

## Subject Index, 1977

- Abietanoic** diterpenoids, unusual rearranged, from *Solenostemon* species, 859
- Ab initio** and semi-empirical calculations on the automerization of methane, 213  
calculations on the species HSiN, HNSi, HCSiH, and H<sub>2</sub>CSi: double-bonded divalent silicon, 619  
—LCAO-MO-SCF calculations. The strongest hydrogen-bond?, 225
- Acacipetalin** and proacacipetalin, 952
- Acanthamolide**, a melampolide amide from *Acanthospermum glabratum* (compositae), 376
- Acenaphthylene**, photochemical dimerization of: reactions using micellar systems, 887
- Acetals**, having a dissociable  $\alpha$ -proton, alkali-catalysed alkoxy exchange, alcohol elimination and hydrolysis of, 333
- Acetamides**, *NN*-diethyl- and *NN*-dipropyl-; *NN*-dimethylpropanamide, tetramethylurea and tetraethylurea; solvents for alkali metals, 188
- Acetoacetates**, 4-substituted, method for synthesis, 932
- Acetone**, enzymically generated triplet, 442
- [<sup>14</sup>C]**Acetylene**, and [<sup>14</sup>C]ethylene, adsorption of, on supported metal catalysts: relevance to the selective hydrogenation of acetylene, 323
- Acetylene** complexes, bridging, of nickel and platinum; *X*-ray crystal structure of [Pt<sub>3</sub>(EtP)<sub>4</sub>(PhC<sub>2</sub>Ph)<sub>2</sub>], 930  
reduction with cobalt(II)-thiol complex catalysts, donor and ligand effects on, 795
- Acetylenes**, insertion of, into carbon-titanium  $\sigma$ -bonds, 397
- $\alpha\beta$ -**Acetylenic**  $\alpha'$ -hydroxy quaternary ammonium salts, chemical behaviour of, in basic media, 679
- Acid chlorides**, aromatic, convenient synthesis of. The reaction of benzylidene chlorides with hexamethyldisiloxane, 808
- Acridinium** ion, *N*-methyl-, influence of Mg<sup>2+</sup> ion on the reduction of, with 1,4-dihydropyridinamide, 848
- Acrylate**, methyl 2-naphthyl-, solvent polarity effect on *trans-cis* photoisomerization and fluorescence of, 506
- Acrylic esters**,  $\gamma$ -phenylthio, and butenolides, new synthesis of, 465
- Acrylonitriles**,  $\alpha$ -t-butoxy- or  $\alpha$ -acetoxy-, ferric chloride-catalysed conversion of, into imides, 298
- Acyl** and enolato-ligands, interconversion and degradation of, in trisium clusters, 472  
radicals, *ipso* substitution in the reaction of, with 2-substituted benzothiazoles, 317
- Acylation**, new applications to reductive nucleophilic: organosilicon chemistry, 513  
of 2',3',5'-tri-*O*-acetylguanosine, 791
- $\beta$ -**Acylcarbanion**, new equivalent based on allyltrimethylsilane chemistry, 772
- Adamantane**. *X*-ray structure of the 1,2-dioxetan dispiro-(adamantane-2,3'-[1,2]dioxetan-4',2''-adamantane), 591
- Adamantanol**, 3-homo-; convenient synthesis of 4-homoprotadamantan-4-one (tricyclo[5.3.1.0<sup>9,9</sup>]undecan-4-one) from; hypiodite thermolysis-cyclization reaction, 478
- Adamantan-4-one**, 4-homoprot-, (tricyclo[5.3.1.0<sup>9,9</sup>]undecan-4-one), convenient synthesis of, from 3-homoadamantanol. Hypiodite thermolysis-cyclization reaction, 478
- 1-Adamantyl** radical, homolytic aromatic *ipso* substitutions in benzothiazoles by the nucleophilic, 316
- Adenine** analogue of the nucleoside skeleton of the polyoxins: transnucleosidation, 159  
and imidazole nucleosides, synthesis of some D-mannofuranosyl and D-lyxofuranosyl, and anomalous <sup>1</sup>H nuclear magnetic resonance spectra of related anomers, 753
- Adenosine-5'-monophosphate**-chloroterpyridineplatinum(II), *X*-ray crystal structure of a 2:2 intercalation complex, 824
- Adenosine**, 8,2'-*O*-cyclo, reaction of, with hydrazine and amines. Convenient preparations of 9- $\beta$ -D-arabinofuranosyladenine and its derivatives, 414
- Adipic acid**, 3-oxo-, an intramolecular, 1,3-suprafacial hydrogen shift in the enzymic conversion of 3-carboxymuconolactone into, 459
- Ajmalicine**. Cathenamine, a central intermediate in the cell free biosynthesis of ajmalicine and related indole alkaloids, 164
- Albena**, the putative structure of; *X*-ray structure of an analogue, 269
- Alcohol**, allylic; novel preparation of a  $\beta\alpha$ -unsaturated methyl ester from, 594
- Alcohols**, dehydrogenation of, by pyrimido[4,5-*b*]quinoline-2(3*H*),4(10*H*)-dione (5-deazaflavin), 825  
optically active; asymmetric synthesis at nitrogen by oxidation of imines with *m*-chloroperoxybenzoic acid in the presence of, 731  
racemic, asymmetric synthesis of amines from chiral nitriles and, 86  
secondary, homogeneous catalytic oxidation of, to ketones by molecular oxygen under mild conditions, 157
- Aldehydes** and alkyl iodides, new synthesis of  $\alpha$ -diketones from, using pentacarbonyliron, 691  
and ketones, conversion into nitriles containing an additional carbon atom, 280
