement products, major fragmentation pathways on electron impact of, 1303.

- Acrylic acid, 2-amino-, derivatives, electroreduction and related studies on. Part I, electroreactivity of 2-acetamidocinnamic acid, 1663. Part II, electroreactivity of 2-acetamidoacrylic acid, 1670.
- Acrylonitriles, allyl cyanides, and alicyclic nitriles, electric dipole moments of some, 537.
- Activation energies of hydrogen atom abstractions from alkanes by free radicals, 361.
 - parameters and mechanism of the acid-catalysed hydrolysis of epoxides, 452.
- Activity coefficient function M_0 for acid-base equilibria. Part I, new methods for estimating pK_a values for weak bases, 1915.
- Acylation. Part XXXVII, the catalysed benzoylation of ethylene oxides by benzoyl halides in aprotic solvents, 995.
 - pyridine-catalysed, of phenols by carboxylic acid anhydrides in carbon tetrachloride: Hammett, Brønsted, and Taft relationships as evidence for general base catalysis, 1828.
- Acyl transfer reactions, strain effects in. Part II, the kinetics of aminolysis of some N-aryl-lactams, 981.
- Adamantanes, substituted, the dipole moments of and the correlation of the dipole moments of aliphatic compounds with substituent constants, 416.
- Addition, heterolytic, of thiocyanogen chloride to some symmetrical α-arylalkenes. Pseudohalogen chemistry. Part II, 1359.
 - gas-phase thermal, of tetramethyldiphosphine to tetrafluoroethylene, kinetics and mechanism of. Organophosphorus chemistry. Part XVI, 1301.
- Additive increments, Hammett correlations, and the effect of lanthanide shift reagents, interpretation of the proton magnetic resonance spectra of olefinic protons by means of. Antiparasitic nitroimidazoles. Part V, 509.
- Adenine and adenosine. Proton transfer from heterocyclic compounds. Part III, 2138.
- Adiphenine hydrochloride, a muscarinic antagonist of acetylcholine, crystal and molecular structure of, 942.
- Alanine, glycine, and sarcosine, piperazinedione formation from esters of dipeptides containing: the kinetics in aqueous solution, 1845.
- Alcohols, cyclic, the formation of rearrangement products in the reactions of, with boron trichloride, 1141.
- Aldoses, mechanism of oxidation by chloramine T, 762.
- Aldoxime, N-t-butylbenz-, and 2-t-butyl-3-phenyloxa-ziridine, the acid-catalysed hydrolysis of, 1744.
- Aldrin, monodechloro-, and monodechloroisodrin, sequential Wagner-Meerwein rearrangements of polychlorinated complex cations derived from, and the ¹H nuclear magnetic resonance spectra of polychloropolycyclic ketones and dechloroaldrin derivatives, 909.
- Aliphatic compounds, free-radical substitution in. Part XXVIII, the gas-phase bromination of halogenocyclohexanes and halogenocyclopentanes in a fast flow reactor, 1346. Part XXIX, halogen atom abstraction from alkyl halides by trimethyltin radicals in the gas phase, 1570.
 - the correlation of the dipole moments of, with substituent constants and the dipole moments of substituted adamantanes, 416.
- Allyl methyl oxalate and allyl phenyl oxalate, vapour-phase thermolysis of, and its relevance to the thermochemistry of oxycarbonyl radicals. Thermolytic reactions of esters. Part XI, 1327.

- Alkaline degradation of p-dinitrobenzene. Kinetic studies in strongly basic glycolic solutions. Part II, 146.
 - hydrolysis of alkyl N-phenylcarbamates, participation of an elimination mechanism in, 1244.
 - of 2-furyldiphenyl-(2-thienyl)phosphonium bromide, and some mixed heteroarylmethylphosphonium salts. Relative stabilities of the forming carbanions. The chemistry of heteroarylphosphorus compounds. Part V, 1912.
 - of α-hydroxyimino-p-nitrobenzyl phosphates, phosphonates, and phosphinates, fast neighbouring group-induced rearrangements. The reactivity of organophosphorus compounds. Part XXVIII, 1798.
 - the mechanism of, of methyl 8-(3- or 4-substituted benzoyl)-, 8-formyl-, and 8-pivaloyl-1-naphthoates and methyl 5-formyl-phenanthrene-4-carboxylate. Neighbouring-group participation by carbonyl groups. Reactions of carbonyl compounds in basic solutions. Part V, 345.
 - the mechanism of, of methyl 8-acetyl, 8-propionyl-, and 8-isobutyryl-1-naphthoate. Neighbouring-group participation by carbon acids. Part VI, reactions of carbonyl compounds in basic solutions, 351.
 - the mechanism of, of methyl pseudo-8-acyl-1-naphthoates and pseudo-5-formyl-phenanthrene-4-carboxylate. Reactions of carbonyl compounds in basic solutions. Part VII, 358.
 - phosphatase, bacterial. Part III, kinetic studies with substituted phenyl phosphates and structurally related inhibitors, 25.
 - solvolysis of chloroform. Kinetic studies in strongly basic glycolic solutions. Part I, 143.
- Alkaloids, Amaryllidaceae, ¹³C nuclear magnetic resonance spectra of, 1180.
- Alkanedioic acids, $\alpha,\alpha,\alpha',\alpha'$ -tetramethyl-, a new route to. Free radical addition of isobutyric acid to α,ω -diolefins, 1655.
- Alkanes, activation energies of hydrogen atom abstraction from, by free radicals, 361.
 - the electrochemical behaviour of, in fluorosulphonic acid, 374.
- n-Alkanes, the partial anodic oxidation of, in acetonitrile and trifluoroacetic acid, 1578.
- Alkenes, ω -aryl-, kinetics and mechanism of addition and cyclialkylation reactions of, with trifluoroacetic acid, 1840.
 - gas-phase oxidation of: decomposition of hydroxysubstituted peroxyl radicals, 540.
 - some symmetrical α-aryl-, heterolytic addition of thiocyanogen chloride to. Pseudohalogen chemistry. Part II, 1359.
- Alkoxides, tri-, butyltin: auto-association in organotin compounds, 1785.
- Alkoxyl radicals, formation and fragmentation of, by oxidation of alcohols with peroxydisulphate ion, 630.
- Alkoxyheterocyclic compounds, studies on. Part II, hydrolysis of 2-methoxy-1-methylbenzimidazoles, 603.
- Alkyl halides in water and nonaqueous solvents, thermodynamic parameters for ionisation and dissociation of. Comments on the ion-pair mechanism of nucleophilic substitution, 1893.
 - -oxygen versus glycosyl-oxygen fission in the acid-catalysed hydrolyses of some alkyl β -D-glucopyranosides, 190.

- Alkyl (contd.)
 - radical-halide ion adducts. Unstable intermediates. Part CXXIV, 391.
 - radicals, β -acyloxy, the mechanism of the rearrangement of 861
 - reactions of. Part III. Relative rates of methylation and hydrogen abstraction by methyl radicals, 484.
 - sulphides, ω-halogeno, cyclisation of: the significance of bromide: chloride ratios in displacement reactions, 1221.
- Alkylamines and -sulphonamides, N- ω -halogeno-, transition states in the cyclisation of. Intramolecular reactions. Part X, 1215.
 - long chain, effects of hydrophobic interaction on the kinetics of the reactions of, with long chain carboxylic esters of 3-nitrophenol, 1006.
- Allenes. Part XXV, cyclobutane dimers of 1-cyanoallenes, 885.
- Allyl cyanides, acrylonitriles, and alicyclic nitriles, electric dipole moments of some, 537.
- N-Allylamides, metal carbonyl-catalysed isomerization of, to prop-2-enyl derivatives. Catalysed prototropic rearrangements. Part II, 1954.
- Aluminium, tri-isobutyl-, and benzonitrile, the kinetics of the reaction between. On the reactivity of organometallic compounds towards functional substrates. Part III, 1129.
- Amidates, di-, phenyl phosphoro- and phosphorothio-, base hydrolysis of. E1cB Mechanisms. Part IV, 318.
- Amide, sodium, base catalysis by in liquid ammonia. Acetylene-allene isomerisations. Part II, 672.
- Amides, the NN-dimethyl, of the pyridinecarboxylic acids, restricted rotation in, 587.
- Amine oxidation. Part VII, the effect of structure on the reactivity of alkyl tertiary amines towards alkaline potassium hexacyanoferrate(III), 206.
- Amines, acyclic, analysis of carbon-13 nuclear magnetic resonance data for structure elucidation of. Applications of artificial intelligence for chemical inference. Part XI, 1753.
 - alkyl(benzylidene), electron impact induced fragmentation of, 854.
 - alkyl tertiary, the effect of structure on the reactivity towards alkaline potassium hexacyanoferrate(III). Amine oxidations. Part VII, 206.
 - and their solutions in water and sulphuric acid, electron spin resonance studies of the effect of high energy radiation on. Unstable intermediates. Part CXXVI, 797.
 - anodic oxidation of. Part III, cyclic voltammetry and controlled potential electrolysis of 4-dimethylamino-antipyrine (4-dimethylamino-2,3-dimethyl-1-phenyl- Δ^3 -pyrazolin-5-one) in acetonitrile, 1640.
 - arylmethylene-erythromycyl-, substituent effects on the pK_a values and rates of hydrolysis of, 173.
 - base-catalysis in the displacement of vinyl ethoxy-, fluoro-, and cyano-leaving groups by. Nucleophilic attacks on carbon-carbon double bonds. Part XVII, 616.
 - o-hydroxyl, micellar catalysis of the deamination of, 93. the Lewis basicity of, in liquid antimony trichloride. Antimony halides as solvents. Part X, 1958.
- Aminolysis of some N-aryl-lactams, the kinetics of. Strain effects in acyl transfer reactions. Part II, 981.
- Analgesics. Part II, crystal structure of dihydrometacodeinone hydrochloride, 2044.

- 5α-Androstan-17β-yl p-bromobenzoate, $2\alpha,3\alpha$ -epithio-, crystal structure of, 1866.
- Androst-4-en-3-one, 17β-hydroxy-, (testosterone), crystal and molecular structure, 1978.
- Anhydrides, sulphonic acid, and thio-, diacyl sulphides and: the conformation around two equivalent bonds linked to one central atom, 1870.
- Aniline, the reaction of, with tetracyanoethylene: N-tricyanovinylation, 974.
 - meta-nitro-, X-ray crystal structure of the electro-optic material, 1197.
- Anilines, para- and meta-substituted, substituent effects on the condensation of nitrosobenzene with, in acetic acidsodium acetate buffered aqueous ethanol solutions, 696.
 - reaction of 2-dicyanomethyleneindane-1,3-dione with, in acetonitrile. Nucleophilic attacks on carbon-carbon double bonds. Part XVIII, 1045.
 - some substituted, the kinetics of the reactions of picryl chloride with. Part I, 2119.
- Anion effects, a kinetic study of, in the deamination of dodecylamine micelles, 2153.
- Anions, radical, factors which determine the rate of carbonhalogen bond fragmentation in, illustrated by some halogenated derivatives of quinoline, quinoxaline, and phenazine. Electrochemical reactions. Part XV, 1811.
 - of substituted thienothiophens, 1816.
- Anisidines, N-benzylidene-p-, anodic pyridination of, in acetonitrile. Anodic oxidation of Schiff's bases. Part II, 1112.
- Anisotropic effects in α-substituted methoxystilbenes, 1660.

 Anthracene, 9-methyl, -tetrachloro-p-benzoquinone molecular complex, crystal and molecular structure. Molecular complexes. Part XX, 731.
 - -α-sulphonates, sodium 9,10-dihydro-9,10-dioxo-, studies on the hydroxylation of, 1626.
- Anthraquinone, 2-piperidino-, fluorescence quenching of, 1742.
- Anthraguinones, methoxy-, photochemistry of, 1386.
- Anticholinergic agents, stereochemistry of. Part II, crystal and molecular structure of glycopyrronium bromide, 1875.
- Antimony halides as solvents. Part X, the Lewis basicity of amines in liquid antimony trichloride, 1958.
- Antioxidant action, mechanisms of: products of the reaction between hydroperoxides and o-phenylene phosphites, 831.
 - mechanisms of: reactions of phosphites with hydroperoxides, 826.
- Antioxidative properties of phenyl-substituted phenols. Part I, the mechanism of synergism between 4-alkoxy-2,6-diphenylphenols and $\beta\beta'$ -disubstituted diethyl sulphides, 1276.
- Antipyrine, 4-dimethylamino-, (4-dimethylamino-2,3-dimethyl-1-phenyl-Δ³-pyrazolin-5-one) in acetonitrile, cyclic voltammetry and controlled potential electrolysis of. Anodic oxidation of amines. Part III, 1640.
- Aralkyl chloro-sulphides, conformer preferences in, 947.
- Arenes, alkyl-, effect of strong acids on the oxidation of, by manganic and cobaltic acetates in acetic acid, 381.
 - nitroso-, hydrogen transfer from N-arylhydroxylamines to: an accompaniment to azoxyarene formation, 1550.
 - N-substituted hydrazo-, kinetics, products and solvent isotope effects for acid-catalysed rearrangements of some. Mechanism of benzidine and semidine rearrangements. Part XXVII, 551.

- Arenes (contd.)
 - vapour phase chemistry of. Part II, thermolysis of chlorobenzene and reactions with aryl radicals and chlorine and hydrogen atoms at 500°, 1635.
- Arenesulphonates, aminovinyl, unimolecular cleavage of the sulphur-oxygen bond in the ethanolysis of. Reactivity of vinyl sulphonic esters, 1021.
- L-Arginine dihydrate, crystal and molecular structure of the amino-acid. Precision neutron diffraction structure determination of protein and nucleic acid components. Part V, 133.
- Aromatic compounds, a study of the reaction of dinitrogen tetroxide with, 1177.
 - redox equilibria of aromatic cation radicals and, 1594. detritiation. Part VI, pentafluorobiphenyl: the novel effect of the pentafluorophenyl substituent, 253.
 - nucleophilic exchange reactions. Part III, dipolar aprotic solvent effects, 1060.
 - substitution, the ortho: para ratio in. Part I, 110. Part II, 2114.
 - protons, as assessment of simple theories of chemical shifts of, as applied to substituted naphthalenes, 611.
 - substitution with rearrangement. Part V, base-catalysed prototropic rearrangement of 4-bromo-2,6-di-t-butyl-cyclohexa-2,5-dienone in acetic acid, 59.
 - systems, annelated, non-linearity of the Extended Selectivity Relationship in electrophilic substitution of, 1250.
- Aromaticity and tautomerism. Part II, the 4-pyridone, 2-quinolone, and 1-isoquinolone series, 1080.
- 2-Arylethyl chlorides, halogenation of. Directive effects in benzylic hydrogen atom abstraction. Part IV, 693.
- Arylphosphorus, hetero-, compounds, the chemistry of. Part V, the alkaline hydrolysis of 2-furyldiphenyl-(2-thienyl)phosphonium bromide, and some mixed hetero-arylmethylphosphonium salts. Relative stability of the forming carbanions, 1912.
- **Azaindoles,** acid catalysed hydrogen exchange of. The kinetics and mechanism of the electrophilic substitution of heteroaromatic compounds. Part XXXII, 1072.
- Azetidin-2-one, 1-(4-bromophenyl)-, crystal and molecular structure, 2042.
- Azole N-oxides. Part I, the tautomerism of benzotriazole I-oxide and its 4- and 6-nitro-derivatives with the corresponding I-hydroxybenzotriazoles, 160. Part II, the tautomerism of 3,4,5-trimethylpyrazole 2-oxide with I-hydroxy-3,4,5-trimethylpyrazole, 164.

В

Barium and calcium ions in methanol, association with. The stabilities of Meisenheimer complexes. Part V, 1103. Barriers, rotational, in 2-dimethylamino-1,3,4-oxadiazoles

- and -thiadiazoles. A CNDO/2 study, 1500. Base catalysed oxidation of sulphoxides with 1-methyl-1-
- phenylethyl hydroperoxide, kinetics of the, 755. catalysis by potassium t-butoxide in t-butyl alcohol.
- Acetylene-allene isomerisations. Part I, 668. by sodium amide in liquid ammonia. Acetylene-allene
 - isomerisations. Part II, 672.
 - in the displacement of vinylic ethoxy-, fluoro-, and cyano-leaving groups by amines. Nucleophillic attacks on carbon-carbon double bonds. Part XVII, 616.

- hydrolysis of substituted phenyl phosphoro- and phosphorothio-diamidates. E1cB Mechanisms. Part IV, 318.
- Basicity constants, spectrophotometric determination of. Benzamides and phenylureas, 1331.
 - studies of a series of 4,4-dimethylcyclohexa-2,5-dienones, 84.
- Beckmann rearrangement, catalysed by decationated zeolite, infrared study of, 41.
 - of cyclopentanone oxime catalysed by decationated zeolite, 1262.
- Benzaldehyde, p-dimethyl and -dimethylamino-, the complexes and conjugated acids of. Boron trifluoride complexes. Part VI, 514.
- Benzaldehydes and acetophenones, substituted, kinetics and mechanism of the morpholine-borane reduction of, 1948.
 - Lewis acid properties of, and substituent effects, 786.
- Benzamide with succinic acid and furamide with oxalic acid, crystal structure of the 2:1 complexes. Molecular packing modes. Part XI, 503.
- Benzamides and phenylureas. Spectrophotometric determination of basicity constants, 1331.
 - o-benzoyl; solvent, substituent and steric effects on the ring-chain tautomerism of. Aspects of tautomerism. Part V, 1160.
- N-substituted 4-chloro-, acid catalysed hydrolysis of, 1402. Benzamidine and n-butylamine, reaction of, with p-nitrophenyl triphenylmethanesulphenate. Nucleophilic substitution at sulphur, 534.
- Benzene, radiolytic displacement of substituent groups in, by hydrogen (tritium), 1453.
 - chloro-, thermolysis of and reactions with aryl radicals and chlorine and hydrogen atoms at 500°. Vapour phase chemistry of arenes. Part II, 1635.
 - and benzonitrile, substitution accompanying addition in the reactions of, with chlorine under free radical conditions, 650.
 - derivatives in aqueous solution, isomer distributions in the radiation-induced tritiation of. Kinetics of hydrogen isotope exchange reactions. Part XXIII, 1450.
 - p-dinitro-, alkaline degradation of. Kinetic studies in strongly basic glycolic solutions. Part II, 146.
 - ethyl-, kinetics of the oxidation of, by cobaltic acetate in acetic acid, 1035.
 - hexafluoro-, some correlations involving ¹³C chemical shifts of monosubstituted derivatives of, 1789.
 - nitroso-, derivatives, nitrosodurene and other. Spin trapping by use of nitroso-compounds. Part VI, 1252.
 - substituent effects on the condensation of, with paraand meta-substituted anilines in acetic acid-sodium acetate buffered aqueous ethanol solutions, 696.
 - 1,2,4,5-tetracyano-, crystal and molecular structure of the π^* -electron-acceptor molecule. Molecular complexes. Part XIV, 520.
 - 1,2,4,5-tetracyano-, and pyrene, crystal structure of the
 1:1 molecular complex of, at 290 and 178 K.
 Molecular complexes. Part XV, 523.
 - 2,4,6-tri-t-butylnitroso-, a new type of spin-trapping reagent. Spin trapping by use of nitroso-compounds. Part V, 369.
 - 1,3,5-trinitro-, -pyrene, crystal and molecular structure.

 Molecular complexes. Part XXI, 734.

- Benzenes, alkyl-, reaction of 5-substituted thiazol-2-yl radicals with. Homolytic aromatic substitution by heterocyclic free radicals. Part IV, 1093.
 - di- and tri-nitro-derivatives of m- and p-dichloro-, and lithium chloride, a kinetic study of chlorine-isotopic exchange between, 1883.
 - I-X-3,5-dinitro-, methoxide adducts from. The stabilities of Meisenheimer complexes. Part IV, 710.
 - ethyl-, toluenes, and diphenylmethanes, chlorination of nuclear-substituted. Directive effects in benzylic hydrogen atom abstraction. Part III, 689.
 - fluoronitro-, the origin of high ortho: para-reactivity ratios in the reactions of, with potassium t-butoxide in t-butyl alcohol, 55.
 - monosubstituted, in sulphuric acid, Hammett treatment for hydrogen exchange of (under standard conditions). The kinetics and mechanism of the electrophilic substitution of heteroaromatic compounds. Part XXXIII, 1077.
 - polyalkyl, selenonation and sulphonation of, with selenic and sulphuric acids in acetic anhydride. Aromatic sulphonation. Part XLIII, 2129.
- Benzenesulphonamide, N-bromo-N-sodio (bromamine B), the interaction of, with p-nitrophenoxide ion, 742.
- Benzenesulphonic acids, methyl substituted, rates of sulphonation ortho, meta, and para to a sulphonic acid group in. Aromatic sulphonation. Part XL, 633.
- Benzenesulphonyl chloride and carbon tetrachloride, addition of, to substituted styrenes: a kinetic study. Redox transfers. Part VIII, 1000.
 - enthalpies of transfer from methanol to protic and aprotic solvents of the transition state in the reaction of, with imidazole, 1760.
- Benzidine and semidine rearrangements, mechanism of. Part XXVII, kinetics, products and solvent isotope effects for acid-catalysed rearrangements of some N-substituted hydrazoarenes, 511.
- Benzilate formate and oxalate anions and bipyridylium dications, photochemically induced electron-transfer reactions between, 80.
- Benzimidates, some aryl N-aryl-, Chapman rearrangement products and acridones, major fragmentation pathways on electron impact of, 1303.
- Benzimidazoles. Part I, proton transfer from heterocyclic compounds, 432.
 - 2-methoxy-1-methyl, hydrolysis of. Studies on alkoxy-heterocyclic compounds. Part II, 603.
- Benzonitrile, the acid-catalysed hydrolysis of, 223.
 - and chlorobenzene, substitution accompanying addition in the reactions of, with chlorine under free radical conditions, 650.
 - and tri-isobutylaluminium, kinetics of the reaction between. On the reactivity of organometallic compounds towards functional substrates. Part III, 1129.
 - N-oxides, variable reaction paths for the cycloaddition of, to styrenes, 1769.
- o-Benzoquinone, crystal and molecular structure, 477.
- p-Benzoquinone, tetrachloro-, -acenaphthene molecular complex, crystal and molecular structure. Molecular complexes. Part XVIII, 724.
 - -9-methylanthracene molecular complex, crystal and molecular structure. Molecular complexes. Part XX, 731.

Benzotriazole 1-oxide and its 4- and 6-nitro-derivatives, the tautomerism of, with the corresponding 1-hydroxybenzotriazoles. Azole N-oxides. Part I, 160.