- Alkali-metal** ion acceleration of the electron-transfer reaction between *N*-propyl-1,4-dihydropyridinamide and ferricyanide ion, 784
- Alkali metals**, solvents for: *NN*-diethylacetamide, *NN*-dipropylacetamide, *NN*-dimethylpropanamide, tetramethylurea, and tetraethylurea, 188
- Alkaline earth** metal complexes of furanyl-containing Schiff base macrocycles; *X*-ray crystal and molecular structure of the strontium complex, 623
- Alkaloid**, a novel bis-indole. *X*-ray crystal structure determination of borreverine and its rearrangement product on diacetylation, 261  
Biosynthesis of isococculidine, 211  
Photochemical approach to the rhoeadine alkaloid skeleton: synthesis of ( $\pm$ )-*cis*-alpinigenine, 419
- Alkaloids**. Alternative synthesis of ( $\pm$ )-eburunamenine *via* cleavage of a cyclic dithioacetal of an  $\alpha$ -oxo-thione, 68  
a novel class of, from *Melochia tomentosa*: phenylpentylisatins, 535  
*cis*-3a-(3,4-dimethoxyphenyl) octahydroindole, skeleton as a precursor to the; late stages in the biosynthesis of mesembrine, 60  
indole; cathenamine, a central intermediate in the cell free biosynthesis of ajmalicine and related, 164  
monoterpenoid indole; strictosidine (isovincoside), the key intermediate in the biosynthesis of, 646  
new biogenetic-type approach to *Cephalotaxus*, 847  
'one-pot' biomimetic synthesis of 19 $\beta$ -heteroyohimbine, 636  
phenanthroindolizidine, biosynthesis from 6,7-diphenylhexahydroindolizidines, 953  
Regiospecific cyclisation of 1,2,3,4-tetrahydro-1-methylene-2-nicotinoyl- $\beta$ -carbolines: a synthesis of nauclefine, 319  
secodine-type; novel access to 2-substituted indoles and a convenient synthesis of, 742
- Alkanes**, 1,*k* + 2-diazabicyclo[*k.l.m*]-, syntheses of medium ring, by reductive cleavage of hydrazinium dications, 747  
mechanism of the 1,2-bond shift rearrangement of. Gas-phase reactions on platinum, 95  
nitro-, nucleophilic displacement of the nitro-group from, 597  
radical-initiated reduction of chloroformates to, by tri-n-propylsilane: removal of unwanted hydroxy groups from organic molecules, 344
- Alkenes**, evidence for the formation of tertiary carbonium ions from, on alumina at *ca.* 300 K, 894  
interactions of, with hydridotriphenylphosphine complexes of ruthenium, 59  
selectivities in Brønsted acid-catalysed reactions of, on Ga<sub>2</sub>O<sub>3</sub>, 896
- Alkenyl** halides, highly general, stereo-, regio-, and chemo-selective synthesis of terminal and internal conjugated enynes by the Pd-catalysed reaction of alkynylzinc reagents with, 683

- Alkoxy** cations,  $\text{CH}_3\text{O}^+$  and  $\text{C}_2\text{H}_5\text{O}^+$ ; high barriers to isomerisation and low barriers to symmetry-allowed 1,1-elimination, 378
- Alkyl iodides**, and aldehydes, new synthesis of  $\alpha$ -diketones from, using pentacarbonyliron, 691
- Alkyl species**, direct evidence for the intermediacy of adsorbed, in the isomerization of neopentane on platinum, 563
- Alkylammonium** cations, stereoselectivity in complexation of primary, by the diastereotopic faces of chiral asymmetric crowns, 481
- Alkylation**, mono-*C*-, of  $\beta$ -dicarbonyl compounds using tetraethylammonium fluoride, 64
- Alkylmagnesium** hydrides, preparation and characterisation of, 169
- Alkyne**. *X*-Ray crystal and molecular structure of  $[\text{Et}_2\text{NCFe}(\text{CO})_2]_2$ : an example of the division of an alkyne into two separate units by rupture of the  $\text{C}\equiv\text{C}$  bond, 30
- Alk-1-yne**s,  $\omega$ -(9-borabicyclo[3.3.1]nonan-9-yl)-; novel synthesis of an  $\omega$ -alkynylorganometallic reagent *via* triple bond isomerization with potassium 3-aminopropylamide, 318
- $\sigma$ -**Alkynyl** complexes of transition metals, novel preparation of, by copper(I) iodide-catalysed dehydrohalogenation, 291
- Alkynylzinc** reagents, highly general stereo-, regio-, and chemo-selective synthesis of terminal and internal conjugated enynes by the Pd-catalysed reaction of, with alkenyl halides, 683
- Allene**, 1,3-diethoxycarbonyl-: an active dienophile and ethoxycarbonylketen equivalent in the synthesis of antibiotic *C*-nucleosides, 582
- Alliacolide**, a new bicyclic sesquiterpene epoxy-lactone with a novel carbon skeleton from cultures of the fungus *Marasmius alliaceus* (Jacques ex Fr.)Fr; *X*-ray structure, 727
- Allyl but-3-enoate**, transition metal-catalysed rearrangement of, to hepta-2,6-dienoic or hepta-3,6-dienoic acids, 793
- Allylic** Grignard reagents; evidence for [2 + 2] and [4 + 2] cycloadditions of, to benzyne, 454
- $\pi$ -**Allyl**-palladium chloride complexes from calciferol and related compounds, 799
- Allyltrimethylsilane** chemistry, new  $\beta$ -acylcarbanion equivalent based on, 772.
- ( $\pm$ )-**cis-Alpinigenine**, synthesis of: photochemical approach to the rhodeadine alkaloid skeleton, 419
- Alumina**, evidence for the formation of tertiary carbonium ions from alkenes on, at *ca.* 300 K, 894
- supported platinum-rhenium catalysts, hydrogen spillover on, 631
- Aluminium**. Direct evidence for a rate-determining chelate ring closure mechanism during the reaction of 2,2'-bipyridine with the hexakis(dimethyl sulphoxide)aluminium(III) ion in nitromethane solution, 586
- Effect of temperature of reduction on the activity and selectivity of a coprecipitated Ni- $\text{Al}_2\text{O}_3$  catalyst for the Fischer-Tropsch and methanation reactions, 734
- silicate polymer, a tubular: synthesis of imogolite, 462
- Amicetoside**, methyl, simple synthesis: photochemical preparations of deoxy-sugars from carbohydrate esters, 927
- Amide** hydrolysis, catalysis of, due to micelles containing imidazole and hydroxy functional groups, 401
- Amides**, bidentate; complexes of uranium(III) with, 507
- effect of lithium ion on the torsional barrier in, 350
- first evidence for hydration of. Hydration of *N*-trifluoroacetylpyrrole, 857
- Amidines**, kinetics and isotope effects in the reaction of 4-nitrophenylnitromethane with, in toluene, 695
- Amine** radical cation, the first long-lived saturated; 9-butylazabicyclo[3.3.1]nonane radical cation, 490
- secondary, open-chain, (*R*)-3,3-dimethyl-2-methylaminobutane; circular dichroism of the nitrogen chromophore in the, 786
- Amines**, and chloroform, hydrogen exchange between, catalysed by palladium(II) amine complexes containing a  $\beta$ -diketonate anion in the outer sphere, 914
- and hydrazine, reaction of 8,2'-*O*-cycloadenosine with. Convenient preparations of 9- $\beta$ -*D*-arabinofuranosyladenine and its derivatives, 414
- asymmetric synthesis of, from chiral nitriles and racemic alcohols, 86
- conversion of, into esters: pyridines as leaving groups in synthetic transformations, 701
- NN*-dichloroalkyl-, pyrolytic eliminations with, 418
- Amines**—*continued*
- secondary; nucleophilic substitution of 1-chloro-3,5-diphenyl-1*H*,3*H*,5*H*-1,3,5,2,4,6-trithiatriazene 1,3,5-trioxide (diphenylsulphanuric chloride) by, 195
- some, and ammonia, binding of, to crown esters bearing an intra-annular phenolic group, 438
- synthesis of optically active.  $\beta$ -Asymmetric induction in the reduction of *N*-alkylidenesulphinamides, 723
- Amino-acid**, benzyloxycarbonyl-; an oxazol-5(4*H*)-one derived from a, 281
- sequence, entire, of duck glucagon, synthesis of the nonacosapeptide corresponding to, 909
- $\alpha$ -**Amino-acids**, *N*-acyl, oxidative dehydrodimerization of; synthesis of novel di- $\alpha\alpha'$ -amino-acid derivatives, 238
- aliphatic, photomethylation of inorganic mercury by, 158
- effect of cathodic potential on the electrochemical synthesis of optically active, 250
- $\alpha$ - and  $\beta$ -, novel mixed tris-complexes of cobalt(III) with: isolation, adsorption chromatography and absorption spectra, 676
- phenolic, novel reaction of cysteine with, in hydrobromic acid: reversible formation of 3-cystein-S-yltyrosine and cystein-S-ylidopas, 251
- Aminophosphine**  $\text{H}_2\text{P-NH}_2$ , pseudopotential calculations on, 615
- Aminophosphines**, the N-H link as a 'probe' for the electronic structure of the phosphorus-nitrogen bond in. An infrared spectroscopic study, 614
- Ammonia** and some amines, binding of, to crown ethers bearing an intra-annular phenolic group, 438
- Ammonio-amidates**, allyl- and pentadienyl-, the thermal rearrangement of. Evidence for competing but distinct concerted and radical mechanisms, 97
- Ammonium** groups, stereo-ordered macromolecular matrices bearing, as catalysts in alkylation and carbenation reactions, 231
- salts,  $\alpha\beta$ -acetylenic  $\alpha'$ -hydroxy quaternary-, chemical behaviour of, in basic media, 678
- salts, hexa-, hepta-, and octa-methylene-, *X*-ray crystal and molecular structure, model compounds for simple saturated 7-9-membered rings, 939
- tetraethyl-, or Methylene Blue as cations; heteronuclear *versus* homonuclear electron transfer mechanisms in the conductivity of solid dithiolate mixtures with, 455
- Anabily sine**, a 3-(2-piperidyl)pyridinium derivative, identification of, as a cross-linking entity in a glutaraldehyde-treated protein, 759
- Aniline**, deuterium isotope effect and base catalysis in  $\sigma$ -complex formation between 1,3,5-trinitrobenzene and, 55
- Anilines**, conversion of, into *N*-methyl-2-quinolones *via* [2,3]-sigmatropic rearrangements, 694
- Anion exchange resins**, borohydride reducing agents derived from. Chemical modification of polymers, 815
- Anion** solvation in protic solvents, 174