- Benzoylation, the catalysed, of ethylene oxides by benzoyl halides in aprotic solvents. Acylation. Part XXXVII,
- Benzyl alcohol, kinetics and mechanism of the oxidation of, to benzaldehyde by acid permanganate, 435.
 - chloride, α-methyl-, in diethyl ether, tin, zinc, and antimony halides as catalysts for the racemisation of. Acceptor properties of metal halides. Part VII, 642.
 - chlorides and α-substituted toluenes, halogenation of. Directive effects in benzylic hydrogen atom abstraction. Part V, 1617.
 - α-hydroxyimino-p-nitro-, phosphates, phosphonates, and phosphinates, fast, neighbouring group-induced rearrangement during alkaline hydrolysis of. The reactivity of organophosphorus compounds. Part XXVIII, 1798.
- Benzylation of 1-ethyl-4-phenylpiperidine and 1-isopropyl-4-phenylpiperidine, crystal and molecular structure of the major products from the, 1558.
 - of piperidines, the stereochemical orientation of the. Part LII, the conformation analysis of saturated heterocycles, 1553.
- Benzylic hydrogen atom abstraction, directive effects in. Part III, chlorination of nuclear-substituted toluenes, diphenylmethanes, and ethylbenzenes, 689. Part IV, halogenation of 2-arylethyl chlorides, 693.
- Bicycloalkylium ions, evidence for gaseous. Reactions of helium tritiide ions with gaseous bicyclo[n,1,0]alkanes, 66
- Bicyclo[3,2,0]hept-2-en-7-one, 1-methyl-, the gas-phase thermal reactions of, 835.
- 2-Bicyclo[3,1,0]hexyl cation, the formation of, by deamination and solvolysis, and the effect of methyl substitution at C-5, 2165.
- trans,trans-Bicyclo[6,1,0]non-4-ene oxide, 9,9-dichloro-,
 crystal and molecular structure of 'perpendicular',
 339
- Bicyclo[3,2,1]-octan-2- and -3-one, stereochemistry and kinetics of the reactions of, with sodium borohydride, methylmagnesium iodide, and diazomethane, 571.
- Biphenyl in solution, the conformational problem of, as investigated by the liquid crystal nuclear magnetic resonance spectrum of 3,3',5,5'-tetrachlorobiphenyl, 1396.
 - p-nitro-, crystal and molecular structure. A comparison of the results of X-ray crystal analysis with semi-empirical calculations of conformation, 342.
 - pentafluoro-, the novel effect of the pentafluorophenyl substituent. Aromatic detritiation. Part VI, 253.
- Biphenyls, heterocyclic bridged, nuclear magnetic resonance studies of, 2131.
- Bipyridylium dications, and formate, oxalate, and benzilate anions, photochemically induced electron-transfer reactions between, 80.
- Bithienyl derivatives, conformational analysis of: a liquid crystal nuclear magnetic approach, 751.
- Bombardment, hydrogen atom, and high energy radiation, radicals formed from acetylenes by: an electron spin resonance study, 1405.
- Bond cleavage in the acid-catalysed hydrolysis of ferrocenylmethyl β-D-glucopyranoside, a reinvestigation of. Reactions at position 1 of carbohydrates. Part IX, 310.

- Bonding in 1,2,4-triazoles. Part II, crystal structure of 3,4,5-triamino-1,2,4-triazole hydrobromide (guanazine hydrobromide), 1. Part III, crystal structure of 4-amino-3-(β-benzoylhydrazino)-5-mercapto-1,2,4-triazole,
 - 4. Part IV, crystal structure of the sodium salt of 4-amino-5-mercapto-1,2,4-triazole trihydrate, 6. Part V. crystal structure of 4-benzylideneamino-5-mercapto-1,2,4-triazole, 9. Part VI, crystal structure of 6-mercapto-3-phenyl-s-triazolo[4,3-b]-s-tetrazine pyridine adduct, 11.
- Boranes, the influence of some organo-, on the gaseous oxidation of isobutane, 803.
- Borates, diacetalopropenyleniumdioxy- (β-diketone boroacetates), 1796.
- Borohydride, sodium, methylmagnesium iodide and diazomethane, stereochemistry and kinetics of the reactions of bicyclo[3,2,1]octan-2- and -3-one with, 571.
- Boron trichloride, the formation of rearrangement products in the reactions of cyclic alcohols with, 1141.
 - trifluoride complexes. Part VI. The complexes and conjugate acids of p-dimethyl- and -diethylaminobenz-aldehyde, 514.
- Bromamine B (N-bromo-N-sodiobenzenesulphonamide), interaction of, with p-nitrophenoxide ion, 742.
- Bromide: chloride ratios, the significance of, in displacement reactions: cyclisation of ω-halogenoalkyl sulphides. Intramolecular reactions. Part XI, 1221.
 - ions, protonated riboflavin and quinol, crystal and molecular structure of a donor-acceptor complex involving, 1266.
- Bromides, phenylethyl, in t-butyl alcohol, deuterium kinetic isotope effect in elimination from, 169.
- Bromination and chlorination of 1-cyanobutane and cyanocyclobutane. Free radical substitution in aliphatic compounds. Part XXVII, 125.
 - aromatic, by hypobromous acid in aqueous perchloric acid, mechanism of. Kinetic evidence against the prior formation of 'positive bromine', 1321.
 - of 3-acetoxycholesta-3,5-diene. Electrophilic substitution with rearrangement. Part VI, 1086.
 - of cholest-4-en-3-one, reaction paths in the. Electrophilic substitution with rearrangement. Part VII, 1586.
 - of olefins, the effect of 2-halogeno-substituents on the rates of, 1053.
 - rate-determining, a change from, to geometric isomerisation of pyridylhydrazones, 1466.
 - the gas-phase, of halogenocyclohexanes and halogenocyclopentanes in a fast flow reactor. Free-radical substitution in aliphatic compounds. Part XXVIII, 1346.
- 'Bromine, positive', kinetic evidence against the formation of. Mechanism of aromatic bromination by hypobromous acid in aqueous perchloric acid, 1321.
- Bromopicrin reaction. Part II, reaction between 2-nitroethanol and sodium hypobromite, 1107. Part III, kinetics of the ionisation of α -nitrotoluene in alkaline solution, 1110.
- Brønsted, Hammett, and Taft relationships as evidence for general base catalysis: the pyridine-catalysed acylation of phenols by carboxylic acid anhydrides in carbon tetrachloride, 1828.
- Burimamide, [N-(4-imidazol-4-ylbutyl)-N'-methylthiourea], the histamine H_2 -receptor antagonist, crystal and molecular structure, 1734.

- Butane, 2-amino-3-methyl-, and 2-amino-4-methylpentane, absolute configuration of. Assignment of the configuration of optical isomers by gas chromatography by the use of asymmetric stationary phases, 2094.
 - 2-chloro-3-methyl, formation of, in the thermal decomposition of 2-methylbutyl chloroformate: evidence for a 1,3-shift involving a protonated cyclopropane intermediate in a kinetically controlled substitution, 74.
 - I-cyano-, and cyanocyclobutane, chlorination and bromination of. Free-radical substitution in aliphatic compounds. Part XXVII, 125.
- Butanes, barriers to rotation and conformer populations of two substituted, 960.
- Butanols, 1- and 2-methylindolyl-, and their toluene-p-sulphonates, cyclisation of. Electrophilic substitution in indoles. Part VII, 548.
- Butan-2-one, 4-diethylamino-, and 5-diethylaminopentan-2-one, intra- and inter-molecular catalysis in the iodination of 1518.
- **σ-But-3-enyl-** to 1—3-η-but-2-enyl-nickel transformation, mechanistic studies of the course of, 1993.
- t-Butoxide ions and phenoxide, the *syn-anti* dual pattern in elimination from fluorosulphonylethanes promoted by, 1336.
 - potassium, in t-butyl alcohol, base catalysis by. Acetylene-allene isomerisations. Part I, 668.
 - the origin of high *ortho*: para-reactivity ratios in the reactions of fluoronitrobenzenes with, in t-butyl alcohol, 55.
- t-Butoxyl radicals, the reaction of, with diborane, 420.
- t-Butyl alcohol-methanol mixtures, the effect of, on the free energy of reactants and transition states in the substitution of tetraethyltin by mercury(II) salts. Part XV, substitution at saturated carbon, 444.
 - nitrite, 2-methyl-2-nitropropane, and 2-methyl-2-nitrosopropane. Studies in vacuum ultraviolet photochemistry. Part III, 2019.
 - nitroxide, di-, and some halogenated *C*-nitroso-compounds, C-N bond dissociation energies in, 1853.
 - nitroxides, 1- and 2-naphthyl-, unpaired electron distribution in. Nitroxide radicals. Part XIII, 718.
- n-Butylamine and benzamidine, reaction of, with p-nitrophenyl triphenylmethanesulphenate. Nucleophilic substitution at sulphur, 534.
- **t-Butylamine** N-oxide, benzylidene-, and 3-phenyl-2-t-butyloxaziridine, micellar effects on the hydrolysis of, 1900.
- 1-t-Butylbut-3-enyl acetate, kinetics of the gas-phase pyrolysis of, 1961.
- [But-2-ynyl-4-(2-oxopyrrolidin-1-yl)]-trimethylammonium iodide, crystal structure of, 1247.

C

- Calcium and barium ions in methanol, association with.

 The stabilities of Meisenheimer complexes. Part V, 1103.
- Carbaldehydes, heterocyclic di-, alkali metal complexes of. Intramolecular cation exchange in ion pairs. Part I, 903.
- Carbamate, ethyl N-methyl-N-(p̄-tolylsulphonyl)-, at −160
 °C. Folded conformations. Part V, 2031.
- Carbamates, alkyl N-phenyl-, participation of an elimination mechanism in alkaline hydrolysis of, 1244.
 - elimination-addition mechanism for the hydrolysis of. Trapping of an isocyanate intermediate by an o-amino-group, 1719.

- Carbanions, relative stabilities of the forming. The alkaline hydrolysis of 2-furyldiphenyl-(2-thienyl)phosphonium bromide, and some mixed heteroarylmethylphosphonium salts. The chemistry of heteroarylphosphorus compounds. Part V, 1912.
 - stability of the intermediate. Prototropy of 2-methyl-1,3-diphenylpropenes, 2025.
- Carbazole, N-phenyl-, -pyrrole, -indole, and -diphenylamine, and N-ethyl-pyrrole, -carbazole, and -diphenylamine, the reaction of trichloro-1,3,5-triazine (cyanuric chloride) with. 1,3,5-Triazines. Part XII, 2075.
- Carbazoles, tetrahydro-, rearrangements and isotope effects in some reactions of. Part IX, electrophilic substitution in indoles, 878.
- Carbene, dichloro-, free, kinetic evidence for; trichloromethylsilane derivatives as dichloromethylene transfer agents, 437.
- Carbohydrates, reactions at position 1. Part IX, a reinvestigation of the bond cleavage in the acid-catalysed hydrolysis of ferrocenylmethyl-β-D-glucopyranoside, 310.
- Carbon acids, disulphonyl-activated, proton transfer from, 1289.
 - neighbouring-group participation by. The mechanism of the alkaline hydrolysis of methyl 8-acetyl-, 8-propionyl-, and 8-isobutyryl-1-naphthoate. Reactions of carbonyl compounds in basic solutions. Part VI, 351.
 - -carbon double bonds, nucleophilic attacks on. Part XVII, base-catalysis in the displacement of vinylic ethoxy-, fluoro-, and cyano-leaving groups by amines, 616. Part XVIII, reaction of 2-dicyanomethylene-indane-1,3-dione with anilines in acetonitrile, 1045.
 - saturated, substitution at. Part XV, the effect of t-butyl alcohol-methanol mixtures on the free energy of reactants and transition states in the substitution of tetraethyltin by mercury(II) salts, 444. Part XVI, steric effects in the $S_{\rm E}2$ reaction, 1132.
 - tetrachloride and benzenesulphonyl chloride, addition of, to substituted styrenes: a kinetic study. Redox transfer. Part VIII, 1000.
- Carbonitriles, complex formation between iodine monochloride and substituent effects in saturated systems, 128.
- Carbonium ion rearrangements: competitive migration of the electronically contrasted groups methyl and diphenylphosphinyl, 1645.
 - ions, secondary and tertiary, rearrangements of, by diphenylphosphinyl migration, 1472.
- Carbonyl compounds, an electron spin resonance study of the reactions of organosilicon, organogermanium, and organotin radicals with, 1933.
 - conformations of some saturated. Part III, infrared spectra of some isomeric propyl and butyl formates and acetates, 952.
 - reactions in basic solutions. Part V, the mechanism of of alkaline hydrolysis of methyl 8-(3- or 4-substituted benzoyl)-, 8-formyl-, and 8-pivaloyl-1-naphthoates and methyl 5-formylphenanthrene-4-carboxylate. Neighbouring-group participation by carbonyl groups, 345. Part VI, the mechanism of the alkaline hydrolysis of methyl 8-acetyl-, 8-propionyl-, and 8-isobutyryl-1-naphthoate. Neighbouring-group participation by carbon acids, 351. Part VII, the mechanism of the alkaline hydrolysis of methyl pseudo-8-acyl-1-naphthoates and pseudo-5-formyl-phenanthrene-4-carboxylate, 358.

- αβ-unsaturated, comformations of some. Part IV, infrared spectra of dimethyl, diethyl, and di-n-butyl fumarates and maleates, 954.
- $\alpha\beta$ -unsaturated, kinetics and mechanism of oxymercuriation of 1207.
- group frequency, the. Part V, alkyl formates, 845.
- groups, neighbouring-group participation by. The mechanism of the alkaline hydrolysis of methyl 8-(3-or 4-substituted benzoyl), 8-formyl-, and 8-pivaloyl-l-naphthoates and methyl 5-formylphenanthrene-4-carboxylate. Reactions of carbonyl compounds in basic solution. Part V, 345.
- Car-4-en-2-one, 3-methyl-, stereochemical course of the photochemical transformation of, into derivatives of 3,3,7-trimethylocta-4,6-dienoic acid, 122.
- t-Carrageenan segments, a study of the helix-coil transition of, by light scattering and membrane osmometry, 1608.
- Caryophyllene dihydrochloride and isocaryophyllene, crystal and molecular structure of 8,9-dibromo-1,4,4,8-tetramethyltricyclo[5,4,0,0^{2,5}]undecane and 8,9-dibromo-2,4,4,8-tetramethyltricyclo[5,3,1,0^{4,11}]undecane, derivatives of rearrangement products of, 1938.
- Catalysis, general base, Hammett, Brønsted, and Taft relationships as evidence for: the pyridine-catalysed acylation of phenols by carboxylic acid anhydrides in carbon tetrachloride, 1828.
 - intra- and inter-molecular, in the iodination of 4-diethylaminobutan-2-one and 5-dimethylaminopentan-2-one, 1518.
 - intramolecular general acid, in the halogenation of ketones, 1681.
- Cation of an amino-N-heteroaromatic compound and the neutral species of the corresponding oxo-analogue, ultraviolet spectral correlation between, 1101.
 - radicals of alkylthiothiophens, conformational isomerism in, 1491.
 - photochemically induced electron-transfer reactions between bipyridylium dications and formate, oxalate and benzilate anions, 80.
 - tri-iodine, the effect of substituents and solvent composition on the rate of aromatic iodination by means of. Iodination and iodo-compounds. Part IV, 589.
- Cations, arylmethyl, SCF treatment of: parametric variation and chemical effects, 1063.
 - polychlorinated complex, derived from monodechloroisodrin and monodechloraldrin, sequential Wagner-Meerwein rearrangements of, and the ¹H nuclear magnetic resonance spectra of polychloropolycyclic ketones and dechloroaldrin derivatives, 909.
 - vinylic, from solvolysis. Part XV, β-phenyl and β-p-methoxyphenyl rearrangement during the solvolysis of 2,2-diaryl-1-phenylvinyl bromides, 1506.
- Centres, positive hole, in γ -irradiated glycine, electron spin resonance studies of. Unstable intermediates. Part CXXXIV, 1808.
- Chalcone, p-bromo-, crystal and molecular structure. Topochemistry. Part XXXIV, 33.
- Chapman rearrangement, a free-radical analogue of the: conversion of arylhydrazonates into N'N'-diarylhydrazides, 1422.
 - products, some aryl N-arylbenzimidates and acridones, major fragmentation pathways on electron impact of, 1303.

- Charge transfer and ultraviolet spectroscopy, a study using polarography and. Part I, d_{π} - p_{π} interaction in trimethylsilyl substituted naphthalenes, 447.
 - complexes. Part XII, viscosity dependence of the intensity of contact charge-transfer absorption bands, 1350.
- Chemical shifts, an assessment of simple theories of, of aromatic protons as applied to substituted naphthalenes. 611.
 - carbon-13, in methylnaphthalenes, 1333.
- Chirality, an investigation of the effects of, upon electron spin resonance spectra, 1834.
- Chloranil and pyrene, crystal and molecular structure of the molecular complex of. Molecular complexes. Part XXII, 1212.
- Chloramine T, mechanism of oxidation of aldoses by, 762.
- Chlorides, pseudo-acid, a kinetic study of the dimerization of. Aspects of tautomerism. Part IV, 1158.
- γ-radiolysis of pure acyl at 77 K: an electron spin resonance study of intermediate radicals, 1563.
- Chlorination and bromination of 1-cyanobutane and cyanocyclobutane. Free-radical substitution in aliphatic compounds. Part XXVII, 125.
 - of nuclear-substituted toluenes, diphenylmethanes, and ethylbenzenes. Directive effects in benzylic hydrogen atom abstraction. Part III, 689.
- Chlorine acetate, stereochemistry of addition of, and of chlorine to some unsaturated compounds. The kinetics and mechanisms of additions to olefinic substances. Part XI, 1480.
- Chloroform and acetone, variation of the intensity of infrared bands of, with temperature, 957.
 - the alkaline solvolysis of. Kinetic studies in strongly basic glycolic solutions. Part I, 143.
- Cholesta-3,5-diene, 3-acetoxy-, bromination of. Electrophilic substitution with rearrangement. Part VI, 1086.
- Cholest-4-en-3-one, reaction paths in the bromination of. Electrophilic substitution with rearrangement. Part VII, 1586
- Chroman-3-amine, 2-methyl- and 2,NN-trimethyl- and derivatives, conformational studies on, 227.
- Chromium(vi), oxidation by. Kinetics of the metal-ion oxidation of phenylphosphonous acid. Part II, 929.
- Chromogens based on non-benzenoid aromatic systems. Part II, arylazo-derivatives of 1,2,3,4-tetrachlorocyclopentadiene, 1155.
- Cinnamic acid, stereochemistry of the chloro- and bromohydrins derived from, and from some derivatives thereof. The kinetics and mechanisms of additions to olefinic substances. Part X, 653.
 - 2-acetamido-, electroreactivity of. Electroreduction and related studies on 2-aminoacrylic acid derivatives. Part I, 1663.
- trans-Cinnamic acids and trans-cinnamides, relative yields of photodimers from mixed crystals of. Topochemistry. Part XXXVI, 1095.
- Cleavage, cathodic, in methanol solution of benzylic carbonoxygen and carbon-fluorine bonds. Electro-organic reactions. Part I, 1903.
- Clerodendrin A, p-bromobenzoate chlorohydrin of, crystal and molecular structure of, 69.
- Cobaltic and manganic acetates in acetic acid, effect of strong acids on the oxidation of alkylarenes by, 381.

Colchicum cornigerum, molecular structure and absolute stereochemistry of a I-phenylethylisoquinoline alkaloid from: X-ray analysis of a methiodide derivative, 1002.

- Complex, donor-acceptor, involving protonated riboflavin, quinol, and bromide ions, crystal and molecular structure of, 1266.
 - formation between carbonitriles and iodine monochloride. Substituent effects in saturated systems, 128.
- $[\pi 2_s + \pi 2_a]$ Concerted mechanism, evidence for, in cycloadditions of olefins and acetylenes to dimethylketen, 166.
- Condensation, oxidative, of p-phenylenediamines with mono- and poly-substituted benzoylacetanilides, kinetics of, 1766.
- Configuration of optical isomers, assignment of, by gas chromatography by the use of asymmetric stationary phases. Absolute configuration of 2-amino-3-methylbutane and 2-amino-4-methylpentane, 2094.
- Configurational stability of asymmetrically substituted organotin compounds. An example of optical activity at the tin centre, 638.
 - and intramolecular exchange of organotin alkoxides and phenoxides, 1284.
- Conformation and dipole moments of thiosulphinates, 488.
 - around two equivalent bonds linked to one central atom: diacyl sulphides and sulphonic acid anhydrides and thioanhydrides, 1870.
 - SO-cis-, in thiophen-2-carbaldehyde, evidence for. Nematic phase nuclear magnetic resonance investigations of rotational isomerism. Part II, 1739.
 - molecular, and dipole moments of diazo-compounds. Part III, benzoylphenyldiazomethane and related molecules, 1498. Part IV, dipole moments and infrared spectra of some hindered α -diazo-ketones, 2142.
 - of humulene: X-ray analysis of the crystal structure of humulene diepoxide. Part XV, sesquiterpenoids, 404
 - of luteinizing hormone releasing hormone (LH-RH) and its component peptides, high resolution nuclear magnetic resonance studies on the, 1691.
 - semi-empirical calculations of, a comparison of the results with X-ray crystal analysis. Molecular structure of p-nitrobiphenyl, 342.
- Conformational analysis. Part VII, 2-alkyl-4-methyl- and 2-alkyl-2,4-dimethyl-1,3-dithiolans, 1376.
 - of bithienyl derivatives: a liquid crystal nuclear magnetic resonance approach, 751.
 - of saturated heterocycles. Part XLIX, the conformation of ring NH-groups on piperazines, hexahydropyrimidines, tetrahydro-1,3-oxazines, and tetrahydro-1,3-thiazines, 325. Part L, computer program for strain energy minimisation on six-membered rings and recalculation of conformational equilibria, 332. Part LI, spirodioxolans, 337. Part LII, the stereochemical orientation of the benzylation of piperidines, 1553. Part LIII, further 1,3,5-trialkylhexahydro-1,3,5-triazines, 2109.
 - equilibria, the solvent dependence of, in trans-1,2- and trans-1,4-dihalogenocyclohexanes. Rotational isomerism. Part XV, 582.
 - problem, the, of biphenyl in solution as investigated by the liquid crystal nuclear magnetic resonance spectrum of 3,3',5,5'-tetrachlorobiphenyl, 1396.
 - on 2-methyl- and 2, NN-trimethyl-chroman-3-amine and derivatives, 227.

- Conformations and dipole moments of nitramines, nitrosamines, and 1,3,5-trinitrocyclohexane. Dielectric properties of cyclic nitramines and related compounds, Part I, 1280.
 - folded. Part V, crystal and molecular structure of ethyl N-methyl-N-(p-tolylsulphonylmethyl)carbamate at $-160~^{\circ}$ C, 2031.
 - of 1-formyl, 1-acetyl, and 1-benzoyl-2-methylnaphthalenes, 1368.
 - of peptides in solution by nuclear magnetic resonance spectroscopy. Part I, application of nuclear magnetic double resonance spectroscopy to the determination of cis- and trans-conformations of peptide bonds, 1651.
 - of some cyclopropyl ketones. Molecular polarisability, 1365.
 - of some polar substituted ethanes: molecular polarisability, 766.
 - of some saturated carbonyl compounds. Part III, infrared spectra of isomeric propyl and butyl formates and acetates, 952.
 - of some $\alpha\beta$ -unsaturated carbonyl compounds. Part IV, infrared spectra of dimethyl, diethyl, and di-n-butyl fumarates and maleates, 954.
 - of the formyl-, acetyl-, and benzoyl-pyridines, 1461.
- Conformer populations and barriers to rotation of two substituted butanes, 960.
- Conjugate acids and complexes of p-dimethyl- and -diethylaminobenzaldehyde. Boron trifluoride complexes. Part VI, 514.
- Conjugation of the sulphonyl group, probes for: thiopyranylidenedihydropyridine SS-dioxides. Cyclic sulphones. Part XVI, 1184.
- Correlations, Hammett-type, effect of solvent on. Kinetics of aromatic nucleophilic substitution by toluene-p-thiolate in dimethylformamide, 1430.
 - structure-reactivity, for the hydrolysis of organic orthophosphate monoesters. Solvolysis of organic phosphates. Part IX, 1235.
- Corroles and porphins, a spectroscopic study of the protonation of, 407.
- Cortisol (11β,17α,21-trihydroxypregn-4-ene-3,20-dione) methanol solvate, crystal and molecular structure of, 774
- Corynoline p-bromobenzoate, crystal structure of, 1605.
- Coupling constants, isotropic hyperfine, relationships for assigning for a variety of aromatic radicals, 1762.
- Crotonic esters, 3-amino-, infrared and nuclear magnetic resonance absorption and isomerism of. Part II, 15.
- Crown ether, the effect of, on the 4H-cyclopenta[def]phenanthrene system. Radical-anion intermediates. Part VI, 1201.
- Crystal and molecular structure and absolute configuration of datiscoside bis-(p-iodobenzoate) dihydrate. Stereochemistry of the cucurbitacins, 892.
 - of maytansine (3-bromopropyl) ether, 897.
 - of triptolide and tripdiolide, two anti-leukaemic diterpenoid triepoxides, 816.
 - and absolute stereochemistry of cularine methiodide,
 - of abieslactone, (23R)- 3α -methoxy- 5α , 9β -lanosta-7,24-diene-26,23-lactone, 498.
 - of acenaphthene-tetrachloro-p-benzoquinone molecular complex. Molecular complexes. Part XVIII, 724.
 - -7,7,8,8-tetracyanoquinodimethane molecular complex.
 Molecular complexes. Part XIX, 727.

- of adiphenine hydrochloride, a muscarinic antagonist of acetylcholine, 942.
- of a donor-acceptor complex involving protonated riboflavin, quinol, and bromide ions, 1266.
- of o-benzoquinone, 477.
- of p'-bromochalcone. Topochemistry. Part XXXIV, 33
- of 1-(4-bromophenyl)azetidin-2-one, 2042.
- of 5-bromotetrazole. Tetrazole studies. Part II, 2036.
- of (1S,2S)-2-[(S)-chlorofluoroacetoxy]-1-phenylcyclohexanol, 295.
- of cortisol (11β,17α,21-trihydroxypregn-4-ene-3,20-dione) methanol solvate, 774.
- of 8,9-dibromo-1,4,4,8-tetramethyltricyclo[5,4,0,0^{2,5}]undecane and 8,9-dibromo-2,2,4,8-tetramethyltricyclo-[5,3,1,0^{4,11}]undecane, derivatives of rearrangement products of caryophyllene dihydrochloride and isocaryophyllene respectively, 1938.
- of NN-dimethylacetamidoxime, 2106.
- of N-(dimethylsulphonio)toluene-p-sulphonamidate. Structural investigation of the ylides. Part III, 1951.
- of 6,7-diphenyldibenzo[e,g][1,4]diazocine, a heterocyclic cyclo-octatetraene, 1929.
- of eserine (physostigmine), 1342.
- of ethyl N-methyl-N-(p-tolylsulphonylmethyl)carbamate at -160 °C. Folded conformations. Part V, 2031.
- of glycopyrronium bromide. Stereochemistry of anticholinergic agents. Part II, 1875.
- of hexapyrronium bromide [3-(2-cyclohexyl-2-hydroxy-2-phenylacetoxy)-1,1-dimethylpyrrolidinium bromide], 1963.
- of 17β-hydroxyandrost-4-en-3-one (testosterone), 1978.
- of (23R)-23-hydroxy-3 α ,5 α -cycloergost-7-en-6-one, 781.
- of p-nitrobiphenyl. A comparison of the results of X-ray crystal analysis with semi-empirical calculations of conformation, 342.
- of 'perpendicular' 9,9-dichloro-trans,trans-bicyclo[6,1,0]-non-4-ene oxide, 339.
- of perylene-7,7,8,8-tetracyanoquinodimethane molecular complex. Molecular complexes. Part XVII, 720.
- of mesembranol, 51.
- of 9-methylanthracene-tetrachloro-p-benzoquinone molecular complex. Molecular complexes. Part XX, 731.
- of trans, trans-tetrabenzo[a,c,g,i]cyclododecene, 1984.
- of 2,3,6,7-tetrahydro-6-phenyl-5H-imidazo[2,1-b]thiazolium chloride, 203.
- of the amino-acid L-arginine dihydrate. Precision neutron diffraction structure determination of protein and nucleic acid components. Part V, 133.
- of the p-bromobenzoate chlorohydrin of clerodendrin A,
- of the π^* -electron-acceptor molecule 1,2,4,5-tetracyanobenzene. Molecular complexes. Part XIV, 520.
- of the germination stimulant strigol by X-ray analysis, 465. of the histamine H_2 -receptor antagonist N-(4-imidazol-4-ylbutyl)-N'-methylthiourea (burimamide), 1734.
- of the major products from the benzylation of 1-ethyl-4-phenylpiperidine and 1-isopropyl-4-phenylpiperidine,
- of the molecular complex of pyrene and chloranil.

 Molecular complexes. Part XXII, 1212.
- of two thiopyranylidenedihydropyridine SS-dioxides, 1189.

- Crystal structure analysis and strain-energy minimization calculations on a sterically crowded molecule: 1,8-dimethylnaphthalene, 2101.
 - and absolute configuration of 2'-bromopodophyllotoxin—0.5 ethyl acetate, 288.
 - of zygacine acetonide hydriodide acetone solvate. Veratrum alkaloids. Part LVI, 386.
 - and dynamic behaviour in solution of dimethyl(dimethylaminomethylene)malonate, 657.
 - and molecular conformation of syn-8,8-dichloro-4-phenyl-3,5-dioxabicyclo[5,1,0]octane, 194.
 - of corynoline p-bromobenzoate, 1605.
 - of α-cyanoacetohydrazide, 1825.
 - of $2\alpha,3\alpha$ -epithio- 5α -androstan- 17β -yl p-bromobenzoate, 1866.
 - of heptachlor (racemic 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene). Insecticides. Part IV, 1374.
 - of the 1:1 molecular complex of pyrene and 1,2,4,5-tetracyanobenzene at 290 and 178 K. Molecular complexes. Part XV, 523.
 - of the 1:1 molecular complex of pyrene and 7,7,8,8-tetracyanoquinodimethane. Molecular complexes. Part XVI, 528.
 - of 4-amino-3-(β-benzoylhydrazino)-5-mercapto-1,2,4-triazole. Bonding in 1,2,4-triazoles. Part III, 4.
 - of 4-benzylideneamino-5-mercapto-1,2,4-triazole. Bonding in 1,2,4-triazoles. Part V, 9.
 - of dihydrometacodeinone hydrochloride. Analgesics. Part II, 2044.
 - of 1,12-dimethyl[1,1]ferrocenophane (1,1":1',1"'-diethylidenediferrocene). X-Ray studies on constrained ferrocene derivatives. Part I, 138.
 - of guanazine hydrobromide, 3,4,5-triamino-1,2,4-triazole hydrobromide. Bonding in 1,2,4-triazoles. Part II, 1.
 - of humulene diepoxide, X-ray analysis of: conformation of humulene. Part XV, sesquiterpenoids, 404.
 - of I-hydroxymethyl-4-methyl-7-oxabicyclo[4,3,0]non-4-en-8-one, 240.
 - of 6-mercapto-3-phenyl-s-triazolo[4,3-b]-s-tetrazine pyridine adduct. Bonding in 1,2,4-triazoles. Part VI, 11.
 - of the acid salts of some dibasic acids. Part VIII, an X-ray study of the β -form of rubidium hydrogen acetylenedicarboxylate, and a comparison with the isomorphous α -forms of the potassium and rubidium salts, 706.
 - of the doubly bridged biphenyl, 2-chloro-4,5,9,10-tetra-hydropyrene, 314.
 - of the 2:1 complexes of benzamide with succinic acid and furamide with oxalic acid. Molecular packing modes. Part XI, 503.
 - of the sodium salt of 4-amino-5-mercapto-1,2,4-triazole trihydrate, 6.
 - of 3,4,5-triamino-1,2,4-triazole hydrobromide (guanazine hydrobromide), 1.
 - of trimethyl-[4-(2-oxopyrrolidin-1-yl)but-2-ynyl]-ammonium iodide, 1247.
 - X-ray, of the electro-optic material meta-nitroaniline, 1197.
- Crystal structures of the acid salts of some dibasic acids. Part VII, an X-ray study of potassium hydrogen acetylenedicarboxylate: the α -form, 703.

- Crystal Violet, Michler's Hydrol Blue, and Malachite Green, electronic absorption spectra of derivatives of, containing o-trifluoromethyl groups. Steric effects of di- and triarylmethane dyes. Part XI, 1792.
- Cularine methiodide, crystal and molecular structure and absolute stereochemistry of, 1226.
- Cucurbitacins, stereochemistry of the. Crystal and molecular structure and absolute configuration of datiscoside bis-(p-iodobenzoate) dihydrate, 892.
- Cyanide, hydrogen and dihydrogen, radical, loss of, from aromatic nitrogen heterocycles on electron impact, 648.
 - methyl, H(R)CN· radicals in acidic solutions, and γ-irradiated cyanoacetic acid. Unstable intermediates. Part CXXV, 394.
- Cyanuric chloride (trichloro-1,3,5-triazine), the reaction of, with N-phenyl-pyrrole, -indole, -carbazole and -diphenyl-amine and N-ethyl-pyrrole, -carbazole and -diphenyl-amine. 1,3,5-Triazines. Part XII, 2075.
- Cyclisation of N- ω -halogeno-alkylamines and -sulphon-amides, transition states in. Intramolecular reactions. Part X, 1215.
 - of ω-halogenoalkyl sulphides: the significance of bromide: chloride ratios in displacement reactions. Intramolecular reactions. Part XI, 1221.
 - of I- and 2-methylindolylbutanols and their toluene-p-sulphonates. Electrophilic substitution in indoles. Part VII, 548.
- Cycloadditions, 1,3-dipolar, substituent effects in. Variable reaction paths for the cycloaddition of benzonitrile Noxides to styrenes, 1769.
 - of olefins and acetylenes to dimethylketen: evidence for the $[_{\pi}2_{8} + _{\pi}2_{8}]$ concerted mechanism, 166.
- Cyclobutane, dimers of 1-cyanoallenes. Part XXV, allenes, 885
 - cyano-, and 1-cyanobutane, chlorination and bromination of. Free-radical substitution in aliphatic compounds. Part XXVII, 125.
- Cyclobutanone and thietan in liquid crystalline solvents, conformational investigation of, 1908.
 - 2,2,4,4-tetramethyl-, the thermal unimolecular decomposition of, 2016.
- (23R)-3α,5α-Cycloergost-7-en-6-one, 23-hydroxy-, crystal and molecular structure, 781.
- Cyclohexa-2,5-dienone, 4-bromo-2,6-di-t-butyl, in acetic acid, base-catalysed prototropic rearrangement of. Aromatic substitution with rearrangement. Part V, 59.
 - 4,4-dimethyl-, basicity studies of a series of, 84. Kinetics of the dienone-phenol rearrangement of, 88.
- Cyclohexane, 1,3,5-trinitro-, nitramines, and nitrosamines, dipole moments and conformations of. Dielectric properties of cyclic nitramines and related compounds. Part I, 1280.
- Cyclohexanes, trans-1,2- and trans-1,4-dihalogeno-, the solvent dependence of the conformational equilibria in. Rotational isomerism. Part XV, 582.
 - halogeno-, and halogenocyclopentanes, gas-phase bromination of, in a fast flow reactor. Free-radical substitution in aliphatic compounds. Part XXVIII, 1346.
- Cyclohexanol, (1S,2S)-2[(S)-chlorofluoroacetoxy]-1-phenyl-, crystal and molecular structure, 295.
- Cyclohexene, 1-p-tolylsulphonylazo-, kinetics of the reaction of, with maleic anhydride, 1922.

- Cyclohexyl 1,2,2-tricyanovinyl ether, tricyanovinylation with. The kinetics and mechanism of the reaction of cyclopentadienylidenetriarylphosphoranes with cyanoolefins. Part V, 1821.
- Cyclohexylamine, N-allyl-, the unimolecular thermal decomposition of, in the gas phase. Thermochemical kinetics of nitrogen compounds. Part III, 2007.
- Cyclopentadiene, 1,2,3,4-tetrachloro-, arylazo-derivatives. Chromogens based on non-benzenoid systems. Part II, 1155.
- Cyclopentanes, halogeno-, and halogenocyclohexanes, gasphase bromination of, in a fast flow reactor. Free-radical substitution in aliphatic compounds. Part XXVIII, 1346.
- Cyclopentanone oxime, Beckmann rearrangement of, catalysed by decationated zeolite, 1262.
- 4H-Cyclopenta[def]phenanthrene, system, the effect of a crown ether on the. Radical-anion intermediates. Part VI, 1201.
- Cyclo-octatetraene, a heterocyclic, 6,7-diphenyldibenzo[e,g]-[1,4]diazocine, crystal and molecular structure, 1929.
- Cyclopropane, acetyl, gas-phase thermal unimolecular isomerizations of. Part I, the equilibrium between 2,3-dihydro-5-methylfuran and acetylcyclopropane, 197. Part II, determination of rate constants, 199.
 - intermediate, protonated, in a kinetically controlled substitution, evidence for a 1,3-shift involving: formation of 2-chloro-3-methylbutane in the thermal decomposition of 2-methylbutyl chloroformate, 74.
- Cyclopropanes, aryl-, a conformational study of some substituted. Molecular polarisability, 2060.
 - aryldimethylvinylidene-, and aryldimethylenecyclopropanes, thermal rearrangements, 278.
- Cyclopropyl ketones, the conformations of some. Molecular polarisability, 1365.
- Cysteine and cysteamine, kinetics of the reaction of hydrogen peroxide with, 1547.

 \mathbf{D}

- Datiscoside bis-(p-iodobenzoate) dihydrate, crystal and molecular structure and absolute configuration of. Stereochemistry of the cucurbitacins, 892.
- **Deamination** of O-alkylhydroxylamines, micellar catalysis of, 93.
 - of dodecylamine micelles, a kinetic study of anion effects in the, 2153.
- Decarboxylation of some heterocyclic acetic acids. Part II, direct and indirect evidence for the zwitterionic mechanism, 557.
- **Decomposition,** the thermal unimolecular, of 2,2,4,4-tetramethylcyclobutanone, 2016.
 - the unimolecular thermal, of N-allylcyclohexylamine in the gas phase. Thermochemical kinetics of nitrogen compounds. Part III, 2007.
- Dehalogenation reactions of vicinal dihalides. Part III, dehalogenations of 1-chloro-2-iodo-1,2-diphenylethane induced by a variety of nucleophiles. The nucleophilic reactivity towards iodine, 38.
- Dehydrohalogenation, base-promoted, of 2-phenylsulphonylethyl bromide, chloride, and fluoride. Elimination reactions on the borderline between concerted and stepwise processes, 1538.

Densities, electronic, and carbon-13 nuclear magnetic resonance spectra of symmetrical naphthyridines, 1024.

- Deuterium isotope effects on competing metastable decompositions of organic ions, mechanistic inferences from, 76. kinetic isotope effect in elimination from phenylethyl bromides in t-butyl alcohol, 169.
- **Dextrins,** α and β -, thermodynamics of binding of guest molecules to, 2081.
- 2,3-Diazabuta-1,3-dienes, 1-chloro- and 1,4-dichloro-, the competing mechanisms of substitution, hydrolysis and cyclization of, 1708.
- Diazepines. Part XVI, nuclear magnetic resonance spectra of 2,3-dihydro-1*H*-1,4-diazepinium salts, 1729.
- Diazo-compounds, dipole moments and molecular conformation of. Part III, benzoylphenyldiazomethane and related molecules, 1497.
 - molecular conformation of. Part IV, dipole moments and infrared spectra of some hindered α -diazo-ketones, 2142.
- Dibasic acids, crystal structures of the acid salts of some. Part VII, an X-ray study of potassium hydrogen acetylenedicarboxylate: the α -form, 703. Part VIII, an X-ray study of the β -form of rubidium hydrogen acetylenedicarboxylate, and a comparison with the isomorphous α -forms of the potassium and rubidium salts, 706.
- 5H-Dibenzo[a,d]cycloheptene, and related compounds, an electron spin resonance study of the radical anions of, 811.
- Dibenzo [e,g] [1,4] diazocine, 6,7-diphenyl-, a heterocyclic cyclo-octatetraene, crystal and molecular structure, 1929.
- Diborane, the reaction of, with t-butoxyl radicals, 420.
- Dielectric properties of cyclic nitramines and related compounds. Part I, dipole moments and conformations of nitramines, nitrosamines, and 1,3,5-trinitrocyclohexane, 1280.
- Dienone-phenol rearrangement of some 4,4-dimethylcyclohexa-2,5-dienones, kinetics of the, 88.
- Dihalides, vicinal, dehalogenation reactions of. Part III, dehalogenations of the 1-chloro-2-iodo-1,2-diphenylethane induced by a variety of nucleophiles. The nucleophilic reactivity towards iodine, 38.
- Dinitrogen tetroxide, a study of the reaction of, with aromatic compounds, 1177.
- **3,5-Dioxabicyclo**[5,1,0]-octane, syn-8,8-dichloro-4-phenyl-, crystal structure and molecular conformation, 194.
- 1,3,2-Dioxaphosph(v)orinan, 4-methyl-, series, a stereochemical study of some reactions of compounds in the, 676.
- 1,3,2-Dioxathiolan 2-oxides, (ethylene sulphites), nuclear magnetic resonance and infrared studies on. Chemistry of the S=O bond. Part II, 243.
- 1,3-Dioxolan-4-ones, some 2,5-disubstituted, long-range coupling in the nuclear magnetic resonance spectra of, 687.
- Dipole moment, nuclear magnetic resonance spectra, and Kerr effect study: solute-hexafluorobenzene interactions. 1362.
 - solute-benzene interactions, 1272.
 - studies, molecular solute conformation of di-2-pyridyl disulphide from, 701.
- Dipole moments and conformation of thiosulphinates, 488. and conformations of nitramines, nitrosamines, and 1,3,5-trinitrocyclohexane. Dielectric properties of cyclic nitramines and related compounds. Part I, 1280.
 - and infrared spectra of some hindered α -diazo-ketones. Molecular conformation of diazo-compounds. Part IV, 2142.

- Dipole moments (contd.)
 - and molecular conformation of diazo-compounds. Part III, benzoylphenyldiazomethane and related molecules, 1497.
 - of substituted adamantanes and the correlation of the dipole moments of aliphatic compounds with substituent constants, 416.
- Directive effects in benzylic hydrogen atom abstraction. Part III, chlorination of nuclear-substituted toluenes, diphenylmethanes, and ethylbenzenes, 689. Part IV, halogenation of 2-arylethyl chlorides, 693.
- Displacement, nucleophilic, by piperidine in 6-p-tolyl-sulphonyloxyfulvene. Reactivity of fulvenes, 2078.
 - reactions, the significance of bromide: chloride ratios in: cyclisation of ω -halogenoalkyl sulphides. Intramolecular reactions. Part XI, 1221.
- **Dissociation** constants of mono- and poly-substituted benzoylacetanilides, 808.
 - thermodynamic acid, of aromatic thiols, 1969.
 - energies, C-N bond, in some halogenated C-nitroso-compounds and in di-t-butyl nitroxide, 1853.
- 1,3-Dithiolans, 2-alkyl-4-methyl- and 2-alkyl-2,4-dimethyl-. Conformational analysis. Part VII, 1376.
- Dodecylamine micelles, a kinetic study of anion effects in the deamination of, 2153.
- Durene, nitroso-, and other nitrosobenzene derivatives. Spin trapping by use of nitroso-compounds. Part VI, 1252.
- Dyes, di- and tri-arylmethane, steric effects in. Part XI, electronic absorption spectra of derivatives of Michler's Hydrol Blue, Crystal Violet, and Malachite Green containing o-trifluoromethyl groups, 1792. Part XII, electronic absorption spectra of some derivatives of Michler's Hydrol Blue containing α-trifluoromethyl groups, 2151.

E

- Electric dipole moments of some acrylonitriles, allyl cyanides, and alicyclic nitriles, 537.
- Electrochemical behaviour of alkanes in fluorosulphonic acid, 374.
 - reactions. Part XIV, carbon-halogen bond fragmentation in the radical anions from 4-(chlorostryl)pyridines. Factors which determine the rate of such fragmentations, 1150. Part XV, factors which determine the rate of carbon-halogen bond fragmentation in radical anions illustrated by some halogenated derivatives of quinoline, quinoxaline, and phenazine, 1811.
- Electrolysis, controlled potential, and cyclic voltammetry of 4-dimethylaminoantipyrine (4-dimethylamino-2,3-dimethyl-1-phenyl- Δ^3 -pyrazolin-5-one) in acetonitrile. Anodic oxidation of amines. Part III, 1640.
- Electronic absorption spectra of derivatives of Michler's Hydrol Blue, Crystal Violet, and Malachite Green containing o-trifluoromethyl groups. Steric effects in diand tri-arylmethane dyes. Part XI, 1792.
 - of some derivatives of Michler's Hydrol Blue containing α-trifluoromethyl groups. Steric effects in di- and triarylmethane dyes. Part XII, 2151.
- Electron impact, fragmentation and rearrangement processes upon, of aromatic sulphines. Chemistry of sulphines. Part XVII, 458.
 - induced rearrangements of arylthio, arylsulphinyl, and arylsulphonyl substituted sulphines. Chemistry of sulphines. Part XVIII, 461.

- loss of hydrogen cyanide and dihydrogen cyanide radical from aromatic nitrogen heterocycles on, 648.
- major fragmentation pathways on, of some aryl *N*-arylbenzimidates, Chapman rearrangement products, and acridones, 1303.
- π-Electron 'ring current' intensities in some sulphurheterocyclic analogues of fluoranthene, 235.
- Electron spin resonance-flow technique, on the use of, in the study of short-lived radicals, 1702.
 - investigation of some selenium containing radicals. Heterocyclic radicals. Part III, 258.
 - kinetic spectroscopy. Part III, proton exchange rates for ketyl radicals in organic solvents, 1620.
 - spectra and structure of chlorophosphoranyl radicals in solution, 1339.
 - and the formation of some cyclic alkoxynitroxide radicals, 2134.
 - an investigation of the effects of chirality upon, 1834. of naphthoxyl radicals, 2124.
 - of some arylsemiquinones, steric effects observed in the, 1533
 - of some symmetrically substituted polynitroacenaphthenes. Studies on nitroaromatic compounds. Part
 - spectroscopy and INDO (intermediate neglect of differential overlap) molecular orbital calculations, an investigation employing. The structure of nitroanion-radicals, 2010.
 - the identification by, of dimeric species formed by the autoxidation of hydroquinone and quinone, 2128.
 - studies. d_{π} - p_{π} Interaction in trimethylsilyl substituted naphthalenes. Part II, 2091.
 - of positive hole centres in γ -irradiated glycine. Unstable intermediates. Part CXXXIV, 1808.
 - Part XXXVII, oxidation of β-hydroxy-sulphfdes by the hydroxyl radical and structural features of sulphur-conjugated radicals, 272. Part XXXVIII, evidence for the formation of dimeric radical-cations, R₂S≐SR₂+, in the one-electron oxidation of sulphides, 1748. Part XXXIX, a kinetic investigation of the role of radical reduction in metal ion-hydrogen peroxide systems, 2174.
 - of oxidative processes of quinones and hydroquinones in alkaline solution; formation of primary and secondary semiquinone radicals, 424.
 - of the effect of high energy radiation on amines and their solutions in water and sulphuric acid. Unstable intermediates. Part CXXVI, 797.
 - of the effect of γ -radiation and of hydrogen atoms upon various olefinic carboxylic acids and their amides, 397.
 - of the structure and reactivity of some spirophosphoranyl radicals in solution, 1416.
 - study of conformational inversion in 4-alkylpiperidine nitroxides, 1171.
 - of homolytic substitution on silicon: trimethylsiloxy-radicals from peroxides, 182.
 - of intermediate radicals: γ -radiolysis of pure acyl chlorides at 77 K, 1563.
 - of some sulphonyl radicals in solution, 626.
 - of the radical anions of 5H-dibenzo[a,d]cycloheptene and related compounds, 811.
 - of the reactions of organosilicon, organogermanium, and organotin radicals with carbonyl compounds, 1933.