- Anionic** intermediate, evidence for, in the mechanistic pathway of the oxidative addition reaction of  $[(\text{cyclo-octadiene})\text{IrCl}(\text{PEtPh}_2)]$  with hydrochloric acid, 845
- Annulenes**, macrocyclic, correlation between resonance energies per  $\pi$  electron and Sondheimer's rates of formation of, 243
- Anthelmicycin**, structural identity of, with hikizimycin, 41
- Anthracene**, 1,4,5,8,9-pentamethyl-, reactions of: double *peri*-interactions, 409
- Anthracenes**, 9-alkylidene-9,10-dihydro-, methyl substituted; stable hydrocarbon analogues of 9-anthrone, 78
- Anthraquinone**, 1,4-diamino-, diboroacetate and quinizarin boroacetate as dienophiles, 745
- 9-Anthroates**, 1-phenylpropyl and 1-phenylbutyl, enantiomeric, as novel chiral inclusion complexing agents. Preparation and *X*-ray analysis of the 6:1 inclusion complexes with *n*-hexane, 928
- 9-Anthrone**, stable hydrocarbon analogues of: methyl substituted 9-alkylidene-9,10-dihydroanthracenes, 78
- Antibiotic**, a new polyether, *X*-ray crystal structure of the thallium salt of carriomycin, 590
- ionophore X-537A; fluorimetric determination of complexation constants for the, with biogenic amines, 268
- C*-nucleosides, an active dienophile and ethoxycarbonylketen equivalent in the synthesis of; 1,3-diethoxycarbonyllallene, 582

- Antibiotic**—*continued*  
 $\beta$ -lactam, fused, new, isolated from *Streptomyces olivaceus*, structure elucidation of MM 17880; a mild  $\beta$ -lactam degradation reaction, 952  
 synthesis of a congener of the cyclohexadepsipeptide, monamycin, 635  
 synthesis of the, anticapsin, 849  
 total structure of the polythiazole-containing, micrococcin P. A  $^{13}\text{C}$  nuclear magnetic resonance study, 706
- Antibiotics**, heptaene macrolide, 67-121-A and 67-121-C, structural elucidation of, 710  
 Structural identity of anthelmicycin with hikizimycin, 41  
 Structures of olivanic acid derivatives MM 4550 and MM 13902; two new, fused  $\beta$ -lactams isolated from *Streptomyces olivaceus*, 523  
 Total synthesis of rhodomycin aglycones, 140
- Anticapsin**, synthesis of the antibiotic, 849
- Antimony**. A new cationic S-N ring system,  $\text{S}_4\text{N}_4^{2+}$ . The crystal structure of cyclotetrathiazyl bis(hexachloroantimonate(v)),  $[\text{S}_4\text{N}_4][\text{SbCl}_6]_2$ , and cyclotetrathiazyl hexafluoroantimonate(v) tetradecafluorotriantimonate,  $[\text{S}_4\text{N}_4][\text{SbF}_6][\text{Sb}_3\text{F}_{14}]$ , 253  
 Trifluoroacetate as a bridging ligand for antimony(v): X-ray molecular structure of  $\mu$ -oxo- $\mu$ -bis(trifluoroacetato)bis(trifluoroantimony(v)), 584
- Antitumour** agents, plant: isolation and structure of samaderine A (X-ray analysis) and a new antileukaemic quassinoid samaderine E from *Samadera indica*, 295
- 9- $\beta$ -D-Arabinofuranosyladenine** and its derivatives, convenient preparations of. Reaction of 8,2'-O-cycloadenosine with hydrazine and amines, 414
- Arenediazonium** fluoroborates, reduction of, to arylhydrazines by benzeneselenol, 131
- Arenes**, stereoselective homogeneous hydrogenation of, to cyclohexanes catalysed by  $[\text{Rh}(\eta^5\text{-C}_5\text{Me}_5)_2\text{Cl}_2]$ , 427
- Argon-ion** beam sputtering, concentration profiles in the surface layer on glass electrodes by, 792
- Aromatic acids**, dihydro-, anodic decarboxylation of, 82  
 compounds-1,2,4,5-tetracyanobenzene-methanol systems, photo-induced 1:1 reactions of, 667
- Arsenic**. Synthesis and  $^{17}\text{O}$  nuclear magnetic resonance spectroscopic structure determination of  $[(\text{PhAs})_4\text{Mo}_6\text{O}_{18}]^{4-}$ , 201  
 Very high electrical conductivity in  $\text{AsF}_6$ -graphite intercalation compounds, 389
- Aryl** compounds, nitrogen-, oxygen-, fluorine-, silicon-, sulphur-, and tin-substituted, easy perchlorination, 915  
 radical formation during the thermal decomposition of aryl-diazo alkyl ethers, 769
- Aryldiazo** alkyl ethers, aryl radical formation during the thermal decomposition of, 769
- Arynes**, polyhalogeno-, addition of  $\text{Li}^{90\text{m}}$  Br to, 933
- Ascorbic acid**, ready reduction of some nitroxide free radicals with, 345
- L-Ascorbic acid** (vitamin C), a new route to, 332
- L-Asparagine** and L-histidine, synthesis of a ternary copper(II) complex containing, and optical resolution of DL-histidine via complex formation, 718
- 2-Azabicyclo[2.2.0]hexa-2,5-diene** derivatives, stable, 154
- Azabicyclo[3.3.1]nonane**, 9-butyl-, radical cation, the first long-lived saturated amine radical cation, 490
- $\Delta^2$ -Azetines, simple N-substituted; their preparation and reactivity, 806
- Azide**. Photoanation reactions of hexa(dimethyl sulphoxide)-chromium(III) ion by azide and thiocyanate: evidence for associative reaction, 138