- Electron spin resonance (contd.)
 - of the reactivity of organotin and organolead radicals,
 - : radicals formed from acetylenes by high energy radiation and hydrogen atom bombardment, 1405.
- Electron-transfer reactions, photochemically induced, between bipyridylium dications and formate, oxalate and benzilate anions, 80.
- Electro-organic reactions. Part I, the cathodic cleavage in methanol solution of benzylic carbon-oxygen and carbon-fluorine bonds, 1903.
- Electrophilic and $S_N 1$ addition-elimination routes in the solvolysis of α -bromo- and α -chloro-4-methoxystyrenes. Vinylic cations from solvolysis. Part XIII, 301.
 - attack, the effect of structure on the direction of. Two different structures for copper and lithium derivatives of vinylic enolates, 1971.
 - substitution in indoles. Part VII, cyclisation of 1- and 2-methylindolylbutanols and their toluene-p-sulphonates, 548. Part VIII, the mechanism of electrophilic substitution in 6-methoxyindoles, 872. Part IX, rearrangements and isotope effects in some reactions of tetrahydrocarbazoles, 878.
- Electroreduction and related studies on 2-aminoacrylic acid derivatives. Part I, electroreactivity of 2-acetamidocinnamic acid, 1663. Part II, electroreactivity of 2-acetamidoacrylic acid, 1670.
- Elimination from phenylethyl bromides in t-butyl alcohol, deuterium kinetic isotope effect in, 169.
 - the syn-anti dual pattern in, from fluorosulphonylethanes promoted by phenoxide and t-butoxide ions, 1336.
 - mechanism, participation of an, in alkaline hydrolysis of alkyl N-phenylcarbamates, 1244.
 - reactions, mechanisms of. Part IV, rates of elimination from substituted phenethyl'onium salts in isopropyl alcohol containing potassium isopropoxide, 1352.
- Enolates, vinylic, two different structures for copper and lithium derivatives of. The effect of structure on the direction of electrophilic attack, 1971.
- Enthalpies, free energies and entropies of transfer of nonelectrolytes from water to mixtures of water and dimethyl sulphoxide, water and acetonitrile, and water and dioxan, 607.
 - of transfer from methanol to protic and aprotic solvents of the transition state in the reaction of benzenesulphonyl chloride with imidazole, 1760.
- **Epoxides,** activation parameters and mechanism of the acidcatalysed hydrolysis of, 452.
- Equilibra, redox, of aromatic cation radicals and aromatic compounds, 1594.
- Ergolines, lysergic acid and related, luminescence characteristics of, 1312.
- Eserine (physostigmine), crystal and molecular structure of, 1342.
- Ester hydrolysis, hydroxy-group participation in, 1118.
- Esters, thermolytic reactions of. Part XI, vapour-phase thermolysis of allyl methyl oxalate and allyl phenyl oxalate and its relevance to the thermochemistry of oxycarbonyl radicals, 1327.
- Ethane, 1-chloro-2-iodo-1,2-diphenyl-, dehalogenations of, induced by a variety of nucleophiles. The nucleophilic reactivity towards iodine. Dehalogenation reactions of vicinal dihalides. Part III, 38.
- Ethanes, conformations of some polar substituted: molecular polarisability, 766.

- fluorosulphonyl-, the *syn-anti* dual pattern in elimination from, promoted by phenoxide and t-butoxide ions, 1336.
- Ethanol, 2-nitro-, and sodium hypobromite, reaction between. Bromopicrin reaction. Part II, 1107.
- Ethanols, 2-aryl and 1-aryl-2-halogeno, kinetics of formation of styrene oxide by reaction of, with aqueous alkali, 589.
- Ethanolysis of aminovinyl arenesulphonates, unimolecular cleavage of the sulphur—oxygen bond in the. Reactivity of vinyl sulphonic esters. Part XV, 1021.
- Ethyl acetates, 1-aryl-, electrophilic aromatic reactivities via pyrolysis of. Part IX, the effect of the trimethylsilyl substituent, 1632.
 - 2-phenylsulphonyl-, bromide, chloride, and fluoride, basepromoted dehydrohalogenation of. Elimination reactions on the borderline between concerted and stepwise processes, 1538.
- Ethylene oxides, the catalysed benzoylation of, by benzoyl halides in aprotic solvents. Acylation. Part XXXVII, 995.
 - sulphites (1,3,2-dioxathiolan 2-oxides), nuclear magnetic resonance and infrared studies on. Chemistry of the S=O bond. Part II, 243.
 - tetracyano-, the reaction of, with aniline: N-tricyano-vinylation, 974.
 - tetrafluoro-, kinetics and mechanism of the reaction of, with dimethylphosphine. Organophosphorus chemistry. Part XV, 1295.
 - kinetics and mechanism of the gas-phase thermal addition of, to tetramethyldiphosphine. Organophosphorus chemistry. Part XVI, 1301.
- Exchange, acid catalysed hydrogen, of azaindoles. The kinetics and mechanism of the electrophilic substitution of heteroaromatic compounds. Part XXXII, 1072.
 - chlorine-isotopic, between lithium chloride and di- and trinitro- derivatives of *m*- and *p*-dichlorobenzenes, a kinetic study of, 1883.
 - hydrogen, of monosubstituted benzenes in sulphuric acid under standard conditions, Hammett treatment for. The kinetics and mechanism of the electrophilic substitution of heteroaromatic compounds. Part XXXIII, 1077.
 - rates, acid catalysed, the standardisation of. The kinetics and mechanism of the electrophilic substitution of heteroaromatic compounds. Part XXXI, 1065.

F

- Ferrate(III), hexacyano-, alkaline potassium, the effect of structure on the reactivity of alkyl tertiary amines towards. Amine oxidations. Part VII, 206.
- [1,1]Ferrocenophane, 1,12-dimethyl, (1',1":1',1"'-diethylidenediferrocene), crystal structure of. X-Ray studies on constrained ferrocene derivatives. Part I, 138.
- Fischer-Hepp rearrangement, kinetics and measurement.

 Part II, separation of rearrangement and denitrosation,

 473
- Fluoranthene, approximate π -electron 'ring current' intensities on some sulphur-heterocyclic analogues of, 235.
- Fluorescence, acetone, quenching of, by inorganic anions, 1624.
- Fluorine chemical shifts, the solvent dependence of. Part I, 1027.
- Fluorosulphonic acid, the electrochemical behaviour of alkanes in, 374.

- Formate, oxalate, and benzilate anions and bipyridylium dications, photochemically induced electron-transfer reactions between, 80.
- Formates, alkyl. Part V, the carbonyl group frequency, 845.
 - and acetates, isomeric propyl and buty!, infrared spectra of. Conformations of some saturated carbonyl compounds. Part III, 952.
- Formylation, Vilsmeier-Haack, of five-membered heteroaromatic compounds containing the Group VI elements, relative reactivities and activation parameters for the, 2097.
- Fragmentation and rearrangement processes upon electron impact of aromatic sulphines. Part XVII, chemistry of sulphines, 458.
 - electron impact induced, of alkyl(benzylidene)amines, 854.
 - pathways, major, on electron impact or some aryl *N*-arylbenzimidates, Chapman rearrangement products, and acridones, 1303.
 - solvolytic, of trialkoxy-2-halogenoethylsilanes, 1699.
- Free energies, enthalpies, and entropies of transfer of nonelectrolytes from water to mixtures of water and dimethyl sulphoxide, water and acetonitrile, and water and dioxan, 607.
- Free energy of reactants and transition states in the substitution of tetraethyltin by mercury(II) salts, the effect of t-butyl alcohol-methanol mixtures on. Substitution at saturated carbon. Part XV, 444.
- Free radical addition of isobutyric acid to α, ω -diolefins. A new route to $\alpha, \alpha, \alpha', \alpha'$ -tetramethylalkanedioic acids, 1655.
 - analogue of the Chapman rearrangement: conversion of arylhydrazonates into N'N'-diarylhydrazides, 1422.
 - conditions, substitution accompanying addition in the reactions of chlorobenzene and benzonitrile with chlorine under, 650.
 - substitution in aliphatic compounds. Part XXVII, chlorination and bromination of I-cyanobutane and cyanocyclobutane, 125. Part XXVIII, the gas-phase bromination of halogenocyclohexanes and halogenocyclopentanes in a fast flow reactor, 1346. Part XXIX, halogen atom abstraction from alkyl halides by trimethyltin radicals in the gas phase, 1570.
- Free radicals, activation energies of hydrogen atom abstractions from alkanes by, 361.
 - trapping and identification of, in the oxidation of some substituted hydrazines, 1039.
- Fulvenes, reactivity of. Nucleophilic displacement by piperidine in 6-p-tolylsulphonyloxyfulvene, 2078.
- Fumarates and maleates, infrared spectra of dimethyl, diethyl, and di-n-butyl. Conformations of some αβ-unsaturated carbonyl compounds. Part IV, 954.
- Fumaric and maleic acids, intermediates in the oxidation of.

 Mechanism of the permanganate oxidation of unsaturated compounds. Part III, 1565.
 - kinetic investigation of the oxidation of. Mechanism of the permanganate oxidation of unsaturated compounds. Part IV, 1856.
- Furamide with oxalic acid and benzamide with succinic acid, crystal structures of the 2:1 complexes. Molecular packing modes. Part XI, 503.
- Furan, 2,3-dihydro-5-methyl-, and acetylcyclopropane, the equilibrium between. Gas-phase thermal unimolecular isomerizations of acetylcyclopropane. Part I, 197.

- Furan-2(5H)-ones, 3,4-disubstituted, hydrogen bonding in, 105.
- Furan-2-yl, bis-(3,4-disubstituted 5-oxo-2,5-dihydro) ethers, synthesis and stereochemistry, 107.
- Furazans and furazan oxides. Part IV, the structures and tautomerism of some unsymmetrically substituted furoxans, 1613.

G

- **β-Galactosidase**-catalysed hydrolyses, evidence for catalysis other than acidic in, 300.
- **Gas-phase** oxidation of alkenes: decomposition of hydroxysubstituted peroxyl radicals, 540.
 - pyrolysis of 1,2-dimethylpropyl acetate, 663.
 - thermal unimolecular isomerizations of acetylcyclopropane. Part I, the equilibrium between 2,3dihydro-5-methylfuran and acetylcyclopropane, 197. Part II, determination of rate constants, 199.
- Germanium, organo-, organosilicon, and organotin radicals, an electron spin resonance study of the reactions of, with carbonyl compounds, 1933.
- β-D-Glucopyranoside, ferrocenylmethyl, a reinvestigation of the bond cleavage in the acid-catalysed hydrolysis of. Reactions at position 1 of carbohydrates. Part IX, 310.
 - 8-quinolyl, acid-catalysed and metal-ion-catalysed hydrolysis of, 1943.
- **β-p-Glucopyranosides**, alkyl, alkyl-oxygen *versus* glycosyl-oxygen fission in the acid-catalysed hydrolyses of, 190.
- Glycine, alanine, and sarcosine, piperazinedione formation from esters of dipeptides containing: the kinetics in aqueous solution, 1845.
 - γ-irradiated, electron spin resonance studies of positive hole centres in. Unstable intermediates. Part CXXXIV, 1808.
- Glycolic solutions, strongly basic, kinetic studies in. Part I, the alkaline solvolysis of chloroform, 143. Part II, alkaline degradation of p-dinitrobenzene, 146.
- Glycopyrronium bromide, crystal and molecular structure. Stereochemistry of anticholinergic agents. Part II, 1875.
- Glycosyl chlorides, 1,2-trans-O-acetyl, exchange and hydrolysis reactions of, in acetone. The reactivity of O-acylglycosyl halides. Part X, 932.
 - halides, O-acyl, the reactivity of. Part X, exchange and hydrolysis reactions of 1,2-trans-O-acetylglycosyl chlorides in acetone, 932.
 - -oxygen versus alkyl-oxygen fission in the acid-catalysed hydrolyses of some alkyl β-p-glycopyranosides, 190.
- Glycyltyrosine and acetylglycine, the acid catalysed hydrolysis of, 685.
- Guanazine hydrobromide, 3,4,5-triamino-1,2,4-triazole hydrobromide, crystal structure of. Bonding in 1,2,4-triazoles. Part II, 1.

Н

- **Halide** ion-alkyl radical adducts. Unstable intermediates. Part CXXIV, 391.
- Halides, alkyl, halogen atom abstraction from, by trimethyltin radicals in the gas phase. Free radical substitution in aliphatic compounds. Part XXIX, 1570.

- Halogen atom abstraction from alkyl halides by trimethyltin radicals in the gas phase. Free radical substitution in aliphatic compounds. Part XXIX, 1570.
- Halogenation of 2-arylethyl chlorides. Directive effects in benzylic hydrogen atom abstraction. Part IV, 693. of benzyl chlorides and α -substituted toluenes. Directive

effects in benzylic hydrogen atom abstraction. Part

- of ketones, examination of the evidence for 'Hal B I 'and 'Hal B II' mechanisms for, 1391.
 - intramolecular general acid catalysis in, 1681.
- Halogenoboronation of phenylacetylene, stereoselectivity of, 1989.
- Hammett, Brønsted, and Taft relationships as evidence for general base catalysis: the pyridine-catalysed acylation of phenols by carboxylic acid anhydrides in carbon tetrachloride, 1828.
 - correlations, additive increments, and the effect of lanthanide shift reagents, interpretation of the proton magnetic resonance spectra of olefinic protons by means of. Antiparasitic nitroimidazoles. Part V, 509.
 - equation, application of the: a structure-basicity relationship. 1,2-diaryl-2-imidazolines, 1371.
 - treatment for hydrogen exchange of monosubstituted benzenes in sulphuric acid under standard conditions. The kinetics and mechanism of the electrophilic substitution of heteroaromatic compounds. Part XXXIII, 1077.
- **Heats** of combustion and formation of 4-phenyl-1,2,3-selenadiazole and dibenzyl diselenide, 1732.
- **Helium** tritiide ions, reactions of, with gaseous bicyclo-[n,1,0]alkanes. Evidence for gaseous bicycloalkylium ions, 66.
- Heptachlor (racemic 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene), crystal structure of. Insecticides. Part IV, 1374.
- **Heteroanionic** species, aromatic. Part I, proton nuclear magnetic resonance spectra of the anions of five-membered aza-heterocycles, 568.
- Heteroaromatic compounds, the kinetics and mechanism of the electrophilic substitution of. Part XXXI, the standardisation of acid catalysed hydrogen exchange rates, 1065. Part XXXII, acid catalysed hydrogen exchange of azaindoles, 1072. Part XXXIII, Hammett treatment for hydrogen exchange of monosubstituted benzenes in sulphuric acid under standard conditions, 1077. Part XXXIV, the hydrogen exchange rates of methylpyrazoles, 1675.
 - five-membered compounds containing the Group VI elements, relative reactivities and activation parameters for the Villsmeier-Haack formylation of, 2097.
 - nitrogen compound, amino-; ultraviolet spectral correlation between cation of, and neutral species of the corresponding oxo-analogue, 1101.
- **Heterocycles,** aromatic nitrogen, loss of hydrogen cyanide and dihydrogen cyanide radical from, on electron impact, 648.
 - saturated, conformational analysis of. Part XLIX, the conformation of ring NH-groups in piperazines, hexahydropyrimidines, tetrahydro-1,3-oxazines, and tetrahydro-1,3-thiazines, 325. Part L, computer program for strain energy minimisation in six-membered rings and recalculation of conformational equilibria, 332. Part LI, spirodioxolans, 337. Part LII, the stereochemical orientation of the benzylation of piperidines,

- 1553. Part LIII, further 1,3,5-trialkylhexahydro-1,3,5-triazines, 2109.
- Heterocyclic compounds, proton transfer from. Part I, some benzimidazoles, 432. Part II, purine, 9-alkylpurines, and imidazo[4,5-b]pyridine, 1889. Part III, adenine and adenosine, 2138.
 - radicals. Part III, an electron spin resonance investigation of some selenium-containing radicals, 258. Part IV, some reactions of phenothiazine, two derived radicals, and phenothiazin-5-ium ion, 264.
- Hexapyrronium bromide, [3-(2-cyclohexyl-2-hydroxy-2-phenylacetoxy)-1,1-dimethylpyrrolidinium bromide], crystal and molecular structure, 1963.
- High energy radiation, electron spin resonance studies of the effect of, on amines and their solutions in water and sulphuric acid. Unstable intermediates. Part CXXVI, 797.
- Homolytic substitution on silicon, electron spin resonance study of: trimethylsilyoxyl radicals from peroxides, 182.
- Hormone, luteinizing hormone releasing, (LH-RH) and its component peptides, high resolution nuclear magnetic resonance studies on the conformation of, 1691.
- Humulene diepoxide, X-ray analysis of the crystal structure of: conformation of humulene. Sesquiterpenoids. Part XV, 404.
- **Hydrazides**, N'N'-diaryl-, conversion of arylhydrazonates into: a free-radical analogue of the Chapman rearrangement, 1422.
- Hydrazines, some substituted, trapping and identification of free radicals in the oxidation of, 1039.
- Hydrazones, pyridyl-, a change from rate-determining bromination to geometric isomerisation of, 1466.
- **Hydrazonyl** bromides, N-amidino-, mechanism of the formation of, and their conversion to N-amidinobenzohydrazides and 3-amino-5-aryl-1,2,4-triazoles, 2047.
- Hydrogen atom abstraction, directive effects in benzylic. Part V, halogenation of benzyl chlorides and α-substituted toluenes, 1617.
 - from alkanes by free radicals, activation energies of, 361.
 - atoms and γ -radiation, electron spin resonance studies of the effect of, upon various olefinic carboxylic acids and their amides, 397.
 - bonding in 3,4-disubstituted 5-hydroxyfuran-2(5H)-ones, 105
 - bonds, intramolecular, in aromatic sulphoxides: ¹H nuclear magnetic resonance and acidity constant measurements, 848.
 - ion activities, polarographic determination of. Part III, basic aqueous mixtures of nonelectrolytes, 991.
 - isotope exchange reactions, kinetics of. Part XXII, reactivity comparisons for a series of aromatic substrates towards radiolytically generated tritium atoms in aqueous solution, 1437. Part XXIII, isomer distributions in the radiation-induced tritiation of benzene derivatives in aqueous solution, 1450.
- Hydrogenation, liquid-phase, of organic compounds, selective catalytic behaviour of tungsten carbide in the, 1400.
- Hydrolyses, acid and alkaline, of some perbenzoic acids, the kinetics and mechanism of the, 1544.
- Hydrolysis, acid catalysed and metal-ion-catalysed, of 8-quinolyl β-p-glucopyranoside, 1943.
 - and protonation behaviour of 4,5-diphenylisosydnone.

 Mesoionic compounds. Part III, 1687.

- Hydrolysis (contd.)
 - of some N-substituted 4-chlorobenzamides, 1402.
 - of N-t-butylbenzaldoxime and 2-t-butyl-3-phenyloxaziridine, 1744.
 - acid, of phenylurea, 4-fluorophenylurea, and 3-methylphenylurea, 1457.
 - kinetics of, of NN'-diarylsulphamides, 481.
 - of 2-methoxy-1-methylbenzimidazoles. Studies of alkoxyheterocyclic compounds. Part II, 603.
 - of organic orthophosphate monoesters, structure-reactivity correlations for the. Solvolysis of organic phosphates. Part IX, 1235.
- **Hydroperoxide**, 1-methyl-1-phenylethyl, kinetics of the base-catalysed oxidation of sulphoxides with, 755.
- **Hydrophobic** interaction, effects of, on the kinetics of the reactions of long chain alkylamines with long chain carboxylic esters of 4-nitrophenol, 1006.
- **Hydroquinone** and quinone, the identification by electron spin resonance spectroscopy of dimeric species formed in the autoxidation of, 2128.
- Hydroxy-group participation in ester hydrolysis, 1118.
- **Hydroxylamines**, *N*-aryl, hydrogen transfer from, to nitrosoarenes: an accompaniment to azoxyarene formation, 1550.
- Hydroxylation of sodium 9,10-dihyro-9,10-dioxoanthracene-α-sulphonates, studies on the, 1626.
- Hydroxyl radical, oxidation of β-hydroxy-sulphides by, and structural features of sulphur-conjugated radicals. Electron spin resonance studies. Part XXXVII, 272.

I

- Imidazole, enthalpies of transfer from methanol to protic and aprotic solvents of the transition state in the reaction of benzenesulphonyl chloride with, 1760.
 - rates, activation parameters, and enthalpies of transfer of transition states for the reaction of, with aromatic sulphonyl chlorides in methanol and acetonitrile, 823.
 - nitro-, antiparasitic. Part V, interpretation of the proton magnetic resonance spectra of olefinic protons by means of additive increments, Hammett correlations, and the effect of lanthanide shift reagents, 509.
- 2-Imidazolines, 1,2-diaryl-. A structure-basicity relationship: application of the Hammett equation, 1371.
- Imidazo[4,5-b]pyridine, purine, and 9-alkyl-purines. Proton transfer from heterocyclic compounds. Part II, 1889.
- Imidazo[2,1-b]thiazole system, ¹H nuclear magnetic resonance spectra of, 1926.
- 5H-Imidazo [2,1-b] thiazolium chloride, 2,3,6,7-tetrahydro-6-phenyl-, crystal and molecular structure, 203.
- Indane-1,3-dione, 2-cyanomethylene-, reaction of, with anilines in acetonitrile. Nucleophilic attacks on carboncarbon double bonds. Part XVIII, 1045.
- INDO (intermediate neglect of differential overlap) molecular orbital calculations and electron spin resonance spectroscopy, an investigation employing. The structure of nitro-anion-radicals, 2010.
- Indole, N-phenyl-, -pyrrole, -carbazole, and -diphenylamine, and N-ethyl-pyrrole, -carbazole, and -diphenylamine, the reaction of trichloro-1,3,5-triazine (cyanuric chloride) with. 1,3,5-Triazines. Part XII, 2075.
- Indoles, electrophilic substitution in. Part VII, cyclisation of 1- and 2-methylindolylbutanols and their toluene-p-sulphonates, 548. Part VIII, the mechanism of

- electrophilic substitution in 6-methoxyindoles, 872. Part IX, rearrangements and isotope effects in some reactions of tetrahydrocarbazoles, 878.
- encounter control for the nitrosation of, in dilute acid.

 The chemistry of nitroso-compounds. Part V, 918.
- Infrared absorption spectra of 5-cyanopent-1-ene adsorbed on Y-type zeolites, 48.
 - and nuclear magnetic resonance absorption and isomerism of 3-aminocrotonic esters. Part II, 15.
 - studies on ethylene sulphites (1,3,2-dioxathiolan 2-oxides). Chemistry of the S=O bond. Part II, 243. studies on phenylethylene sulphites. Chemistry of the S=O bond. Part III, 1966.
 - bands, variation of the intensity of, with temperature, of chloroform and acetone, 957.
 - spectra and dipole moments of some hindered α-diazoketones. Molecular conformation of diazo-compounds. Part IV, 2142.
 - of dimethyl, diethyl, and di-n-butyl fumarates and maleates. Conformations of some αβ-unsaturated carbonyl compounds. Part VI, 954.
 - of isomeric propyl and butyl formates and acetates. Conformations of some saturated carbonyl compounds. Part III, 952.
 - study of the Beckmann rearrangement catalysed by decationated zeolite, 41.
- Insecticides. Part IV, crystal structure of heptachlor (racemic 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene), 1374.
- Intelligence, artificial, application of, for chemical inference. Part XI, analysis of carbon-13 nuclear magnetic resonance data for structure elucidation of acyclic amines, 1753.
- Intermediates, unstable. Part CXXXIV, electron spin resonance studies of positive hole centres in γ -irradiated glycine, 1808.
- Internal rotation, hindered, in [15N]trifluoroacetamide, 771. Inversion, conformational, in 4-alkylpiperidine nitroxides, an electron spin resonance study of, 1171.
 - of sucrose in aqueous solutions of some strongly dissociated acids, studies of the rate of. Part II, acidity constants for acetylenecarboxylic and propionic acids, 102.
- **Iodination** and iodo-compounds. Part IV, the effect of substituents and solvent composition on the rate of aromatic iodination by means of the tri-iodide cation, 589.
 - intra- and inter-molecular catalysis of the, of 4-diethylaminobutan-2-one and 5-diethylaminopentan-2-one, 1518.
- Iodine monochloride, complex formation between carbonitriles and. Substituent effects in saturated systems, 128.
- Ion pairs, intramolecular cation exchange in. Part I, alkali metal complexes of heterocyclic dicarbaldehydes, 903.
- Ionisation constants of substituted thiopyran 1,1-dioxides. Cyclic sulphones. Part XIV, 50.
 - kinetics of triphenylmethanols in concentrated acid solutions, nuclear magnetic resonance study of, 746.
 - of α -nitrotoluene in alkaline solution, kinetics of the Bromopicrin reaction. Part III, 1110.
 - self association, and proton exchange studies of nicotinamide in aqueous solution using nuclear magnetic resonance spectroscopy, 2145.
- Ions, isomeric, an investigation by ion cyclotron double resonance of the structural differences of, using a direct insertion probe, 2088.

reactions. Part X, transition states in the cyclisation of N-ω-halogeno-alkylamines and -sulphonamides, 1215. Part XI, cyclisation of ω-halogenoalkyl sulphides: the significance of bromide: chloride ratios in displacement reactions, 1221.

γ-Irradiation, chemical changes of benzylpenicillin in aqueous solution following, 575.

Isobutane, the influence of some organoboranes on the gaseous oxidation of, 803.

Isobutyric acid, free radical addition of, to α,ω -diolefins. A new route to $\alpha,\alpha,\alpha',\alpha'$ -tetramethylalkanedioic acids, 1655.

Isocyanate, intermediate, trapping of, by an o-amino-group. Elimination-addition mechanism for the hydrolysis of carbamates, 1719.

Isodrin, monodechloro-, and monodechloraldrin, sequential Wagner-Meerwein rearrangements of polychlorinated complex cations derived from, and the ¹H nuclear magnetic resonance spectra of polychloropolycyclic-ketones and dechloroaldrin derivatives, 909.

Isolantolactone, 2α -3β-diacetoxy-13β-p-bromophenylthio- 11α ,13-dihydro-, (13β-p-bromophenylthio- 11α ,13-dihydro-pulchellin-C diacetate): stereochemistry of addition of thiols to sesquiterpenoid α -methylene γ -lactones. Sesquiterpenoids. Part XIV, 400.

Isomer distributions in the radiation-induced tritiation of benzene derivatives in aqueous solutions. Kinetics of hydrogen isotope exchange reactions. Part XXIII, 1450.

Isomerisation, geometric, of pyridylhydrazones, a change from rate-determining bromination to, 1466.

metal carbonyl-catalysed, of N-allylamides to prop-2-enyl derivatives. Catalysed prototropic rearrangements. Part II, 1954.

and infrared and nuclear magnetic resonance absorption of 3-aminocrotonic esters. Part II, 15.

conformational, in cation radicals in alkylthiothiophens, 1491.

rotational, nematic phase nuclear magnetic resonance investigations of. Part II, evidence for the SO-cisconformation in thiophen-2-carbaldehyde, 1739.

Isomers, optical, assignment of the configuration of, by gas chromatography by the use of asymmetric stationary phases. Absolute configuration of 2-amino-3-methylbutane and 2-amino-4-methylpentane, 2094.

Isoquinoline, 1-phenylethyl-, alkaloid from *Colchicum cornigerum*, molecular structure and absolute stereochemistry of a: X-ray analysis of a methiodide derivative, 1002.

Isosydnone, 4,5-diphenyl-, acid-catalysed hydrolysis and protonation behaviour of. Mesoionic compounds. Part III, 1687.

Isothiocyanates and thiocyanates, pyrolysis of. Part V, the pyrolysis of but-3-enyl and 1-methylprop-2-enyl isothiocyanates, 839.

Isotope effects and rearrangements in some reactions of tetrahydrocarbazoles. Part IX, electrophilic substitution in indoles, 878.

Isoxazol-5(4H)-one molecular ions, a Beckmann-like aryl migration in substituted. Electron impact induced rearrangements of organic ions. Part III, 2038.

J

Juglone (5-hydroxy-1,4-naphthoquinone), mass spectra of derivatives of, 1781. \mathbf{K}

Kerr effect, nuclear magnetic resonance spectral, and dipole moment study: solute-benzene interactions, 1272.

nuclear magnetic resonance spectral, and dipole moment study: solute-hexafluorobenzene interactions, 1362.

Keten, a non-empirical LCAO-MO-SCF study on the site of protonation of, 795.

OO-, ON-, OS-, and SS-acetals, orthoesters, and ketenimines, the reactions of phosphorus acids with. Nucleophilic reactivity of organophosphorus compounds. Part II, 2064.

dimethyl-, cycloadditions of olefins and acetylenes to: evidence for the $[\pi^2_5 + \pi^2_8]$ concerted mechanisms, 166. **Ketones**, amino-, orbital interaction in, 210.

α-diazo-, dipole moments and infrared spectra of some hindered. Molecular conformation of diazo-compounds. Part IV, 2142.

examination of the evidence for 'Hal B I ' and 'Hal B II' mechanisms for the halogenation of, 1391.

intramolecular general acid catalysis in the halogenation of, 1681.

polychloropolycyclic, and dechloraldrin derivatives, the ¹H nuclear magnetic resonance spectra of, and sequential Wagner-Meerwein rearrangements of polychlorinated complex cations derived from monodechloroisodrin and monodechloraldrin, 909.

Ketyl and semiquinone radicals, termination rates for, in alcoholic solvents. Kinetic electron spin resonance spectroscopy. Part II, 543.

radicals, proton exchange rates for, in organic solvents. Kinetic electron spin resonance spectroscopy. Part III, 1620.

Kinetic electron spin resonance spectroscopy. Part II, termination rates for ketyl and semiquinone radicals in alcoholic solvents, 543.

evidence against the prior formation of 'positive bromine'.

Mechanism of aromatic bromination by hypobromous acid in aqueous perchloric acid, 1321.

for free dichlorocarbene; trichloromethylsilane derivatives and dichloromethylene transfer agents, 437.

investigation of the oxidation of maleic and fumaric acids.

Mechanism of the permanganate oxidation of unsaturated compounds. Part IV, 1856.

of the role of radical reduction in metal ion-hydrogen peroxide systems. Electron spin resonance studies. Part XXXIX, 2174.

studies in strongly basic glycolic solutions. Part I, the alkaline solvolysis of chloroform, 143. Part II, alkaline degradation of p-dinitrobenzene, 146.

with substituted phenyl phosphates and structurally related inhibitors. Bacterial alkaline phosphatase. Part III, 25.

study of anion effects in the deamination of dodecylamine micelles, 2153.

of chlorine-isotopic exchange between lithium chloride and di- and tri-nitro-derivatives of *m*- and *p*-dichlorobenzenes, 1883.

of the dimerization reaction of pseudo-acid chlorides.
Aspects of tautomerism. Part IV, 1158.

Kinetically controlled substitution, evidence for a 1,3-shift involving a protonated cyclopropane intermediate in: formation of 2-chloro-3-methylbutane in the thermal decomposition of 2-methylbutyl chloroformate, 74.

Kinetics and intermediates of the oxidation of substituted propynes. Mechanism of the permanganate oxidation of unsaturated compounds. Part V, 1861.

- and mechanism of addition and cyclialkylation reactions of ω -arylalkenes with trifluoroacetic acid, 1840.
 - of additions to olefinic substances. Part X, stereochemistry of the chloro- and bromo-hydrins derived from cinnamic acid and some derivatives thereof, 653. Part XI, stereochemistry of addition of chlorine acetate and of chlorine to some unsaturated compounds, 1480.
 - of hydrolysis of the amidinating agent, 1-(N-benzoylamidino)-3,5-dimethylpyrazole, 2054.
 - of the acid and alkaline hydrolyses of some perbenzoic acids. 1544.
 - of the *ortho*-Claisen rearrangement of allyloxynaphthoquinones, 1137.
 - of the electrophilic substitution of heteroaromatic compounds. Part XXXI, the standardisation of acid catalysed hydrogen exchange rates, 1065. Part XXXII, acid catalysed hydrogen exchange of azaindoles, 1072. Part XXXIII, Hammett treatment for hydrogen exchange of monosubstituted benzenes in sulphuric acid under standard conditions, 1077. Part XXXIV, the hydrogen-exchange rates of methylpyrazoles, 1675.
 - of the Fischer-Hepp rearrangement. Part II, separation of rearrangement and denitrosation, 473.
 - of the gas-phase thermal addition of tetramethyldiphosphine to tetrafluoroethylene. Organophosphorus chemistry. Part XVI, 1301.
 - of the gas-phase thermal reaction of dimethylphosphine with tetrafluoroethylene. Organophosphorus chemistry. Part XV, 1295.
 - of the morpholine-borane reduction of substituted acetophenones and benzaldehydes, 1948.
 - of the nucleophilic substitution of arylhalogenoacetylenes by sodium toluene-p-thiolate in NNdimethylformamide, 63.
 - of the oxidation of benzyl alcohol to benzaldehyde by acid permanganate, 435.
 - of the oxidation of dimethyl sulphoxide with bromine in aqueous solution, 1355.
 - of the oxidation of mandelic acid and related compounds with bromine and with hypobromous acid, 965.
 - of the oxymercuriation of $\alpha\beta$ -unsaturated carbonyl compounds, 1207.
 - of the reaction of cyclopentadienylidenetriarylphosphoranes with cyano-olefins. Part V, tricyanovinylation with cyclohexyl 1,2,2-tricyanovinyl ether, 1821.
 - of the reaction of phenyl phenylmercury sulphide with picryl halides, 1879.
- in aqueous solution: piperazinedione formation from esters of dipeptides containing glycine, alanine, and sarcosine, 1845.
- of aminolysis of some N-aryl-lactams. Strain effects in acyl transfer reactions. Part II, 981.
- of aromatic nucleophilic substitution by toluene-p-thiolate in dimethylformamide. Effect of solvent on Hammett-type correlations, 1430.
- of formation of substituted styrene oxide by reaction of 2-aryl- and 1-aryl-2-halogenoethanols with aqueous alkali, 589.

- of hydrogen isotope exchange reactions. Part XXII, reactivity comparisons for a series of aromatic substrates towards radiolytically generated tritium atoms in aqueous solution, 1437. Part XXIII, isomer distribution in the radiation-induced tritiation of benzene derivatives in aqueous solution, 1450.
- of hydrolysis of NN'-diarylsulphamides, 481.
- of oxidative condensation of p-phenylenediamines with mono- and poly-substituted benzoylacetanilides, 1766.
- of racemisation of phenylmalonamic acid. Asymmetric transformations in salts of phenylmalonamic and phenylmalonanilic acids, 1204.
- of reactions of arylethylmalonate monoions with hydroxide ion, temperature-jump study of, the effect of ring substituents, 738.
- of the base-catalysed oxidation of sulphoxides with 1-methyl-1-phenylethyl hydroperoxide, 755.
- of the dienone-phenol rearrangement of some 4,4-dimethylcyclohexa-2,5-dienones, 88.
- of the gas-phase pyrolysis of 1-t-butylbut-3-enyl acetate,
- of the ionisation of α -nitrotoluene in alkaline solutions. Bromopicrin reaction. Part III, 1110.
- of the metal-ion oxidation of phenylphosphonous acid in solution. Part I, oxidation by vanadium(v), 926. Part II, oxidation by chromium(vi), 929.
- of the oxidation of ethylbenzene by cobaltic acetate in acetic acid, 1035.
- of the reaction between tri-isobutylaluminium and benzonitrile. On the reactivity of organometallic compounds towards functional substrates. Part III, 1129.
 - of hydrogen peroxide with cysteine and cysteamine, 1547. of picryl chloride with some substituted anilines. Part I, 2119.
 - of 1-p-tolylsulphonylazocyclohexene with maleic anhydride, 1922.
 - of long chain alkylamines with long chain carboxylic esters of 4-nitrophenol, effects of hydrophobic interactions on the, 1006.
 - of silicon compounds. Part VIII, the gas-phase thermal decomposition of trifluoro-1,1,2,2-tetrafluoro-ethylsilane, 1013. Part IX, the gas-phase thermal decomposition of trimethyl-1,1,2,2-tetrafluoroethylsilane, 1018.
- of the solvolysis of benzoyl and p-toluoyl phenylphosphonates in aqueous dioxan. The mechanism of acyl phosphonate reactions. Part I, 1434.
- of the thermal decomposition of bis(trimethylsilyl)mercury in solution. Organosilicon compounds. Part L, 366.
- products and solvent isotope effects for acid-catalysed rearrangements of some N-substituted hydrazoarenes. Mechanism of benzidine and semidine rearrangements. Part XXVII, 551.
- thermochemical, of nitrogen compounds. Part III, the unimolecular thermal decomposition of N-allylcyclohexylamine in the gas phase, 2007.

L

- Lactams, N-aryl-, the kinetics of aminolysis of some. Strain effects in acyl transfer reactions. Part II, 981.
- (23R)- 5α ,9\textit{9}-Lanosta-7,24-diene-26,23-lactone,} 3\textit{\alpha}-methoxy-, abieslactone, crystal and molecular structure, 498.

- Lanthanide shift reagents, the effect of, additive increments, and Hammett correlations, interpretation of the proton magnetic resonance spectra of olefinic protons by means of. Antiparasitic nitroimidazoles. Part V, 509.
- Lead, organo-, and organotin radicals, an electron spin resonance study of the reactivity of, 1056.
- Lewis acid properties of benzaldehydes and substituent effects, 786.
 - basicity of amines in liquid antimony trichloride.
 Antimony halides as solvents. Part X, 1958.
- Liquid crystal nuclear magnetic resonance approach: conformational analysis of bithienyl derivatives, 751.
- Lithium chloride and di- and tri-nitro-derivatives of m- and p-dichlorobenzenes, a kinetic study of chlorine-isotopic exchange between, 1883.
- Long-range coupling in the nuclear magnetic resonance spectra of some 2,5-disubstituted 1,3-dioxolan-4-ones, 687
- Lysergic acid diethylamide and related ergolines, luminescence characteristics of, 1312.

M

- Malachite Green, Michler's Hydrol Blue, and Crystal Violet, electronic absorption spectra of derivatives of, containing o-trifluoromethyl groups. Steric effects in di- and triarylmethane dyes. Part XI, 1792.
- Maleates and fumarates, infrared spectra of dimethyl, diethyl, and di-n-butyl. Conformations of some $\alpha\beta$ -unsaturated carbonyl compounds. Part VI, 954.
- Maleic anhydride, kinetics of the reaction of with 1-p-tolyl-sulphonylazocyclohexene, 1922.
 - and fumaric acids, intermediates in the oxidation of.

 Mechanism of the permanganate oxidation of unsaturated compounds. Part III, 1565.
 - kinetic investigation of the oxidation of. Mechanism of the permanganate oxidation of unsaturated compounds. Part IV, 1856.
- Malonamic acid, phenyl-, and phenylmalonanilic acid, asymmetric transformations in salts of. The kinetics of racemisation of phenylmalonamic acid, 1204.
- Malonate, arylethyl, monoions, temperature-jump study of the kinetics of the reactions of, with hydroxide ion. The effect of ring substituents, 738.
 - dimethyl(dimethylaminomethylene): crystal struture and dynamic behaviour in solution, 657.
- Mandelic acid and related compounds, the kinetics and mechanism of the oxidation of, with bromine and with hypobromous acid, 965.
- Manganic and cobaltic acetates in acetic acid, effect of strong acids on the oxidation of alkylarenes by, 381.
- Mass spectra of derivatives of 5-hydroxy-1,4-naphthoquinone (juglone), 1781.
 - the positive and negative ion, of some nitro- and polynitro-acenaphthenes, 1167.
- Maytansine (3-bromopropyl) ether, crystal and molecular structure and absolute configuration of, 897.
- **Mechanism**, elimination-addition, for the hydrolysis of carbamates. Trapping of an isocyanate intermediate by an o-amino-group, 1719.
 - of acyl phosphonate reactions. Part I, the kinetics of the solvolysis of benzoyl and p-toluoyl phenylphosphonates in aqueous dioxan, 1434.

- of oxidation of aldoses by chloramine T, 762.
- of the formation of reactive N-amidinohydrazonyl bromides and their conversion to N-amidinobenzo-hydrazides and 3-amino-5-aryl-1,2,4-triazoles, 2047.
- of the permanganate oxidation of unsaturated compounds. Part III, intermediates in the oxidation of maleic and fumaric acids, 1565. Part IV, kinetic investigation of the oxidation of maleic and fumaric acids, 1856. Part V, intermediates and kinetics of the oxidation of substituted propynes, 1861.
- Mechanisms, ElcB. Part IV, base hydrolysis of substituted phenyl phosphoro- and phosphorothio-diamidates, 318.

 'Hol B. I.' and 'Hol B. II.' for hologopation of lectons.
 - 'Hal B I' and 'Hal B II', for halogenation of ketones, examination of the evidence for, 1391.
 - the competing, of substitution, hydrolysis, and cyclization of 1-chloro- and 1,4-dichloro-2,3-diazabuta-1,3-dienes, 1708.
- Mechanistic inferences from deuterium isotope effects on competing metastable decompositions of organic ions, 76.
 - studies on the course of a σ-but-3-enyl- to 1—3-η-but-2-enyl-nickel transformation, 1993.
- Meisenheimer complexes, the stabilities of. Part IV, methoxide adducts from 1-X-3,5-dinitrobenzenes, 710. Part V, association with barium and calcium ions in methanol, 1103. Part VI, spiro-complexes, 2157.
- Mercury, bistrimethylsilyl-, kinetics of the thermal decomposition of, in solution. Organosilicon compounds. Part L, 366.
- Mercury(II) salts, the effect of t-butyl alcohol-methanol mixtures on the free energy of reactants and transition states in the substitution of tetraethyltin by. Substitution at saturated carbon. Part XV, 444.
- Mesembranol, crystal and molecular structure of, 51.
- Mesoionic compounds. Part III, acid-catalysed hydrolysis and protonation behaviour of 4,5-diphenylisosydnone, 1687.
- Metacodeinone, dihydro-, hydrochloride, crystal structure of. Analgesics. Part II, 2044.
- Metal halides, acceptor properties of. Part VII, tin, zinc, and antimony halides as catalysts for the racemisation of α -methylbenzyl chloride in diethyl ether, 642.
- Metallation reactions. Part XV, metallation of diacetylenes, 599.
- Metastable decompositions, competing, or organic ions, mechanistic inferences from deuterium isotope effects on, 76
- Methane, benzoylphenyldiazo-, and related molecules. Dipole moments and molecular conformation of diazo-compounds, 1497.
- diazo-, sodium borohydride, and methylmagnesium iodide, stereochemistry and kinetics of the reactions of bicyclo[3,2,1]octan-2- and -3-one with, 571.
- Methanes, diphenyl-, toluenes, and ethylbenzenes, chlorination in nuclear-substituted. Directive effects in benzylic hydrogen atom abstraction. Part III, 689.
- Methanesulphenate, p-nitrophenyl triphenyl-, reaction with n-butylamine and benzamidine. Nucleophilic substitution at sulphur, 534.
- 4,7-Methanoindene, racemic 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-, (heptachlor), crystal structure of. Insecticides. Part IV, 1374.
- Methanol, enthalpies of transfer from, to protic and aprotic solvents of the transition state in the reaction of benzene-sulphonyl chloride with imidazole, 1760.

- Methanols, triphenyl-, in concentrated acid solutions, nuclear magnetic resonance study of the ionization kinetics of, 746.
- Methoxide adducts from 1-X-3,5-dinitrobenzenes. The stabilities of Meisenheimer complexes. Part IV, 710.
- Methyl and diphenylphosphinyl, competitive migration of the electronically contrasted groups: carbonium ion rearrangements, 1645.
 - groups, (transition metallo)-, substituent effects of, by fluorine-19 nuclear magnetic resonance, 986.
 - o-trifluoro-, electronic absorption spectra of derivatives of Michler's Hydrol Blue, Crystal Violet, and Malachite Green containing. Steric effects in di- and tri-arylmethane dyes. Part XI, 1792.
 - radicals, relative rates of methylation and hydrogen abstraction by. Reactions of alkyl radicals. Part III, 484.
- Methylene, dichloro-; trichloromethylsilane derivatives as transfer agents for. Kinetic evidence for free dichlorocarbene, 437.
- **Micellar** catalysis of the deamination of *O*-alkylhydroxylamines, 93.
 - effects on the hydrolysis of benzylidene-t-butylamine N-oxide and 3-phenyl-2-t-butyloxaziridine, 1900.
- Michler's Hydrol Blue, Crystal Violet, and Malachite Green, electronic absorption spectra of derivatives of, containing o-trifluoromethyl groups. Steric effects in diand tri-fluoromethyl groups. Part XI, 1792.
 - electronic absorption spectra of some derivatives of, containing α-trifluoromethyl groups. Steric effects in diand tri-arylmethane dyes. Part XII, 2151.
- Migration, a Beckmann-like aryl, in substituted isoxazol-5(4H)-one molecular ions. Electron impact induced rearrangements of organic ions. Part III, 2038.
 - competitive, of the electronically contrasted groups methyl and diphenylphosphinyl: carbonium ion rearrangements, 1645.
- Molecular complexes. Part XIV, crystal and molecular structure of the π^* -electron-acceptor molecule 1,2,4,5tetracyanobenzene, 520. Part XV, crystal structure of the 1:1 molecular complex of pyrene and 1,2,4,5-tetracyanobenzene at 290 and 178 K, 523. Part XVI, crystal structure of the 1:1 molecular complex of pyrene and 7,7,8,8-tetracyanoquinodimethane, 528. Part XVII, crystal and molecular structure of perylene-7,7,8,8-tetracyanoquinodimethane molecular complex, 720. Part XVIII, crystal and molecular structure of acenaphthenetetrachloro-p-benzoquinone molecular complex, 724. Part XIX, crystal and molecular structure of acenaphthene-7,7,8,8-tetracyanoquinodimethane molecular complex, 727. Part XX, crystal and molecular structure of 9-methylanthracene-tetrachloro-p-benzoquinone molecular complex, 731. Part XXI, crystal and molecular structure of pyrene-1,3,5-trinitrobenzene, 734. Part XXII, crystal and molecular structure of the molecular complex of pyrene and chloranil, 1212.
- Molecular orbital study, non-empirical, of the Wolff rearrangement, 794.
- Molecular packing modes. Part XI, crystal structure of the 2:1 complexes of benzamide with succinic acid and furamide with oxalic acid, 503.
- Molecular polarisability: conformations of some polar substituted ethanes, 766.
- Molecular solute conformation of di-2-pyridyl disulphide from dipole moment studies, 701.

- Molecular structure and absolute configuration of vincamine and of its hydrobromide methanolate, X-ray determination of, 2001.
 - and absolute stereochemistry of a I-phenylethylisoquinoline alkaloid from *Colchicum cornigerum*: X-ray analysis of a methiodide derivative, 1002.
- Molecules, guest, thermodynamics of binding of, to α and β -cyclodextrins, 2081.
- Monoesters, organic orthophosphate, structure-reactivity correlations for the hydrolysis of. Solvolysis of organic phosphates. Part IX, 1235.
- Morpholine-borane reduction of substituted acetophenones and benzaldehydes, kinetics and mechanism of the, 1948.

N

- Naphthalene derivatives, peri-interactions in. Low temperature nuclear magnetic resonance study of 1,8-bis-dimethylamino- and 1-benzylmethylamino-8-dimethylaminonaphthalene, 2086.
 - 1,8-dimethyl-: crystal structure analysis and strainenergy minimization calculations on a sterically crowded molecule, 2101.
- Naphthalenes, methyl-, carbon-13 chemical shifts in, 1333.
 - 2-methyl-, conformations of 1-formyl-, 1-acetyl-, and 1-benzoyl-, 1368.
 - substituted, an assessment of simple theories of chemical shifts of aromatic protons as applied to, 611.
 - trimethylsilyl substituted, d_{π} - p_{π} interactions in. Part I, a study using polarography, and charge-transfer and ultraviolet spectroscopy, 447. Part II, electron spin resonance studies, 2091.
- 1-Naphthoate, methyl 8-acetyl-, 8-propionyl-, and 8-isobutyryl-, the mechanism of the alkaline hydrolysis of. Neighbouring-group participation by carbon acids. Reactions of carbonyl compounds in basic solutions. Part VI, 351.
 - methyl pseudo-8-acyl-, and pseudo-5-formylphenanthrene-4-carboxylate, the mechanism of the alkaline hydrolysis of. Reactions of carbonyl compounds in basic solutions. Part VII, 358.
 - methyl 8-(3- or 4-substituted benzoyl)-, 8-formyl-, and 8-pivaloyl-, and methyl 5-formylphenanthrene-4-carboxylate, the mechanism of the alkaline hydrolysis of. Neighbouring-group participation by carbonyl groups. Reactions of carbonyl compounds in basic solutions. Part V, 345.
- 1,4-Naphthoquinone, 5-hydroxy-, (juglone), mass spectra of derivatives of, 1781.
- Naphthoquinones, allyloxy-, kinetics and mechanism of the ortho-Claisen rearrangement of, 1137.
- Naphthoxyl radicals, the electron spin resonance spectra of, 2124.
- 1-Naphthyl ketones, a type 2 photoelimination reaction of, 233
- Naphthyridines, symmetrical, carbon-13 nuclear magnetic resonance spectra and electronic densities of, 1024.
- Neighbouring-group participation by carbon acids. The mechanism of the alkaline hydrolysis of methyl 8-acetyl-, 8-propionyl-, and 8-isobutyryl-1-naphthoate. Reactions of carbonyl compounds in basic solutions. Part VI, 351.