- Azides**, organic, electron spin resonance study of iminyl and triazanyl radicals derived from, 320
- Aziridines**, di- and tri-substituted N-phenyl, extension of the Darzens condensation to the synthesis of, 602  
 formation of, in the oxidation of  $\beta$ -aminoallylpalladium complexes by bromine. Aziridination of olefins, 413
- Aziridinium** ions, effect of acid concentration on the hydrolysis of, 672
- Azirine**, bis-2H-, photocycloaddition reactions of a, 551
- Azirines**, 2,2-diphenyl-2H-, palladium(II)-catalysed formation of indoles from 664
- Azo**-compounds, photochemistry of cyclic: preparation of highly strained spiro-compounds, 843
- Bacteria**, extreme thermoacidophile, lipid structures in the Caldariella group of, 514
- Baeyer-Villiger** reaction, a new reagent for the: conversion of ketones into lactones with benzeneseleninic acid and hydrogen peroxide (benzeneperoxseleninic acid), 870
- Barium**. Crystal structure of a complex showing simultaneous water-barium ion co-ordination to 6,7,9,10,12,13,20,21,23,24,26,27-dodecahydrodibenzo[*b,n*][1,4,7,10,13,16,19,22]octa-oxacyclotetracosin (dibenzo-24-crown-8), 804
- (+)-**Bazzanene**, revised structure and absolute configuration of the sesquiterpene, 566  
 X-ray crystal and molecular structure of the *p*-bromobenzoate derivative of the sesquiterpene ( $\pm$ )-cyclobazzanene obtained in the formic acid-catalysed reaction of, 568
- Benzaldehyde**. Tritium-exchange between the aldehyde group and sodium borohydride during the reduction of benzaldehyde in dimethyl sulphoxide solution, 182
- Benzene**, and naphthalene; five-to-nine-bond  $^{31}\text{P}$ - $^{31}\text{P}$  coupling constants in derivatives of, 375  
*t*-butyl-, photochemical 1,3-addition of methanol to, 780  
 hexafluoro-, stereochemistry of 2 + 2 photoaddition of cyclopentene to, 365  
 hexakis(bromomethyl)-, X-ray crystal structure of the novel bis-quaternary dispiro system obtained from the reaction of morpholine with, 525  
 Synthesis of optically active  $\eta^6$ -benzene-ruthenium complexes, 488  
 1,3,5-trinitro, deuterium isotope effect and base catalysis in  $\sigma$ -complex formation with aniline, 55
- Benzenes**, monosubstituted, solvent effects in 1,3-photocycloaddition of vinyl ethers to, 242  
 trichloroethyl-, synthesis of: homolytic displacement at saturated carbon, 653
- Benzeneseleninic anhydride**, regeneration of ketones from hydrazones, oximes, and semicarbazones by, 445  
 removal of 1,3-dithiolan protecting groups by, 751
- Benzeneselenenyl** chloride, use of: new route to bicyclic lactones 484
- Benzeneselenol**, reduction of arenediazonium fluoroborates to arylhydrazines by, 131
- Benzoic acid**, conversion of 2-nitrobenzotrile into, 152
- Benzonitrile**, 2-nitro-, conversion of, into benzoic acid, 152
- Benzenophenones**, 2-azidosulphonyl-, decomposition of. Unusual rearrangement products, 18
- Benzothiazine**, 2,2'-(ethane-1,2-diylidene)bis-1,4-, dye, formation of a: unusual reaction of a substituted benzothiazoline with sulphuryl chloride, 863  
 1,4-, trimeric aldolization product of, 50
- Benzothiazoles**, homolytic aromatic *ipso* substitutions in, by the nucleophilic 1-adamantyl radical, 316  
 2-substituted, *ipso* substitution in the reaction of acyl radicals with, 317
- Benzothiazoline**, unusual reaction of a substituted, with sulphuryl chloride: formation of a 2,2'-(ethane-1,2-diylidene)bis-1,4-benzothiazine dye, 863
- Benzothiet**, synthesis of, from benzo[*b*]thiophen 1,1-dioxide, 130
- Benzo[*b*]thiophen 1,1-dioxide**, synthesis of benzothiet from, 130
- N-Benzoylaminoacetaldehyde**-papain complex, an investigation of the; detection of enzyme-bound intermediates by cross-saturation in nuclear magnetic resonance spectroscopy, 451
- Benzoxazepine**-5-carboxylate, 2-phenyl-3,1-, photochemical and thermal addition of methanol to; reverse stereoselectivities in the two reactions, 899
- Benzoyldiazenido**-bridged complex of molybdenum, novel asymmetric. X-ray crystal structure of  $[\text{Mo}_2\text{O}(\text{PhCON}_2)_2(\text{S}_2\text{CNEt}_2)_2]$ , 70
- $[\alpha\text{-}^2\text{H}]$ **Benzyl alcohol**, Raman optical activity due to isotopic substitution, 305
- Benzyl** halides and acetate, photolysis of, in alcohols, 108
- Benzylamine**, X-ray structure of 4-acetyl-5-methyl-2-phenylimidazole formed from 3-hydroxyiminopentane-2,4-dione and, 443
- Benzylideneammonium benzylide**, 3-cyano-3-methoxycarbonyl-2,4,4,5-tetraphenylpyrrolidine as a precursor of, 768
- Benzylidyne** chlorides, the reaction of with hexamethyldisiloxane. Convenient synthesis of aromatic acid chlorides, 808
- Benzynes**, evidence for [2 + 2] and [4 + 2] cycloadditions of allylic Grignard reagents to, 454

- Beryllium.** Gas-phase nuclear magnetic resonance spectroscopic study of the molecular structure of beryllium borohydride,  $\text{Be}(\text{BH}_4)_2$ , 224
- (±)-trans-Bicyclo[10.8.0]deca-1(12)-ene**, preparation of, *trans* Doubly-bridged ethylene, 346
- Bikaverin**, total synthesis of, involving the novel rearrangement of an *ortho*-quinone to a *para*-quinone, 645
- Bilane.** Biosynthesis of the natural (type-III) porphyrins: proof that rearrangement occurs after head-to-tail bilane formation, 113
- Billindione.** Electrophilic substitution in verdins: deuteration and nitration of 2,3,7,8,12,13,17,18-octaethylbilin-1,19(21*H*, 24*H*)-dione (octaethylbilatriene-*abc*): X-ray crystal structure of the 5-nitro derivative, 829
- Biosynthesis**, polyketide, deuterium as a tracer in: a new method for the detection of chain starter units, 921
- Bipyridyl.** Photochemistry of a surfactant derivative of tris-(2,2'-bipyridyl)ruthenium(II), 777  
Photosensitization of superoxo-bridged dicobalt(III) cations by tris-(2,2'-bipyridyl)ruthenium(II) in the excited state, 774  
-ruthenium systems, novel species in, 776
- Bis(dicyanoethylenedithiolato)** complex monoanions, new high-conductivity salts of, 417
- Blood-group substances**, one of the core oligosaccharides of human; synthesis of a branched pentasaccharide, 449
- Bond dissociation energy**  $D(\text{Me}_3\text{Ge}-\text{H})$ , kinetic determination of the, and its implications for bond strengths in germanes, 446
- Borane.** Isomeric *hypho* borane structures  $\text{B}_3\text{H}_6\cdot\text{L}$  [ $\text{L} = (\text{Ph}_2\text{P})_2\text{CH}_2$ ,  $(\text{Ph}_2\text{PCH}_2)_2$ , or  $(\text{Me}_2\text{NCH}_2)_2$ ]; X-ray crystal and molecular structures, 368  
metallo-, clusters, metal atom synthesis of, 45  
Preparation and X-ray crystal structures of 5,10-dibromonido-decaborane(14), 121  
skeletons, an analogy of the mesomeric effect with: background of the nuclear magnetic resonance antipodal shift induced by substituents, 561
- Boranes**, alkenyl-, stereoselective synthesis of *E*-olefins by the reaction of, with palladium acetate, 852  
metallacarba-, progressive cage-opening in  $d^6$ ,  $d^8$ ,  $d^{10}$ , and  $d^{10} s^2$ ; crystal and molecular structures of 3-triphenylphosphino-3-mercuro-1,2-dicarbododecaborane and triphenylmethylphosphonium 3-thalla-1,2-dicarbododecaborate, 737  
trialkyl-, photochemical reaction of, in alcohols. Convenient synthesis of 2-alkyl-1,3,2-dioxaborolanes, 690
- Borate**, a single M-H bridged tetrahydro-,  $[(\text{MePh}_2\text{P})_3\text{CuBH}_4]$ , 137  
tetrahydro-, group, X-ray crystallographic characterization of the single hydrogen bridge attachment of the, in tris(methyl-diphenylphosphine)tetrahydroborate copper, 593  
tetraphenyl-. Conversion of bonded cyclo-octadiene into a cyclo-octadienyl ligand and cleavage of boron-phenyl bonds of arene-bonded tetraphenylborate anions in ruthenium(II) systems: X-ray crystal and molecular structures of  $[\text{Ru}(\eta^6\text{-C}_6\text{H}_6\text{BL}_2)(1-3,5,6-\eta\text{-C}_8\text{H}_{11})]$  ( $\text{L} = \text{Ph}$  or  $\text{F}$ ), 937
- Borates**, lithium trialkylalkynyl-, Michael reactions, 913
- (-)-Bornyl acetate**, chemical and microbiological remote oxidation of, 358
- Boroacetates.** Quinizarin boroacetate and 1,4-diaminoanthraquinone diboroacetate as dienophiles, 745
- Borohydride.** Gas-phase nuclear magnetic resonance spectroscopic study of the molecular structure of beryllium borohydride,  $\text{Be}(\text{BH}_4)_2$ , 224  
reducing agents derived from anion exchange resins. Chemical modification of polymers, 815
- Borolanes**, 2-alkyl-1,3,2-dioxo-, convenient synthesis of. Photochemical reaction of trialkylboranes in alcohols, 690
- Borreverine**, X-ray crystal structure of and its rearrangement product on diacetylation. A novel bis-indole alkaloid, 261
- Bromine**, formation of aziridines in the oxidation of  $\beta$ -amino-alkylpalladium complexes by. Aziridination of olefins, 413  
Modification of the electronic properties of  $(\text{SN})_x$  by halogens; properties of  $(\text{SNBr}_{0.4})_x$ , 407
- Brönsted acid-catalysed reactions** of alkenes on  $\text{Ga}_2\text{O}_3$ , selectivities in, 896
- Bruceoside-A**, a novel antileukaemic quassinoid glycoside from *Brucea javanica*, 69
- Butadiene**, cyclo-, -palladium chloride complexes, mechanism of the formation of: the X-ray structures of  $[\text{Pd}(\text{bipy})\{\text{C}_4\text{Me}_2\text{CMe}=\text{CMe}\}\text{Cl}]$  and  $[\text{Pd}_2\text{Cl}_2(\eta^4\text{-C}_4\text{Bu}_2\text{Me}_2)_2]$   $[\text{Pd}_2\text{Cl}_6]$ , 289
- Buta-1,3-diene** and ethane, novel conversion of ethylene into, catalysed by titanium metallocenes, 560