- Neighbouring-group (contd.)
 - by carbonyl groups. The mechanism of the alkaline hydrolysis of methyl 8-(3- or 4-substituted benzoyl)-, 8-formyl-, and 8-pivaloyl-1-naphthoates and methyl 5-formylphenanthrene-4-carboxylate. Reactions of carbonyl compounds in basic solutions. Part V, 345.
- Neutron diffraction, precision, structure determination of protein and nucleic acid components. Part V, crystal and molecular structure of the amino-acid L-arginine dihydrate, 133.
- Nicotinamide in aqueous solution, ionisation, self association, and proton exchange studies of, using nuclear magnetic resonance spectroscopy, 2145.
- Nitramines, cyclic, and related compounds, dielectric properties of. Part I, dipole moments and conformations of nitramines, nitrosamines, and 1,3,5-trinitrocyclohexane, 1280.
- Nitration of toluene in acetic anhydride, formation of adducts in, 237.
- Nitriles, alicyclic, acrylonitriles, and allyl cyanides, electric dipole moments of some, 537.
- Nitro-anion-radicals, the structure of. An investigation employing electron spin resonance spectroscopy and INDO (intermediate neglect of differential overlap) molecular orbital calculations, 2010.
- Nitroaromatic compounds, studies on. Part V, the electron spin resonance spectra of some symmetrically substituted polynitroacenaphthenes, 681.
- Nitrogen atoms, bridgehead, proton magnetic resonance studies of compounds with. Part XXV, the stereochemistry and ¹H nuclear magnetic resonance spectra of some perhydro-oxazolo[3,4-c]oxazines and perhydro[1,3]oxazino[3,4-c][1,3]oxazines, 1379.
 - compounds, thermochemical kinetics of. Part III, the unimolecular thermal decomposition of N-allylcyclohexylamine in the gas phase, 2007.
 - pyramidal, configurational stability of, in spiro-oxaziridines, 1575.
- Nitrosamines, nitramines, and 1,3,5-trinitrocyclohexane, dipole moments and conformations of. Dielectric properties of cyclic nitramines and related compounds. Part I, 1280.
- C-Nitroso-compounds, some halogenated, and di-t-butyl nitroxide, C-N bond dissociation energies in, 1853.
- Nitroso-compounds, spin trapping by use of. Part V, 2,4,6-tri-t-butylnitrosobenzene: a new type of spin-trapping reagent, 369. Part VI, nitrosodurene and other nitrosoderivatives, 1252.
 - the chemistry of. Part V, encounter control for the nitrosation of indoles in dilute acid, 918. Part VI, direct and indirect transnitrosation reactions of N-nitrosodiphenylamine, 1526. Part VII, the first 'fast' proton transfer for aromatic nitrosation, 1597.
- Nitroxide radicals. Part XIII, unpaired electron distribution in 1- and 2-naphthyl t-butyl nitroxides, 718.
 - alkyloxy-, the formation and electron spin resonance spectra of some cyclic, 2134.
- Nonelectrolytes, basic aqueous mixtures of. Polarographic determination of hydrogen ion activities. Part III, 991. free energies, enthalpies and entropies of transfer of, from water to mixtures of water and dimethyl sulphoxide, water and acetonitrile, and water and dioxan, 607.
- **2-Norborny**l toluene-p-sulphonates, 7-substituted exo- and endo-5,6-(o-phenylene)-, solvolytic fragmentation studies, 150.

- Nuclear magnetic resonance and infrared absorption and isomerism of 3-aminocrotonic esters. Part II,
 - and infrared studies on ethylene sulphites (1,3,2-dioxathiolan 2-oxides). Chemistry of the S=O bond. Part II, 243.
 - on phenylethylene sulphides. Chemistry of the S=O bond. Part III, 1966.
 - carbon-13 data, analysis of, for structure elucidation of acyclic amines. Applications of artificial intelligence for chemical inference. Part XI, 1753.
 - chemical shifts for alcoholic and phenolic protons in dimethyl sulphide: utility as a structural parameter, 1231.
 - fluorine-19, substituent effects of (transition metallo)methyl groups by, 986.
 - ¹H, and acidity constant measurements: intramolecular hydrogen bonds in aromatic sulphoxides, 848.
 - nematic phase, investigations of rotational isomerism. Part II, evidence for the *SO-cis*-conformation in thiophen-2-carbaldehyde, 1739.
 - spectra, carbon-13, and electronic densities of symmetrical naphthyridines, 1024.
 - ¹³C, of Amaryllidaceae alkaloids, 1180.
 - of 2,3-dihydro-1*H*-1,4-diazepinium salts. Diazepines. Part XVI, 1729.
 - of some 2,5-disubstituted 1,3-dioxolan-4-ones, long-range coupling in the, 687.
 - ¹H, and the stereochemistry of some perhydro-oxazolo-[3,4-c]oxazines and perhydro[1,3]oxazino[3,4-c][1,3]oxazines. Proton magnetic resonance studies of compounds with bridgehead nitrogen atoms. Part XXV, 1379.
 - ¹H, of polychloropolycyclic ketones and dechloraldrin derivatives, and sequential Wagner-Meerwein rearrangements of polychlorinated complex cations derived from monodechloroisodrin and monodechloraldrin, 909.
 - ${}^{1}\mathrm{H}$, of the imidazo[2,1-b]thiazole system, 1926.
 - spectral, dipole moment, and Kerr effect study: solutebenzene interactions, 1272.
 - dipole moment and Kerr effect study: solute-hexafluorobenzene interactions, 1362.
 - spectroscopy, conformations of peptides in solution by. Part I, application of nuclear magnetic double resonance spectroscopy to the determination of cisand trans-conformations of peptide bonds, 1651.
 - ionisation, self association, and proton exchange studies of nicotinamide in aqueous solution using, 2145.
 - spectrum, the liquid crystal, of 3,3',5,5'-tetrachlorobiphenyl, the conformational problem of biphenyl in solution as investigated by, 1396.
 - studies, carbon-13, of cyclic compounds. Part I, piperidines and decahydroquinolines, 842.
 - high resolution, of the conformation of luteinizing hormone releasing hormone (LH-RH) and its component peptides, 1691.
 - of heterocyclic bridged biphenyls, 2131.
 - study, low temperature, of 1,8-bisdimethylamino- and 1-benzylmethylamino-8-dimethylamino-naphthalene. *peri*-Interactions in naphthalene derivatives, 2086.
 - of the ionization kinetics of triphenylmethanols in concentrated acid solutions, 746.
- Nucleic acid bases, restricted rotation about the exocyclic C-N bond in, 889.

Nucleophiles, dehalogenations of 1-chloro-2-iodo-1,2-diphenylethane induced by a variety of. The nucleophilic reactivity towards iodine. Dehalogenation reactions of vicinal dihalides. Part III, 38.

Nucleophilic attacks on carbon-carbon double bonds. Part XVII, base-catalysis in the displacement of vinylic ethoxy-, fluoro-, and cyano-leaving groups by amines, 616.

- Nucleophilic substitution, aromatic, by toluene-p-thiolate in dimethylformamide, kinetics of. Effect of solvent on Hammett-type correlations, 1430.
 - at sulphur. Reaction of p-nitrophenyl triphenylmethanesulphenate with n-butylamine and benzamidine, 534.
 - comments on the ion-pair mechanism of. Thermodynamic parameters for ionisation and dissociation of alkyl halides in water and non-aqueous solvents, 1893
 - of arythalogenoacetylenes by sodium toluene-p-thiolate in NN-dimethylformamide, kinetics and mechanism of, 63.

0

- Octa-4,6-dienoic acid, 3,3,7-trimethyl-, stereochemical course of the photochemical transformation of 3-methyl-car-4-en-2-one into derivatives of, 122.
- Olefinic carboxylic acids and amides, electron spin resonance studies of the effect of γ -radiation and of hydrogen atoms upon, 397.
 - protons, interpretation of the proton magnetic resonance spectra by means of additive increments, Hammett correlations, and the effect of lanthanide shift reagents. Antiparasitic nitroimidazoles. Part V, 509.
 - substances, the kinetics and mechanisms of additions to. Part X, stereochemistry of the chloro- and bromohydrins derived from cinnamic acid, and of some derivatives thereof, 653. Part XI, stereochemistry of addition of chlorine acetate and of chlorine to some unsaturated compounds, 1480.
- Olefins and acetylenes, cycloadditions of, to dimethylketen: evidence for the $[_{\pi}2_{s} + _{\pi}2_{a}]$ concerted mechanism, 166
 - cyano-, the kinetics and mechanism of the reaction of cyclopentadienylidenetriarylphosphoranes with. Part V, tricyanovinylation with cyclohexyl 1,2,2-tricyanovinyl ether, 1821.
 - α, ω -di-, free radical addition of isobutyric acid to. A new route to $\alpha, \alpha, \alpha', \alpha'$ -tetramethylalkanedioic acids, 1755.
 - the effects of 2-halogeno-substituents on the rates of bromination of, 1053.
- Optical activity, an example of, at the tin centre. Configurational stability of asymmetrically substituted organotin compounds, 638.
- Optical rotation and absolute configuration of chlorofluoroacetic acid, 292.
- Orbital interactions in amino-ketones, 210.
- d Orbitals, the effect of, on the calculated ultraviolet spectra of organo-sulphur compounds, 1542.
- 7-Oxabicyclo[4,3,0]non-4-en-8-one, 1-hydroxymethyl-4-methyl-, crystal structure, 240.
- **1,3,4-Oxadiazoles** and -thiadiazoles, 2-dimethylamino-, rotational barriers in. A CNDO/2 study, 1500.
- Oxalate formate, and benzilate anions and bipyridylium dications, photochemically induced electron-transfer reactions between, 80.

1,3-0xazines, tetrahydro-, piperazines, hexahydropyrimidines and tetrahydro-1,3-thiazines, the conformation of ring NH-groups in. The conformational analysis of saturated heterocycles. Part XLIX, 325.

- **Oxaziridine,** 2-t-butyl-3-phenyl-, and N-t-butylbenz-aldoxime, the acid catalysed hydrolysis of, 1744.
- Oxazolo[3,4-c]-oxazines, perhydro-, and perhydro[1,3]-oxazino[3,4-c][1,3], the stereochemistry and ¹H nuclear magnetic resonance spectra of some. Proton magnetic resonance studies of compounds with bridgehead nitrogen atoms. Part XXV, 1379.
- Oxidation, anodic, of amines. Part III, cyclic voltammetry and controlled potential electrolysis of 4-dimethylaminoantipyrine (4-dimethylamino-2,3-dimethyl-1-phenyl-Δ³-pyrazolin-5-one) in acetonitrile, 1640.
 - of Schiff's bases. Part II, anodic pyridination of N-benzylidene-p-anisidines in acetonitrile, 1112.
 - metal-ion, kinetics of the, of phenylphosphonous acid in solution. Part I, oxidation by vanadium(v), 926. Part II, oxidation by chromium(vi), 929.

of phenols with chromyl chloride, 1476.

- one-electron, of sulphides, evidence for the formation of dimeric radical-cations, $R_2S \stackrel{\cdot}{=} SR_2^{+}$, in the. Electron spin resonance studies. Part XXXVIII, 1748.
- permanganate, of unsaturated compounds, mechanism of.
 Part III, intermediates in the oxidation of maleic and
 fumaric acids, 1565. Part IV, kinetic investigation
 of the oxidation of maleic and fumaric acids, 1856.
 Part V, intermediates and kinetics of the oxidation
 of substituted propynes, 1861.
- the partial anodic, of n-alkanes in acetonitrile and trifluoroacetic acid, 1578.
- $\mathbf{0}$ xime, NN-dimethylacetamid-, crystal and molecular structure, $\mathbf{2106}$.
- **Oxindoles,** substituted. Part VI, polarographic reduction of substituted *trans-3*-benzylideneindol-2(3H)-ones, 469.
- Oxiran, tetramethyl-, the acid-catalysed hydrolysis of: a reinvestigation, 518.
- Oxycarbonyl radicals, vapour-phase thermolysis of allyl methyl oxalate and allyl phenyl oxalate and its relevance to the thermochemistry of. Thermolytic reactions of esters. Part XI, 1327.
- Oxymercuriation of $\alpha\beta$ -unsaturated carbonyl compounds, kinetics and mechanism of, 1207.

P

- Penicillin, benzyl, in aqueous solution, chemical changes following γ -irradiation, 575.
- Pentane, 2-amino-4-methyl-, and 2-amino-3-methylbutane, absolute configuration of. Assignment of the configuration of optical isomers by gas chromatography by the use of asymmetric stationary phases, 2094.
- Pentan-2-one, 5-diethylamino-, and 4-dimethylaminobutan-2-one, intra- and inter-molecular catalysis in the iodination of, 1518.
- Pent-1-ene, 5-cyano-, adsorbed on Y-type zeolites, infrared absorption spectra of, 48.
- **Peptides,** conformations of in solution by nuclear magnetic resonance spectroscopy. Part I, application of nuclear magnetic double resonance spectroscopy to the determination of *cis* and *trans*-conformations of peptide bonds, 1651.

Peracetals, some aromatic, [αα-bis(alkyldioxy)toluenes], thermal decomposition of, 1805.

- Perbenzoic acids, the kinetics and mechanism of the acid and alkaline hydrolyses of some, 1544.
 - voltammetric study of some. Mechanism of reduction at a platinum electrode, 491.
- Permanganate, acid, kinetics and mechanism of the oxidation of benzyl alcohol to benzaldehyde by, 435.
- Peroxides, trimethylsilyoxyl radicals from: electron spin resonance study of homolytic substitution on silicon, 182.
 - hydro-, products of the reaction between, and o-phenylene phosphites. Mechanisms of antioxidant action, 831.
 - reaction of with phosphites: mechanisms of antioxidant action, 826.
- Peroxydisulphate ion, formation and fragmentation of alkoxyl radicals by oxidation of alcohols with, 630.
- **Peroxyl** radicals, hydroxy-substituted, decomposition of: gas-phase oxidation of alkenes, 540.
- Perylene-7,7,8,8-tetracyanoquinodimethane molecular complex, crystal and molecular structure. Molecular complexes. Part XVII, 720.
- Phenanthrene-4-carboxylate, methyl 5-formyl-, and methyl 8-(3- or 4-substituted benzoyl)-, 8-formyl- and 8-pivaloyl-1-naphthoates, the mechanism of the alkaline hydrolysis of. Neighbouring-group participation by carbonyl groups. Reactions of carbonyl groups in basic solutions. Part V, 345.
 - pseudo-5-formyl-, and methyl pseudo-8-acyl-1-naphthoates, the mechanism of the alkaline hydrolysis of. Reactions of carbonyl compounds in basic solutions. Part VII, 358.
- Phenazine, quinoline, and quinoxaline, factors which determine the rate of carbon-halogen bond fragmentation in radical anions illustrated by some halogenated derivatives of. Electrochemical reactions. Part XV, 1811.
- Phenethyl'onium salts, substituted, in isopropyl alcohol containing potassium isopropoxide, rates of elimination from. Mechanisms of elimination reactions. Part IV, 1352.
- Phenol, 4-nitro-, long chain carboxylic esters of, effects of hydrophobic interaction on the kinetics of the reactions of long chain alkylamines with, 1006.
- Phenols, base catalysed addition of, to aryl vinyl sulphones, 1773.
 - oxidation of, with chromyl chloride, 1476.
 - phenyl-substituted, antioxidative properties of. Part I, the mechanism of synergism between 4-alkoxy-2,6-diphenylphenols and $\beta\beta$ -disubstituted diethyl sulphides, 1276.
 - the pyridine-catalysed acylation of, by carboxylic acid anhydrides in carbon tetrachloride: Hammett, Brønsted, and Taft relationships as evidence for general base catalysis, 1828.
- Phenothiazine and its derivatives, intermediates in the pulse radiolysis of solutions of: reactions of cycloalkylperoxyl radicals with phenothiazines, 969.
 - some reactions of, of two derived radicals and phenothiazin-5-ium ion. Heterocyclic free radicals. Part VI, 264.
- Phenoxide and t-butoxide ions, the *syn-anti* dual pattern in elimination from fluorosulphonylethanes promoted by, 1336
 - p-nitro-, ion, the interaction of, with N-bromo-N-sodiobenzenesulphonamide (bromamine B), 742.

- Phenyl phenylmercury sulphide, kinetics and mechanism of the reaction of with picryl halides, 1879.
 - phosphates, substituted, and structurally related inhibitors, kinetic studies with. Bacterial alkaline phosphatase. Part III, 25.
- Phenylamine, di-, N-phenyl-; -pyrrole, -indole, and -carbazole, and N-ethyl-pyrrole, -carbazole, and -diphenylamine, the reaction of trichloro-1,3,5-triazine (cyanuric chloride) with. 1,3,5-Triazines. Part XII, 2075.
- N-nitrosodi-, direct and indirect transnitrosation reactions of. The chemistry of nitroso-compounds. Part VI, 1526.
- Phenylation of 4-methylpyridine with benzoyl peroxide, upon the validity of partial rate factors based on isomer distributions in the, 2071.
- p-Phenylenediamines, kinetics of oxidative condensation of, with mono- and poly-substituted benzoylacetanilides, 1766.
- Phenylhydrazones, αβ-unsaturated, stereochemistry of pyrazoline ring formation from. Addition reactions of conjugated double bonds. Part V, 936.
- Phenylphosphonous acid in solution, kinetics of the metal-ion oxidation of. Part I, oxidation by vanadium(v), 926. Part II, oxidation by chromium(vI), 929.
- Phosphates, organic, solvolysis of. Part IX, structure-reactivity correlations for the hydrolysis of organic orthophosphate monoesters, 1235.
- Phosphine, dimethyl-, kinetics and mechanism of the reaction of, with tetrafluoroethylene. Organophosphorus chemistry. Part XV, 1295.
 - tetramethyldi-, kinetics and mechanism of the gas-phase thermal addition of, to tetrafluoroethylene. Organophosphorus chemistry. Part XVI, 1301.
- Phosphinyl, diphenyl-; and methyl, competitive migration of the electronically contrasted groups: carbonium ion rearrangements, 1645.
- Phosphites, o-phenylene, products of the reaction between hydroperoxides and. Mechanisms of antioxidant action, 831.
 - reactions of, with hydroperoxides: mechanisms of antioxidant action, 826.
- Phosphinyl, diphenyl-, migration, rearrangements of secondary and tertiary carbonium ions by, 1472.
- Phosphobetaines, the effect of substituents at phosphorus on the fate of, in protic solvents. Studies on the mechanism of the Wittig reaction. Part IV, the chemistry of heteroarylphosphorus compounds, 820.
- Phosphonate, acyl, reactions, the mechanism of. Part I, the kinetics of the solvolysis of benzoyl and p-toluoyl phenylphosphonates in aqueous dioxan, 1434.
- Phosphonium, 2-furyldiphenyl-(2-thienyl)-, bromide and some mixed heteroarylmethylphosphonium salts. Relative stabilities of the forming carbanions. The chemistry of heteroarylphosphorus compounds. Part V, 1912.
- Phosphoranes, cyclopentadienylidenetriaryl-, the kinetics and mechanism of the reaction of, with cyano-olefins. Part V, tricyanovinylation with cyclohexyl 1,2,2-tricyanovinyl ether, 1821.
- Phosphoranyl, chloro-, radicals in solution, the electron spin resonance spectra and structure of, 1339.
- Phosphorus compounds, heteroaryl, the chemistry of. Part IV, the effect of substituents at phosphorus on the fate of phosphobetaines in protic solvents. Studies of the mechanism of the Wittig reaction, 820.

Phosphorus (contd.)

- organo-, chemistry. Part XV, kinetics and mechanism of the gas-phase thermal reaction of dimethylphosphine with tetrafluoroethylene, 1295. Part XVI, kinetics and mechanism of the gas-phase thermal addition of tetramethyldiphosphine to tetrafluoroethylene, 1301.
 - compounds, nucleophilic reactivity of. Part II, the reactions of phosphorus acids with keten OO-, ON-, OS-, and SS-acetals, orthoesters, and ketenimines, 2064.
 - compounds, the reactivity of. Part XXVIII, fast, neighbouring group-induced rearrangement during alkaline hydrolysis of α-hydroxyimino-p-nitrobenzyl phosphates, phosphonates and phosphinates, 1798.
- Phosphoryl and sulphinyl groups, the acid-base behaviour of, in some organic bases, 531.
- Photochemical transformation of 3-methyl-car-4-en-2-one into derivatives of 3,3,7-trimethylocta-4,6-dienoic acid, the stereochemical course of, 122.
- Photochemistry of methoxyanthraquinones, 1386.
 - of 1-phenylpropenes, 1582.
 - vacuum ultraviolet, studies in. Part III, 2-methyl-2-nitropropane, 2-methyl-2-nitrosopropane, and t-butyl nitrite, 2019.
- Photocyclisation of 1-o-alkylphenylpropane-1,2-diones: stereochemistry, 1316.
- Photodimers, relative yields of, from mixed crystals of transcinnamic acids and transcinnamides. Topochemistry. Part XXXVI, 1095.
- Photoelimination type 2 reaction of 1-naphthyl ketones, 233.
- **Photolysis** of aromatic thioacid *O*-esters: the nature of the reactive excited state, 1307.
 - of triphenylmethyl and related cations in sulphuric acid, 95.
- Physostigmine (eserine), crystal and molecular structure of, 1342.
- Picryl chloride, the kinetics of the reaction of, with some substituted anilines. Part I, 2119.
 - halides, kinetics and mechanism of the reaction of phenyl phenylmercury sulphide with, 1879.
- Pinacolisation, cathodic, of acetophenone at a mercury pool, stereochemical factors in the, 1410.
- **Pipecolic** (piperidine-2-carboxylic) acid derivatives, preparation, stereochemistry, and acidity of. Substituent effects in saturated systems, 1258.
- Piperazinedione formation from esters of dipeptides containing glycine, alanine, and sarcosine: the kinetics in aqueous solution, 1845.
- Piperazines, hexahydropyrimidines, tetrahydro-1,3-oxazines and tetrahydro-1,3-thiazines, the conformational analysis of ring NH-groups in. The conformational analysis of saturated heterocycles. Part XLIX, 325.
- Piperidine, 1-ethyl-4-phenyl-, and 1-isopropyl-4-phenylpiperidine, crystal and molecular structure of the major products from the benzylation of, 1558.
 - nitroxides, 4-alkyl-, an electron spin resonance study of conformational inversion in, 1171.
 - nucleophilic displacement by, in 6-p-tolylsulphonyloxy-fulvene. Reactivity of fulvenes, 2078.
- Piperidines and decahydroquinolines. Part I, carbon-13 magnetic resonance studies of cyclic compounds, 842.
 - the stereochemical orientation of the benzylation of. Part LII, the conformational analysis of saturated heterocycles, 1553.