- Buta-1,3-dienes**, 1-(alkyl- or phenylthio)-4-(methylthio)-, novel cyclisation of, to thiophen derivatives, 801
- Butanoic acid**, 2-oxo-, stereochemistry of the conversions *in vivo* of L- and D-threonine into, by the L- and D-threonine dehydratases of *Serratia marcescens*, 839
- cis-But-2-ene**, isomerization of, induced by adsorbed nitrogen dioxide, 830
- Butenes**, evidence for a selective *cis-trans*-isomerization of, over alumina with allylic C-H bond-breaking, 227  
mechanism of the isomerization of, on titanium dioxide, 883
- Butenoic acid**, diketene as a synthon, in regioselective olefin syntheses, 500
- Butenolides** and  $\gamma$ -phenylthio acrylic esters, new synthesis of, 465
- t-Butoxide**, potassium, dehalogenations of bicyclic dihalides, 661
- t-Butoxycarbonylamino** groups, a modified Gabriel reagent for the introduction of: t-butyl methyl iminodicarboxylate potassium salt, 758
- 9-Butylazabicyclo[3.3.1]nonane** radical cation, the first long-lived saturated amine radical cation, 490
- But-2-yne**, hexafluoro-, reaction of with halogenodicarbonyl-( $\eta^7$ -cycloheptatrienyl)molybdenum complexes; crystal and molecular structure of  $[\text{Mo}_2(\mu\text{-Cl})_2(\eta^7\text{-C}_7\text{H}_7)_2]^+$   $[\text{MoCl}(\text{CF}_3\text{C}_2\text{CF}_3)]^-$ , 245
- $\text{C}_{12}\text{H}_{15}^+$  systems.** Analysis of the thermodynamic and kinetic factors which control entry into, and Wagner-Meerwein rearrangement within, 941
- Cadmium.** Crystal structures of four complexes of quinquevalent macrocyclic ligands with novel co-ordination geometries containing five co-ordinate silver(I), six co-ordinate cadmium(II), six co-ordinate mercury(II) and seven co-ordinate cadmium(II), 167
- Caesium.** Polarised specular reflectance of the new one-dimensional 'metals'  $\text{K}_{1.75}[\text{Pt}(\text{CN})_4]\cdot 1.5\text{H}_2\text{O}$ ,  $\text{Rb}_{1.75}[\text{Pt}(\text{CN})_4]\cdot 1.5\text{H}_2\text{O}$ , and  $\text{Cs}_{1.75}[\text{Pt}(\text{CN})_4]\cdot 1.5\text{H}_2\text{O}$ , 186
- Cage ketones**, thermal reactions of, possessing an oxygen-containing bridge or a hydroxy-substituent, 532
- Calciferol**, palladium chloride- $\pi$ -allyl complexes from, and related compounds, 799
- Caldariella** group of extreme thermoacidophile bacteria, lipid structures in the, 514
- Carbanion**-induced type of ene reaction, novel, 838
- Carbazoles**, 1,2,3,4-tetrafluoro-, new synthesis of, from enamines, 341
- Carbene** complex  $[(\text{TPP})\text{Fe}^{\text{II}}(\text{CCl}_2)]$ , evidence for the formation of the: reaction of carbon tetrachloride with 5,10,15,20-tetraphenylporphyrinatoiron(II)  $[(\text{TPP})\text{Fe}^{\text{II}}]$ , 648  
complex, synthesis and X-ray structure of an unusual iridium ylide or, 589  
phenyl-, automerization in vinylidenecyclopentadiene and, 210  
-metal complexes, stable paramagnetic; syntheses and properties of low spin  $d^7$  (1,3-dimethylimidazolidin-2-ylidene)iron(I) tetrafluoroborates, 411
- Carbenoid** insertion reactions, thermal, of isocyanides, 855
- Carbocations**, noble metal catalysed hydrogenation of: a key step in the rapid hydrogenation of aromatic hydrocarbons with  $\text{HF}^-$ ,  $\text{HF}^-\text{TaF}_5^-$ , and  $\text{HF}^-\text{BF}_3^-$ -noble metal catalysts, 575  
1-propyl and 2-norbornyl, relative energies of the ground and core hole states of the, 276
- Carbohydrate** esters, photochemical preparations of deoxy-sugars from: simple synthesis of methyl amicitoside, 927
- Carbohydrates**, easy identification of hydroxy-bearing carbon atoms in  $^{13}\text{C}$  nuclear magnetic resonance spectroscopy: a new method for signal assignment in, 509
- Carbolines**, 1,2,3,4-tetrahydro-1-methylene-2-nicotinoyl- $\beta$ -, regioselective cyclisation of; a synthesis of nauclefine, 319
- Carbon.** Insertion of acetylenes into carbon-titanium  $\sigma$ -bonds, 397
- Carbon-13** chemical shifts in *N*-phenacylpyridinium bromides, linear free energy relationships for, 119
- Carbon dioxide**, formation of copper(I) isocyanate complexes by the reaction of, and copper(I) bis(trimethylsilyl)amide complexes, 468
- Carbon monosulphide**, hydrogen reduction of co-ordinated, in  $[\text{IrH}(\text{CS})(\text{PPh}_3)_2]$  to the methanethiolato-ligand and an iridium thioformyl compound  $[\text{Ir}(\text{CHS})\text{Cl}_2(\text{CO})(\text{PPh}_3)_2]$ , 781

- Carbon monoxide**, adsorption of, on copper(100) at 295 K, characterized by photoelectron spectroscopy, 377  
 mechanism of formation of surface isocyanate during the  $\text{SnO}_2$ -0.55 CuO-catalysed oxidation of, by nitric oxide, 398  
 oscillations of the platinum-catalysed oxidation of, induced by inhibitors, 882  