- Podophyllotoxin, 2'-bromo-, -0.5 ethyl acetate, crystal structure and absolute configuration of, 288.
- **Polarisability,** molecular. A conformational study of some substituted arylcyclopropanes, 2060.
 - The conformations of some cyclopropyl ketones, 1365.
- **Polarographic** determination of hydrogen ion activities. Part III, basic aqueous mixtures of nonelectrolytes, 991.
 - reduction of substituted *trans*-3-benzylideneindol-2(3H)-ones. Substituted oxindoles. Part VI, 469.
- **Polarography**, a study using charge transfer and ultraviolet spectroscopy and. Part I, d_{π} - p_{π} interaction in trimethylsilyl substituted naphthalenes, 447.
- Porphins and corroles, a spectroscopic study of the protonation of, 407.
- **Porphyrins,** a spectroscopic study of the acid ionisation of, 414.
- Pregn-4-ene-3,20-dione, 11β,17α,21-trihydroxy-, (cortisol) methanol solvate, crystal and molecular structure of, 774.
- Propanal, 2,2-dimethyl-, vibrational spectra of, 1241.
- Propane, 2-methyl-2-nitro-, 2-methyl-2-nitrosopropane, and t-butyl nitrite. Studies in vacuum ultraviolet photochemistry. Part III, 2019.
- **Propane-1,2-diones**, 1-o-alkylphenyl-, photocyclisation of: stereochemistry, 1316.
- Propane-1-sulphonic acid, 3-phenyl-, in sulphuric acid, sulphonation of. Aromatic sulphonation. Part XLI, 1413.
- **Propenes,** 2-methyl-1,3-diphenyl-, prototropy of. Stability of the intermediary carbanions, 2025.
 - 1-phenyl-, the photochemistry of, 1582.
- Prop-2-enyl derivatives, metal carbonyl-catalysed isomerization of N-allylamides to. Catalysed prototropic rearrangements. Part II, 1954.
- Propionic and acetylenedicarboxylic acids, aqueous solutions of, acidity constants for. Studies of the rate of inversion of sucrose in some strongly dissociated acids. Part II, 102.
- **Propyl** acetate, 1,2-dimethyl-, the gas-phase pyrolysis of, 663.
- Propynes, substituted, intermediates and kinetics of the oxidation of. Mechanism of the permanganate oxidation of unsaturated compounds. Part V, 1861.
- Protein and nucleic acid components, structure determination by precision neutron diffraction. Part V, crystal and molecular structure of the amino-acid L-arginine dihydrate, 133.
- Protic solvents, the effect of substituents at phosphorus on the fate of phosphobetaines in. Studies in the mechanism of the Wittig reaction. Part VI, the chemistry of heteroarylphosphorus compounds, 820.
- Protonation of keten, a non-empirical LCAO-MO-SCF study on the site of, 795.
 - of porphins and corroles, a spectroscopic study of the, 407.
 - thermodynamics of, of substituted pyridines in aqueous solutions, 938.
- Proton dissociation equilibria of substituted pyridines, thermodynamic analysis of substituent effects on, 790.
 - exchange, ionisation, and self association studies of nicotinamide in aqueous solution using nuclear magnetic resonance spectroscopy, 2145.

Proton (contd.)

transfer from disulphonyl-activated carbon acids, 1289. from heterocyclic compounds. Some benzimidazoles. Part I, 432. Part II, purine, 9-alkylpurines, and

imidazo[4,5-b]pyridine, 1889. Part III, adenine and

adenosine, 2138.

magnetic resonance spectra of olefinic protons, interpretation of, by means of additive increments, Hammett correlations, and the effect of lanthanide shift reagents. Antiparasitic nitroimidazoles. Part V, 509.

spectra of the anions of five-membered azaheterocycles. Aromatic heteroanionic species. Part I,

studies of compounds with bridgehead nitrogen atoms. Part XXV, the stereochemistry and ¹H nuclear magnetic resonance spectra of some perhydro-oxazolo[3,4-c]oxazines and perhydro[1,3]oxazino[3,4-c]-[1,3]oxazines, 1379.

Protons, alcoholic and phenolic, nuclear magnetic resonance chemical shifts for, in dimethyl sulphoxide: utility as a structural parameter, 1231.

Prototropy of 2-methyl-1,3-diphenylpropenes. Stability of the intermediate carbanions, 2025.

Pseudohalogen chemistry. Part II, heterolytic addition of thiocyanogen chloride to some symmetrical a-arylalkenes, 1359.

Pulchellin-C, 13β-p-bromophenylthio-11α,13-dihydro-, diacetate(2α,3β-diacetoxy-13β-p-bromophenylthio-11α,13dihydroisolantolactone): stereochemistry of addition of thiols to sesquiterpenoid α -methylene γ -lactones. Sesquiterpenoids. Part XIV, 400.

Pulse radiolysis of solutions of phenothiazine and its derivatives, intermediates in the: reactions of cycloalkylperoxyl radicals with phenothiazines, 969.

Purine, 9-alkylpurines, and imidazo[4,5-b]pyridine. Proton transfer from heterocyclic compounds. Part II, 1889.

Pyran, 2,6-divinyltetrahydro-, 1549.

Pyrazole, 1-(N-benzoylamidino)-3,5-dimethyl-, the amidinating agent, kinetics and mechanism of hydrolysis of, 2054.

3,4,5-trimethyl-, the tautomerism of, with 1-hydroxy-3,4,5-trimethylpyrazole, 164.

Pyrazoles, methyl-, the hydrogen-exchange rates of. The kinetics and mechanism of the electrophilic substitution of heteroaromatic compounds. Part XXXIV, 1675.

Pyrazoline ring formation, from αβ-unsaturated phenylhydrazones, stereochemistry of. Addition reactions of conjugated double bonds. Part V, 936.

 Δ^3 -Pyrazolin-5-one, 4-dimethylamino-2,3-dimethyl-1phenyl-, (4-dimethylaminoantipyrine) in acetonitrile, cyclic voltammetry and controlled potential electrolysis of. Anodic oxidation of amines. Part III, 1640.

Pyrene and chloranil, crystal and molecular structure of the molecular complex of. Molecular complexes. Part XXII, 1212.

and 1,2,4,5-tetracyanobenzene, crystal structure of the 1:1 molecular complex at 290 and 178 K. Molecular complexes. Part XV, 523.

and 7,7,8,8,-tetracyanoquinodimethane, crystal structure of the 1:1 molecular complex of. Molecular complexes. Part XVI, 528.

2-chloro-4,5,9,10-tetrahydro-, the doubly bridged biphenyl, crystal structure of, 314.

-1,3,5-trinitrobenzene, crystal and molecular structure of. Molecular complexes. Part XXI, 734.

Pyridination, anodic, of N-benzylidene-p-anisidines in acetonitrile. Anodic oxidation of Schiff's bases. Part II, 1112.

Pyridine, 4-methyl-, the phenylation of, with benzoyl peroxide, upon the validity of partial rate factors based on isomer distributions in, 2071.

thiopyranylidenedihydro-, SS-dioxides, crystal and molecular structure of two, 1189.

probes for conjugation of the sulphonyl group. Cyclic sulphones. Part XVI, 1184.

Pyridinecarboxylic acids, restricted rotation in the NNdimethylamides of the, 587.

Pyridines, 4-(chlorostyryl)-, carbon-halogen bond fragmentation in the radical anions from. Factors which determine the rate of such fragmentations. Electrochemical reactions. Part XIV, 1150.

substituted, thermodynamic analysis of substituent effects on proton dissociation equilibria of, 790.

thermodynamics of the protonation of, in aqueous solutions. 938.

tautomeric. Part XIV, the tautomerism of 2-benzyl-, 2benzyhydryl-, and 2-anilino-pyridine, 2111.

the formyl-, acetyl- and benzoyl-, conformations of, 1461.

4-Pyridone, 2-quinolone, and 1-isoquinolone series. Aromaticity and tautomerism. Part II, 1080.

Pyridyl, di-2-, disulphide, molecular solute conformation of, from dipole moment studies, 701.

Pyrimidines, hexahydro-, piperazines, tetrahydro-1,3-oxazines and tetrahydro-1,3-thiazines, the conformation of ring NH-groups in. The conformational analysis of saturated heterocycles. Part XLIX, 325.

Pyrolysis, gas-phase, of the S-butyl thioacetates, 1293.

of 1-arylethyl acetates, electrophilic aromatic reactivities via. Part IX, the effect of the trimethylsilyl substituent, 1632.

of thio- and isothio-cyanates. Part V, the pyrolysis of but-3-enyl and 1-methyl-2-enyl isothiocyanates, 839.

the gas-phase, of 1-t-butylbut-3-enyl acetate, kinetics of,

Pyrrole, N-phenyl-, -indole, -carbazole, and -diphenylamine, and N-ethyl-pyrrole, -carbazole, and -diphenylamine, the reaction of trichloro-1,3,5-triazine (cyanuric chloride) with. 1,3,5-Triazines. Part XII, 2075.

Q

Quenching, fluorescence, of 2-piperidinoanthraquinone, 1742.

of acetone fluorescence by inorganic anions, 1624.

Quinodimethane, 7,7,8,8-tetracyano-, -acenaphthene molecular complex, crystal and molecular structure. Molecular complexes. Part XIX, 727.

-perylene molecular complex, crystal and molecular structure. Molecular complexes. Part XVII, 720. and pyrene, crystal structure of the 1:1 molecular

complex of. Molecular complexes. Part XVI, 528. Quinol, protonated riboflavin, and bromide ions, crystal and

molecular structure of a donor-acceptor complex involving, 1266.

Quinoline, quinoxaline, and phenazine, factors which determine the rate of carbon-halogen bond fragmentation in radical anions illustrated by some halogenated derivatives of. Electrochemical reactions. Part XV, 1811.

- Quinolines, decahydro-, and piperidines. Part I, carbon-13 magnetic resonance studies of cyclic compounds, 842.
- 2-Quinolone, 1-isoquinolone and 4-pyridone series. Aromaticity and tautomerism. Part II, 1080.
- Quinone and hydroquinone, the identification by electron spin resonance spectroscopy of dimeric species formed in the autoxidation of, 2128.
- Quinones and hydroquinones in alkaline solution, electron spin resonance studies of oxidative processes of: formation of primary and secondary semiquinone radicals, 424.
- Quinoxaline, quinoline, and phenazine, factors which determine the rate of carbon-halogen bond fragmentation in radical anions illustrated by some halogenated derivatives of. Electrochemical reactions. Part XV, 1811.

R

- Racemisation of α-methylbenzyl chloride in diethyl ether, tin, zinc, and antimony halides as catalysts for. Acceptor properties of metal halides. Part VII, 642.
 - the kinetics of, of phenylmalonamic acid. Asymmetric transformations in salts of phenylmalonamic and phenylmalonanilic acids, 1204.
- Radiation, high energy, and hydrogen atom bombardment, radicals formed from acetylenes by: an electron spin resonance study, 1405.
- γ-Radiation and hydrogen atoms, electron spin resonance studies on the effect of, upon various olefinic carboxylic acids and their amides, 397.
- Radical reduction, a kinetic investigation of the role of, in metal ion-hydrogen peroxide systems. Electron spin resonance studies. Part XXXIX, 2174.
- **Radical-anion** intermediates. Part VI, the effect of a crown ether on the 4*H*-cyclopenta[def]phenanthrene system, 1201.
- Radical anions from 4-(chlorostyryl)pyridines, carbon-halogen bond fragmentation in the. Factors which determine such fragmentations. Electrochemical reactions. Part XIV, 1150.
 - of 5H-dibenzo[a,d]cycloheptene and related compounds, an electron spin resonance study of, 811.
- Radical-cations, evidence for the formation of dimeric, R₂S÷SR₂+, in the one-electron oxidation of sulphides. Electron spin resonance studies. Part XXXVIII, 1748.
- Radicals, aromatic cation, and aromatic compounds, redox equilibria of, 1594.
 - aromatic, relationships for assigning isotropic hyperfine coupling constants for a variety of, 1762.
 - t-butoxyl, and ketone triplets, the reactions of, with organotin compounds. Homolytic organometallic reactions. Part XI, 1777.
 - formed from acetylenes by high energy radiation and hydrogen atom bombardment: an electron spin resonance study, 1405.
 - H(R)CN·, in γ-irradiated cyanoacetic acid and acidic solutions of methyl cyanide. Unstable intermediates. Part CXXV, 394.
 - heterocyclic free, homolytic aromatic substitution by. Part IV, reaction of 5-substituted thiazol-2-yl radicals with alkylbenzenes, 1093.
 - intermediate, an electron spin resonance study of: γ -radiolysis of pure acyl chlorides at 77 K, 1563.

- organosilicon, organogermanium, and organotin, an electron spin resonance study of the reactions of, with carbonyl compounds, 1933.
- organotin and organolead, an electron spin resonance study of the reactivity of, 1056.
- short-lived, on the use of the electron spin resonance-flow technique in the study of, 1702.
- spirophosphoranyl, in solution, electron spin resonance studies of the structure and reactivity of some, 1416.
- γ-Radiolysis of pure acyl chlorides at 77 K: an electron spin resonance study of intermediate radicals, 1563.
- Radiolytic displacement of substituent groups in benzene by hydrogen (tritium), 1453.
- Rate constants, determination of. Gas-phase thermal molecular isomerizations of acetylcyclopropane. Part II, 199.
- Rates of elimination from substituted phenethyl'onium salts in isopropyl alcohol containing potassium isopropoxide. Mechanism of elimination reactions. Part IV, 1352.
 - of hydrolysis and pK_a values of arylmethylene-erythromycylamines, substituent effects on the, 173.
 - relative, of methylation and hydrogen abstraction by methyl radicals. Reactions of alkyl radicals. Part III, 484.
 - the hydrogen-exchange, of methylpyrazoles. The kinetics and mechanism of the electrophilic substitution of heteroaromatic compounds. Part XXXIV, 1675.
 - activation parameters, and enthalpies of transfer of transition states for the reaction of imidazole with aromatic sulphonyl chlorides in methanol and acetonitrile, 823.
- Ratio, ortho: para, in aromatic nucleophilic substitution.
 Part I, 110. Part II, 2114.
- **X-Ray** crystal analysis, a comparison of the results of, with semi-empirical calculations of conformation. Molecular structure of p-nitrobiphenyl, 342.
- Reactivities, electrophilic aromatic, via pyrolysis of 1-arylethyl acetates. Part IX, the effect of the trimethylsilyl substituent, 1632.
 - relative, and activation parameters for the Vilsmeier-Haack formylation of five-membered heteroaromatic compounds containing the Group VI elements, 2097.
- Reactivity and structure of spirophosphoranyl radicals in solution, electron spin resonance studies of the, 1416.
 - nucleophilic, of organophosphorus compounds. Part II, the reactions of phosphorus acids with keten OO-, ON-, OS-, and SS-acetals, orthoesters and ketenimines, 2064.
 - of aromatic molecules, semiemperical all-electron calculations on, 179.
 - of organometallic compounds towards functional substrates, on the. Part III, the kinetics of the reaction between tri-isobutyl-aluminium and benzonitrile, 1129.
 - of organotin and organolead radicals, an electron spin resonance study of the, 1056.
 - ratios, the origin of high ortho: para-, in the reactions of fluoronitrobenzenes with potassium t-butoxide in t-butyl alcohol, 55.
- Rearrangement, aromatic substitution with. Part V, base-catalysed prototropic rearrangement of 4-bromo-2,6-dit-butylcyclohexa-2,5-dienone in acetic acid, 59.
 - fast neighbouring group-induced, during alkaline hydrolysis of α-hydroxyimino-p-nitrobenzyl phosphates, phosphonates, and phosphinates. The reactivity of organophosphorus compounds. Part XXVIII, 1798.

- Rearrangement (contd.)
 - β-phenyl and β-p-methoxyphenyl, during the solvolysis of 2,2-diaryl-1-phenylvinyl bromides. Vinylic cations from solvolysis. Part III, 1506.
 - the mechanism of, of β -acyloxyalkyl radicals, 861.
 - the ortho-Claisen, of allyloxynaphthoquinones, kinetics and mechanism of, 1137.
- Rearrangements, catalysed prototropic. Part II, metal carbonyl-catalysed isomerization of N-allylamides to prop-2-enyl derivatives, 1954.
 - electron impact induced, of organic ions. Part III, a Beckman-like aryl migration in substituted isoxazol-5(4H)-one molecular ions, 2038.
 - of secondary and tertiary carbonium ions by diphenylphosphinyl migration, 1472.
- **Redox** transfer. Part VIII, addition of benzenesulphonyl chloride and carbon tetrachloride to substituted styrenes: a kinetic study, 1000.
- Reduction, mechanism of, at a platinum electrode. Voltammetric study of some perbenzoic acids, 491.
- Resonance, ion cyclotron double, an investigation by, of the structural differences of isomeric ions using a direct insertion probe, 2088.
- Riboflavin, protonated, quinol and bromide ions, crystal and molecular structure of a donor-acceptor complex involving, 1266.
- **Rotation**, barriers to, and conformer populations of two substituted butanes, 960.
 - restricted, about the exocyclic C-N bond in nucleic acid bases, 889.
 - carbon-nitrogen bond, in some ureas, thioureas, and thiouronium salts, 2162.
 - in the *NN*-dimethylamides of the pyridinecarboxylic acids, 587.
- Rotational isomerism. Part XV, the solvent dependence of the conformational equilibria in *trans*-1,2- and *trans*-1,4-dihalogenocyclohexanes, 582.

S

- Sabinene and α-thujene, the acid-catalysed hydration of, 665
- Sarcosine, glycine, and alanine, piperazinedione formation from esters of dipeptides containing: the kinetics in aqueous solution, 1845.
- SCF treatment of arylmethyl cations: parametric variation and chemical effects, 1063.
- Schiff's bases, anodic oxidation of. Part II, anodic pyridination of N-benzylidine-p-anisidines in acetonitrile, 1112.
- 1,2,3-Selenadiazole, 4-phenyl-, and dibenzyl diselenide, heats of combustion and formation of, 1732.
- Selenium-containing radicals, an electron spin resonance investigation of some. Heterocyclic radicals. Part III, 258.
- Selenonation and sulphonation of polyalkylbenzenes with selenic and sulphuric acids in acetic anhydride. Aromatic sulphonation. Part XLIII, 2129.
- Self association, ionisation, and proton exchange studies of nicotinamide in aqueous solution using nuclear magnetic resonance spectroscopy, 2145.
- Semidine and benzidine rearrangements, mechanism of. Part XXVII, kinetics, products, and solvent isotope effects for acid-catalysed rearrangements of some N-substituted hydrazoarenes, 551.

- Semiemperical all-electron calculations on the reactivity of aromatic molecules, 179.
- Semiquinone and ketyl radicals, termination rates for, in alcoholic solvents. Kinetic electron spin resonance spectroscopy. Part II, 543.
- Semiquinones, some aryl-, steric effects observed in the electron spin resonance spectra of, 1533.
- Sesquiterpenoids. Part XIV, X-ray study of 13β-p-bromophenylthio-11α,13-dihydropulchellin-C diacetate (2α,3β-diacetoxy-13β-p-bromophenylthio-11α,13-dihydroiso
 - lantolactone): stereochemistry of addition of thiols to sesquiterpenoid α -methylene γ -lactones, 400. Part XV, conformation of humulene: X-ray analysis of the crystal structure of humulene diepoxide, 404.
- 1,3-Shift involving a protonated cyclopropane intermediate in a kinetically controlled substitution, evidence for: formation of 2-chloro-3-methylbutane in the thermal decomposition of 2-methylbutyl chloroformate, 74.
- Shifts, chemical, nuclear magnetic resonance, for alcoholic and phenolic protons in dimethyl sulphoxide: utility as a structural parameter, 1231.
 - ¹³C, some correlations involving, of monosubstituted derivatives of hexafluorobenzene, 1789.
 - fluorine, the solvent dependence of. Part II, anisotropic and polar solvents, 1521.
- Silane, trichloromethyl-, derivatives as dichloromethylene transfer agents; kinetic evidence for free dichlorocarbene, 437.
 - trifluoro-1,1,2,2-tetrafluoroethyl-, the gas-phase thermal decomposition of. The kinetics of the reactions of silicon compounds. Part VIII, 1013.
 - trimethyl-1,1,2,2-tetrafluoroethyl-, the gas-phase decomposition of. The kinetics of the reactions of silicon compounds. Part IX, 1018.
- Silanes, organo-, asymmetric; preparation and properties of some new, 114.
 - trialkoxy-2-halogenoethyl-, the solvolytic fragmentation of, 1699.
- Silicon compounds, the kinetics of the reactions of. Part VIII, the gas-phase thermal decomposition of trifluoro-1,1,2,2-tetrafluoroethylsilane, 1013. Part IX, the gas-phase thermal decomposition of trimethyl-1,1,2,2-tetrafluoroethylsilane, 1018.
 - organo-, compounds. Part L, kinetics of the thermal decomposition of bis(trimethylsilyl)mercury in solution, 366.
 - organogermanium, and organotin radicals, an electron spin resonance study of the reaction of, with carbonyl compounds, 1933.
- Silyl, trimethyl-, substituent, the effect of. Electrophilic aromatic reactivities *via* pyrolysis of 1-arylethyl acetates. Part IX, 1632.
- Solvent dependence of the conformational equilibria in trans-1,2- and trans-1,4-dihalogenocyclohexanes. Rotational isomerism. Part XV, 582.
 - dipolar aprotic effects. Aromatic nucleophilic exchange reactions. Part III, 1060.
 - effects on the rates of some acid-catalysed reactions, 20.
 - isotope effects, kinetics and products for acid-catalysed rearrangements of some N-substituted hydrazoarenes. Mechanism of benzidine and semidine rearrangements of some N-substituted hydrazoarenes. Part XXVII, 551.

- Solvents, anisotropic and polar. The solvent dependence of fluorine chemical shifts. Part II, 1521.
 - protic and aprotic, enthalpies of transfer from methanol to, of the transition state in the reaction of benzene-sulphonyl chloride with imidazole, 1760.
- Solvolysis of benzoyl and p-toluoyl phenylphosphonates in aqueous dioxan, the kinetics of the. The mechanism of acyl phosphonate reactions. Part I, 1434.
 - of organic phosphates. Part IX, structure-reactivity correlations for the hydrolysis of organic orthophosphate monoesters, 1235.
 - vinylic cations from. Part XIII, $S_N 1$ and electrophilic addition–elimination routes in the solvolysis of α -bromo- and α -chloro-4-methoxystyrenes, 301. Part XV, β -phenyl and β -p-methoxyphenyl rearrangements during the solvolysis of 2,2-diaryl-1-phenylvinyl bromides, 1506
- Solvolytic fragmentation studies on 7-substituted *exo* and *endo*-5,6-(*o*-phenylene)-2-norbornyl toluene-*p*-sulphonates 150.
- **Spectral** correlation, ultraviolet, between the cation of an amino-N-heteroaromatic compound and the neutral species of the corresponding oxo-analogue, 1101.
- Spectrophotometric determination of basicity constants. Benzamides and phenylureas, 1331.
- Spectroscopic properties and preparation of some new asymmetric organosilanes, 114.
- Spectroscopy, kinetic electron spin resonance. Part III, proton exchange rates for ketyl radicals in organic solvents, 1620.
- Spin trapping by use of nitroso-compounds. Part V, 2,4,6-tri-t-butylnitrosobenzene: a new type of spin-trapping reagent, 369. Part VI, nitrosodurene and other nitrosobenzene derivatives, 1252.
- Spiro-complexes. The stabilities of Meisenheimer complexes. Part VI, 2157.
- Spirodioxolans. The conformational analysis of saturated heterocycles. Part LI, 337.
- Spiro-oxaziridines, configurational stability of pyramidal nitrogen in, 1575.
- Stability, configurational, of pyramidal nitrogen in spirooxaziridines, 1575.
- Stereochemical course of the photochemical transformation of 3-methyl-car-4-en-2-one into derivatives of 3,3,7-trimethylocta-4,6-dienoic acid, 122.
 - factors in the cathodic pinacolisation of acetophenone at a mercury pool, 1410.
 - orientation of the benzylation of piperidines. Part LII, the conformational analysis of saturated heterocycles, 1553.
 - study of some reactions of compounds in the 4-methyl-1,3,2-dioxaphosph(v)orinan series, 676.
- Stereochemistry, absolute, and crystal and molecular structure of cularine methiodide, 1226.
 - and kinetics of the reactions of bicyclo[3,2,1]octan-2- and 3-one with sodium borohydride, methylmagnesium iodide, and diazomethane, 571.
 - and ¹H nuclear magnetic resonance spectra of some perhydro-oxazolo[3,4-c]oxazines and perhydro[1,3]oxazino[3,4-c][1,3]oxazines. Proton magnetic resonance studies of compounds with bridgehead nitrogen atoms. Part XXV, 1379.
 - and synthesis of bis-(3,4-disubstituted 5-oxo-2,5-dihydro-furan-2-yl) ethers, 107.

- of addition of chlorine acetate and of chlorine to some unsaturated compounds. The kinetics and mechanisms of additions to olefinic substances. Part XI, 1480.
- of anticholinergic agents. Part II, crystal and molecular structure of glycopyrronium bromide, 1875.
- of the chloro- and bromo-hydrins derived from cinnamic acid and of some derivatives thereof. The kinetics and mechanisms of additions to olefinic substances. Part X. 653.
- photocyclisation of 1-o-alkylphenylpropane-1,2-diones, 1316.
- preparation, and acidity of pipecolic (piperidine-2-carboxylic) acid derivatives. Substituent effects in saturated systems, 1258.
- Steric effects in di- and tri-arylmethane dyes. Part XI, electronic absorption spectra of derivatives of Michler's Hydrol Blue, Crystal Violet, and Malachite Green containing o-trifluoromethyl groups, 1792. Part XII, electronic absorption spectra of some derivatives of Michler's Hydrol Blue containing α-trifluoromethyl groups, 2151.
 - observed in the electron spin resonance spectra of some arylsemiquinones, 1533.
- Stilbenes, α-substituted methoxy-, anisotropic effects in, 1660.
 Strain energy minimisation, computer program for, in sixmembered rings and a recalculation of conformational equilibria. The conformational analysis of saturated heterocycles. Part L, 332.
 - calculations, crystal structure analysis and, on a sterically crowded molecule: 1,8-dimethylnaphthalene, 2101.
- Strigol, the germination stimulant, crystal and molecular structure by X-ray analysis, 465.
- Structural parameter, utility as a: nuclear magnetic resonance chemical shifts for alcoholic and phenolic protons in dimethyl sulphoxide, 1231.
- Structure and reactivity of some spirophosphoranyl radicals in solution, electron spin resonance studies of the, 1416.
- Structures and tautomerism of some unsymmetrically substituted furoxans. Furazans and furazan oxides. Part IV, 1613.
- Styrene, α -bromo- and α -chloro-4-methoxy-, S_N1 and electrophilic addition-elimination routes in the solvolysis of. Vinylic cations from solvolysis. Part XIII, 301.
 - oxide, substituted, kinetics of formation of, by reaction of 2-aryl- and 1-aryl-2-halogenoethanols with aqueous alkali, 589.
- Styrenes substituted, addition of benzenesulphonyl chloride and carbon tetrachloride to: a kinetic study. Redox transfer. Part VIII, 1000.
- variable reaction paths for the cycloaddition of benzonitrile N-oxides to. Substituent effects in 1,3-dipolar cycloadditions, 1769.
- Substituent constants, the correlation of the dipole moments of aliphatic compounds with, and the dipole moments of substituted adamantanes, 416.
 - effects in saturated systems. Complex formation between carbonitriles and iodine monochloride, 128.
 - in saturated systems. Preparation, stereochemistry, and acidity of pipecolic (piperidine-2-carboxylic) acid derivatives, 1258.
 - of (transition metallo)methyl groups by fluorine-19 nuclear magnetic resonance, 986.
 - on the condensation of nitrosobenzene with *para-* and *meta-*substituted anilines in acetic acid-sodium acetate buffered aqueous ethanol solutions, 696.

- Substituent (contd.)
 - on the pK_a values and rates of hydrolysis of arylmethylene-erythromycylamines, 173.
- Substituents, donor, reliable σ^+ values for some strong resonance, 1887.
 - 2-halogeno-, the effect of, on the rates of bromination of olefins, 1053.
- Substitution at saturated carbon. Part XV, the effect of t-butyl alcohol-methanol mixtures on the free energy of reactants and transition states in the substitution of tetraethyltin by mercury(II) salts, 444. Part XVI, steric effects in the $S_{\rm N}2$ reaction, 1132.
 - electrophilic, non-linearity of the extended selectivity relationship in, of annelated aromatic systems, 1250.
 - of heteroaromatic compounds, the kinetics and mechanism of the. Part XXXII, acid catalysed hydrogen exchange of azaindoles, 1072. Part XXXIII, Hammett treatment for hydrogen exchange of monosubstituted benzenes in sulphuric acid under standard conditions, 1077. Part XXXIV, the hydrogen-exchange rates of methylpyrazoles, 1675.
 - with rearrangement. Part VI, bromination of 3-acetoxycholesta-3,5-diene, 1086. Part VII, reaction paths in the bromination of cholest-4-en-3-one, 1586.
 - homolytic aromatic, by heterocyclic free radicals. Part IV, reaction of 5-substituted thiazol-2-yl radicals with alkylbenzenes, 1093.
- Substrates, functional, on the reactivity of organometallic compounds towards. Part III, the kinetics of the reaction between tri-isobutylaluminium and benzonitrile, 1129.
- Sulphamides, NN'-diaryl, kinetics of the hydrolysis of, 481.
- Sulphides, alkyl aryl, and arenethiols, ultraviolet absorption spectra of, 1125.
 - diacyl, and sulphonic acid anhydrides and thioanhydrides: the conformation around two equivalent bonds linked to one central atom, 1870.
 - ββ'-disubstituted diethyl, the mechanism of the synergism between 4-alkoxy-2,6-diphenylphenols and. Antioxidative properties of phenyl-substituted phenols. Part I, 1276.
 - β-hydroxy-, oxidation of, by the hydroxyl radical and structural features of sulphur-conjugated radicals. Electron spin resonance studies. Part XXXVII, 272.
 - the one-electron oxidation of, evidence for the formation of dimeric radical-cations, $R_2S \stackrel{\centerdot}{=} SR_2^{+}$, in. Electron spin resonance studies. Part XXXVIII, 1748.
- Sulphines, chemistry of. Part XVII, fragmentation and rearrangement processes upon electron impact of aromatic sulphines, 458. Part XVIII, electron impact induced rearrangements of arylthio, arylsulphinyl, and arylsulphonyl substituted sulphines, 461.
- Sulphinyl and phosphoryl groups, the acid-base behaviour of, in some organic bases, 531.
- Sulphites, phenylethylene, nuclear magnetic resonance and infrared studies on. Chemistry of the S=O bond. Part III, 1966.
- Sulphonation, aromatic. Part XL, rates of sulphonation ortho, meta, and para to a sulphonic acid group in methyl substituted benzenesulphonic acids, 633. Part XLI, sulphonation of 3-phenylpropane-1-sulphonic acid in sulphuric acid, 1413. Part XLIII, selenonation and sulphonation of polyalkylbenzenes with selenic and sulphuric acids in acetic anhydride, 2129.

- Sulphones, aryl vinyl, base catalysed addition of phenols to, 1773.
 - cyclic. Part XIV, ionisation constants of substituted thiopyran 1,1-dioxides, 50. Part XVI, probes for conjugation of the sulphonyl group: thiopyranylidenedihydropyridine SS-dioxides, 1184.
- Sulphonic esters, vinyl; reactivity of. Part XV, unimolecular cleavage of the sulphur-oxygen bond in the ethanolyis of aminovinyl arenesulphonates, 1021.
- Sulphonyl chlorides, aromatic, in methanol and acetonitrile, rates, activation parameters, and enthalpies of transfer of transition states for the reaction of imidazole with, 823. radicals in solution, an electron spin resonance study of some, 626.
- Sulphoxide, dimethyl, kinetics and mechanism of the oxidation of, with bromine in aqueous solution, 1355.
- Sulphoxides, aromatic, intramolecular hydrogen bonds in:

 ¹H nuclear magnetic resonance and acidity constant measurements, 848.
 - kinetics of the base-catalysed oxidation of, with 1-methyl-1-phenylethyl hydroperoxide, 755.
- Sulphur compounds, organo-, the effect of d orbitals on the calculated ultraviolet spectra of, 1542.
 - conjugated radicals, structural features of, and oxidation of β-hydroxy-sulphides by the hydroxyl radical. Electron spin resonance studies. Part XXXVII, 272.
 - -heterocyclic analogues of fluoranthene, approximate π -electron 'ring current' intensities in, 235.
 - nucleophilic substitution at. Reaction of *p*-nitrophenyl triphenylmethanesulphenate with n-butylamine and benzamidine, 534.
 - =O bond, chemistry of. Part II, nuclear magnetic resonance and infrared studies on ethylene sulphites (1,3,2-dioxathiolan 2-oxides), 243.

T

- **Taft,** Hammett, and Brønsted relationships as evidence for general base catalysis: the pyridine-catalysed acylation of phenols by carboxylic acid anhydrides in carbon tetrachloride, 1828.
- Tautomerism and aromaticity. Part II, the 4-pyridone, 2-quinolone, and 1-isoquinolone series, 1080.
 - aspects of. Part IV, a kinetic study of the dimerization reaction of pseudo-acid chlorides, 1158. Part V, solvent, substituent and steric effects on the ring-chain tautomerism of o-benzoylbenzamides, 1160.
 - of benzotriazole 1-oxide and its 4- and 6-nitro-derivatives with the corresponding 1-hydroxybenzotriazoles. Azole N-oxides. Part I, 160.
 - of 2-benzyl-, 2-benzhydryl-, and 2-anilino-pyridine. Tautomeric pyridines. Part XIV, 2111.
 - of 3,4,5-trimethylpyrazole 2-oxide with 1-hydroxy-3,4,5-trimethylpyrazole. Azole N-oxides. Part II, 164.
- ring-chain. Part V, 8-aroyl and 8-acyl-1-naphthoic acids, 1144.
- Temperature-jump study of the kinetics of reactions of arylethylmalonate monoions with hydroxide ion. The effect of ring substituents, 738.
- **Termination** rates for ketyl and semiquinone radicals in alcoholic solvents. Kinetic electron spin resonance spectroscopy. Part II, 543.
- Testosterone (17β-hydroxyandrost-4-en-3-one), crystal and molecular structure of, 1978.

- trans,trans-Tetrabenzo[a,c,g,i]cyclododecene, crystal and molecular structure of, 1984.
- Tetrazole studies. Part II, crystal structure of 5-bromotetrazole, 2036.
- Thermal decomposition, gas-phase, of trifluoro-1,1,2,2-tetrafluoroethylsilane. The kinetics of the reactions of silicon compounds. Part VIII, 1013.
 - the gas-phase, of trimethyl-1,1,2,2-tetrafluoroethyl-silane. The kinetics of the reactions of silicon compounds. Part IX, 1018.
 - of bis(trimethylsilyl)mercury in solution, kinetics of the.
 Organosilicon compounds. Part L, 366.
 - of 2-methylbutyl chloroformate, formation of 2-chloro-3-methylbutane in: evidence for a 1,3-shift involving a protonated cyclopropane intermediate in a kinetically controlled substitution, 74.
 - of some aromatic peracetals [$\alpha\alpha$ -bis(alkyldioxy)-toluenes], 1805.
 - reactions, the gas-phase, of 1-methylbicyclo[3,2,0]hept-2-en-7-one, 835.
 - rearrangements of aryldimethylvinylidenecyclopropanes and aryldimethylenecyclopropanes, 278.
- Thermodynamic analysis of substituent effects on proton dissociation equilibria of substituted pyridines, 790.
 - parameters for ionisation and dissociation of alkyl halides in water and nonaqueous solvents. Comments of the ion-pair mechanism of nucleophilic substitution, 1893.
- Thermodynamics of binding of guest molecules to α and β -cyclodextrins, 2081.
- Thermolysis of chlorobenzene and reactions with aryl radicals and chlorine and hydrogen atoms at 500°. Vapour phase chemistry of arenes. Part II, 1635.
- Thermolytic reactions of esters. Part XI, vapour-phase thermolysis of allyl methyl oxalate and allyl phenyl oxalate and its relevance to the thermochemistry of oxycarbonyl radicals, 1327.
- **1,3,4-Thiadiazoles** and -oxadiazoles, 2-dimethylamino-, rotational barriers in. A CNDO/2 study, 1500.
- 1,3-Thiazines, tetrahydro-, piperazines, hexahydropyrimidines and tetrahydro-1,3-oxazines, the conformation of ring NH-groups in. The conformational analysis of saturated heterocycles. Part XLIX, 325.
- Thiazol-2-yl, 5-substituted, radicals, reaction of, with alkylbenzenes. Homolytic aromatic substitution by heterocyclic free radicals. Part IV, 1093.
- Thienothiophens, radical anions of substituted, 1816.
- Thietan and cyclobutanone in liquid crystalline solvents, conformational investigation of, 1908.
- Thiirenium ions, formation and reactivity of, 493.
- Thioacetates, the S-butyl, gas-phase pyrolysis of, 1293.
- Thioacid aromatic O-esters, photolysis of: the nature of the reactive excited state, 1307.
- Thiocyanates and isothiocyanates, pyrolysis of. Part V, the pyrolysis of but-3-enyl and 1-methylprop-2-enyl isothiocyanates, 839.
- Thiocyanogen chloride, heterolytic addition of, to some symmetrical α -arylalkenes. Pseudohalogen chemistry, 1359.
- Thiols, arene, and alkyl aryl sulphides, ultraviolet absorption spectra of, 1125.
 - aromatic, thermodynamic acid dissociation constants of, 1969.
- Thiophen-2-carbaldehyde, evidence for the SO-cis-conformation in. Nematic phase nuclear magnetic resonance investigations of rotational isomerism. Part II, 1739.

- Thiophens, alkylthio-, conformational isomerism in cation radicals of, 1491.
- Thiopyran 1,1-dioxides, substituted, ionisation constants of. Cyclic sulphones. Part XIV, 50.
- Thiosulphinates, dipole moments and conformation of, 488. Thiourea, N-(4-imidazol-4-ylbutyl)-N'-methyl-, (burimamide), the histamine H_2 -receptor antagonist, crystal and molecular structure, 1734.
- Thiuronium salts, ureas, and thioureas, restricted carbonnitrogen bond rotation in some, 2162.
- α-Thujene and sabinene, the acid-catalysed hydration of, 665.
- Tin, organo-, alkoxides and phenoxides, intermolecular exchange and configurational stability of, 1284.
 - and organolead radicals, an electron spin resonance study of the reactivity of, 1056.
 - compounds, asymmetrically substituted, configurational stability of. An example of optical activity at the tin centre, 638.
 - compounds, auto-association in: butyltin trialkoxides, 1785
 - compounds, the reactions of t-butoxyl radicals and of ketone triplets with. Homolytic organometallic reactions. Part XI, 1777.
 - organosilicon and organogermanium radicals, an electron spin resonance study of the reactions of, with carbonyl compounds, 1933.
 - tetraethyl-, the effect of t-butyl alcohol-methanol mixtures on the free energy of reactants and transition states in the substitution of, by mercury(II) salts. Part XV, substitution at saturated carbon, 444.
 - trimethyl-, radicals, halogen atom abstraction from alkyl halides by, in the gas phase. Free radical substitution in aliphatic compounds. Part XXIX, 1570.
- Toluene, nitration in acetic anhydride; formation of adducts, 237.
 - of α-nitro-, kinetics of the ionisation of, in alkaline solution. Bromopicrin reaction. Part III, 1110.
- Toluenes, $\alpha\alpha$ -bis(alkyldioxy)-, thermal decomposition of some peracetals, 1805.
 - diphenylmethanes, and ethylbenzenes, chlorination of nuclear-substituted. Directive effects in benzylic hydrogen atom abstraction. Part III, 689.
 - α-substituted, and benzyl chlorides, halogenation of. Directive effects in benzylic hydrogen atom abstraction. Part V, 1617.
- **Toluene-p-sulphonamidate,** N-(dimethylsulphonio)-, crystal and molecular structure of. Structural investigation of ylides. Part III, 1951.
- Toluene-p-sulphonates, 7- exo and endo-5,6-(o-phenylene)-2-norbornyl substituted, solvolytic fragmentation studies on, 150.
- **Toluene-p-thiolate** in dimethylformamide, kinetics of aromatic substitution by. Effect of solvent on Hammett-type correlations, 1430.
 - sodium salt, in NN-dimethylformamide, kinetics and mechanism of the nucleophilic substitution of arylhalogenoacetylenes by, 63.
- **p-Tolyl** sulphoxides, 1-phenylethyl-, absolute configuration of, and the stereochemistry in the oxidation of 1-phenylethyl p-tolyl sulphide, 758.
- **Topochemistry.** Part XXXIV. Crystal and molecular structure of p'-bromochalcone, 33. Part XXXVI, relative yields of photodimers from mixed crystals of transcinnamic acids and trans-cinnamides, 1095.

Transition, helix-coil, of t-carrageenan segments; a study by light scattering and membrane osmometry, 1608.

- states in the cyclisation of N- ω -halogeno-alkylamines and -sulphonamides. Intramolecular reactions. Part X, 1215.
- 1,3,5-Triazines. Part XII, the reaction of trichloro-1,3,5-triazine (cyanuric chloride) with N-phenyl-pyrrole, -indole, -carbazole, and -diphenylamine, and N-ethyl-pyrrole, -carbazole, and -diphenylamine, 2075.
 - 1,3,5-trialkylhexahydro-. The conformational analysis of saturated heterocycles. Part LIII, 2109.
- 1,2,4-Triazoles, 3-amino-5-aryl-, and N-amidinobenzohydrazides, mechanism of the formation of reactive Namidinohydrazonyl bromides and their conversion to, 2047.
 - bonding in. Part II, crystal structure of 3,4,5-triamino-1,2,4-triazole hydrobromide (guanazine hydrobromide), 1. Part III, crystal structure of 4-amino-3-(β-benzoyl-hydrazino)-5-mercapto-1,2,4-triazole, 4. Part IV, crystal structure of the sodium salt of 4-amino-5-mercapto-1,2,4-triazole trihydrate, 6. Part V, crystal structure of 4-benzylideneamino-5-mercapto-1,2,4-triazole, 9. Part VI, crystal structure of 6-mercapto-3-phenyl-s-triazolo[4,3-b]-s-tetrazine pyridine adduct, 11.
- Tricyclo[5,4,0,0^{2,5}]undecane, 8,9-dibromo-1,4,4,8-tetramethyl-, and 8,9-dibromo-2,2,4,8-tetramethyltricyclo-[5,3,1,0^{4,11}]undecane, derivatives of rearrangement products of caryophyllene dihydrochloride and isocaryophyllene respectively, crystal and molecular structure of, 1938.
- Trimethylsilyloxyl radicals from peroxides: electron spin resonance study of homolytic substitution on silicon, 182.
- Triphenylmethyl and related cations in sulphuric acid, photolysis of, 95.
- Triplets, ketone and t-butoxyl radicals, the reactions of, with organotin compounds. Homolytic organometallic reactions. Part XI, 1777.
- Tritiation, radiation-induced, of benzene derivatives in aqueous solution, isomer distributions in the. Kinetics of hydrogen isotope exchange reactions. Part XXIII, 1450.
- Tritium atoms, radiolytically generated, in aqueous solution, reactivity comparisons for a series of aromatic substrates towards. Kinetics of hydrogen isotope exchange reactions. Part XXII, 1437.
 - radiolytic displacement of substituent groups in benzene by, 1453.
- Triptolide and tripdiolide, two anti-leukaemic diterpenoid triepoxides, crystal and molecular structures and absolute configuration of, 816.
- (+)-Tubocurarine chloride, solution conformation, 716.
- Tungsten carbide, selective catalytic behaviour of, in the liquid-phase hydrogenation of organic compounds, 1400.

U

- Ultraviolet absorption spectra of arenethiols and alkyl aryl sulphides, 1125.
 - spectra, the calculated, of organo-sulphur compounds, the effect of d orbitals on, 1542.
 - spectroscopy, a study using polarography, and charge transfer and. Part I, d_{π} - p_{π} interaction in trimethylsilyl substituted naphthalenes, 447.

Unpaired electron distribution in 1- and 2-naphthyl t-butyl nitroxides. Nitroxide radicals. Part XIII, 718.

- Unstable intermediates. Part CXXIV, alkyl radical-halide ion adducts, 391. Part CXXV, H(R)CN· radicals in γ-irradiated cyanoacetic acid and acidic solutions of methyl cyanide, 394. Part CXXVI, electron spin resonance studies of the effect of high energy radiation on amines and their solutions in water and sulphuric acid, 797.
- Urea, phenyl-, 4-fluorophenylurea and 3-methylphenylurea, acid hydrolysis of, 1457.
- Ureas, phenyl-, and benzamides. Spectrophotometric determination of basicity constants, 1331.
 - thioureas, and thiuronium salts, restricted carbonnitrogen bond rotation in some, 2162.

 \mathbf{v}

- Vanadium(v), oxidation by. Kinetics of the metal-ion oxidation of phenylphosphonous acid in solution. Part I, 926.
- Vapour phase chemistry of arenes. Part II, thermolysis of chlorobenzene and reactions with arylradicals and chlorine and hydrogen atoms at 500°, 1635.
- Variation, parametric, and chemical effects: SCF treatment of arylmethyl cations, 1063.
- Veratrum alkaloids. Part LVI, crystal structure and absolute configuration of zygacine acetonide hydriodide acetone solvate, 386.
- Vibrational spectra of 2,2-dimethylpropanal, 1241.
- Vincamine, X-ray determination of the molecular structure and absolute configuration of, and of its hydrobromide methanolate, 2001.
- Vinyl bromides, 2,2-diaryl-1-phenyl-, β-phenyl and β-p-methoxyphenyl rearrangements during the solvolysis of. Vinylic cations from solvolysis. Part III, 1506.
 - sulphonic esters, reactivity of. Part XV, unimolecular cleavage of the sulphur-oxygen bond in the ethanolysis of aminovinyl arenesulphonates, 1021.
- Vinylation, tricyano-, with cyclohexyl 1,2,2-tricyanovinyl ether. The kinetics and mechanism of the reaction of cyclopentadienylidenetriarylphosphoranes with cyanoolefins. Part V, 1821.
- N-tricyano: the reaction of aniline with tetracyanoethylene, 974.
- Vinylic cations from solvolysis. Part XIII, S_N1 and electrophilic addition-elimination routes in the solvolysis of α -bromo- and α -chloro-4-methoxystyrenes, 301.
- ethoxy-, fluoro-, and cyano-leaving groups, base-catalysis in the displacement of, by amines. Nucleophilic attacks on carbon-carbon double bonds. Part XVII, 616.
- Voltammetric study of some perbenzoic acids. Mechanism of reduction at a platinum electrode, 491.
- Voltammetry, cyclic, and controlled potential electrolysis of 4-dimethylaminoantipyrine (4-dimethylamino-2,3-dimethyl-1-phenyl-Δ³-pyrazolin-5-one) in acetonitrile. Anodic oxidation of amines. Part III, 1640.

W

Wagner-Meerwein rearrangements, sequential, of polychlorinated complex cations derived from monodechloroisodrin and monodechloraldrin, and the ¹H nuclear magnetic resonance spectra of polychloropolycyclic ketones and dechloraldrin derivatives, 909. Wittig reaction, studies in the mechanism of. The effect of substituents at phosphorus on the fate of phosphobetaines in protic solvents. Part VI, the chemistry of heteroarylphosphorus compounds, 820.

Wolff rearrangement, a non-emperical molecular orbital study of, 794.

Y

Ylides, structural investigation of. Part III, crystal and molecular structure of N-(dimethylsulphonio)toluene-p-sulphonamidate, 1951.

7.

Zeolite, decationated, Beckmann rearrangement catalysed by, infrared study of, 41.

Beckmann rearrangement of cyclopentanone oxime catalysed by, 1262.

Y-type, infrared absorption spectrum of 5-cyanopent-1ene adsorbed on, 48.

Zwitterionic mechanism, direct and indirect evidence for. The decarboxylation of some heterocyclic acetic acids. Part II, 557.

Zygacine acetonide hydriodide acetone solvate, crystal structure and absolute configuration. Veratrum alkaloids. Part LVI, 386.