 Raman spectrum of, on a platinum electrode surface, 235  
 stereospecific exchange of, in clusters of the type  $[\text{Os}_3(\text{CO})_{10}\text{X}_2]$ , 329  
 the 3-chloro(methyl)-cyclopentyl cation and its reaction with. The ionization mechanism of *trans*-1,2-dichlorocyclohexane in super acid ( $\text{FSO}_3\text{H-SbF}_5$ ), 394
- Carbon tetrachloride**, addition of, to carbon-carbon double bonds: intermediate complex in the reduction of trimethylamine oxide by pentacarbonyl iron, its use as catalyst in the, 705
- Carbonyl ion**, *X*-ray structure of the non-classically bonded,  $[\{\eta^5\text{-C}_5\text{H}_5\}\text{Fe}(\text{CO})_2(\text{C}_2\text{H}_5)]^+$ , 656  
 ions, evidence for C-C  $\sigma$ -delocalisation in simple secondary; secondary  $\rightarrow$  primary rearrangements, 668  
 ions tertiary, evidence for the formation of, from alkenes on alumina at *ca.* 300 K, 894
- Carbonyl complexes**, iron; formation of lactones from dienes *via*, 581  
 $\beta$ -di-, compounds, mono-C-alkylation of, using tetraethylammonium fluoride, 64  
 Novel bimetallic products from octacarbonyldicobalt and methylaminobis(difluorophosphine); *X*-ray crystal structures of  $[\{\text{MeN}(\text{PF}_2)_2\}_2\text{Co}_2(\text{PF}_2\text{NHMe})_2]$  and  $[\{\text{MeN}(\text{PF}_2)_2\}_3\text{Co}_2(\text{CO})_2]$ , 531  
 Tetracarbonyliron(0); magnetic circular dichroism evidence for the paramagnetism of: low-temperature matrix studies, 841
- Carbonyls**. Application of iron carbonyls to organic synthesis. Mediation of nucleophilic addition to alkenes *via* tetracarbonyliron complexes, 20  
 cobalt, halide ion-induced disproportionation of; formation of  $[\text{Co}(\text{CO})_4]^-$  and subsequent cyclic ketone synthesis, 651  
 Derivatives of tricarbonylmetallates(-111) of cobalt, rhodium, and iridium, 686  
 kinetics of reactions of bromine and iodine with some substituted dimanganese and dirhenium carbonyls, 265
- Carboxylic acids**, *endo*- and *exo*-6-isobutyl-1,4-dimethyl-2,7-dioxabicyclo[2.2.1]-heptane-6-, decarboxylation of, 35
- Carotenes**, epimeric 3,3'-dihydroxy- $\epsilon,\epsilon$ -, from the skin of the yellow Costa Rican frog, *Atelopus chiriquiensis*, 96
- Carotenoids**, synthesis of the enolic  $\beta$ -diketone-, mytiloxanthin and trikentrirhodin, 467  
 synthesis of  $\text{C}_{50}$ ; the structure of decaprenoxanthin, 357
- Carriomycin**, *X*-ray crystal structure of the thallium salt of, a new polyether antibiotic, 590
- Catalysis**, phase-transfer, mechanism of, 112
- Catalyst**, for the Fischer-Tropsch and methanation reactions, effect of temperature of reduction on the activity and selectivity of a coprecipitated Ni- $\text{Al}_2\text{O}_3$ , 734
- Catalysts**, heterogeneous phase-transfer: high efficacy of catalysts bonded by a long chain to a polymer matrix, 639
- Cathenamine**, a central intermediate in the cell free biosynthesis of ajmalicine and related indole alkaloids, 164
- Cathodic potential**, effect of, on the electrochemical synthesis of optically active amino-acids, 250
- Cephalotaxus** alkaloids, new biogenic-type approach to, 847
- Charge-transfer** complexes of tetracyanoethylene-ether systems, photoaddition of the, 884
- Chelate ring closure mechanism**, direct evidence for a rate-determining; during the reaction of 2,2'-bipyridine with the hexakis(dimethyl sulphoxide)aluminium(III) ion in nitromethane solution, 586
- Chemiluminescence**, mechanism of Schiff base: evidence for an intermediate dioxetan, 874
- Chiral medium**, asymmetric synthesis at a pyramidal nitrogen centre in a, 51  
 imidate esters of phosphorus, route to: synthesis and hydrolysis of (S)-(+)-*O*-ethyl *N*-*t*-butyl methylphenylphosphinimidate, 33  
 polynuclear cation, barrier to racemization of the framework of a, 393  
 solvent-induced asymmetric synthesis; photosynthesis of optically enriched hexahelicene, 47
- Chloral**, asymmetric induction in the ene reaction of, with (1S,5S)-(-)- $\beta$ -pinene; control of stereoselectivity by the choice of Lewis acid catalyst, 382  
 ene reaction of, with olefins catalysed by Lewis acids, and some applications in organic synthesis, 380
- Chlorination**, per-, of nitrogen-, oxygen-, fluorine-, silicon-, sulphur-, and tin-substituted aromatic compounds, 915
- Chlorine**. Preparation and *X*-ray structure of a novel pseudopolyhalide anion  $[\text{Me}_2\text{N}(\text{ICl})_2]$ , 403
- $\alpha$ -**Chloroethers**, alkylation of  $\beta$ -keto-ester dianions with, 91
- Chloroform** and amines, hydrogen exchange between, catalysed by palladium(II) amine complexes containing a  $\beta$ -diketonate anion in the outer sphere, 914
- Chloroformates**, radical-initiated reduction of, to alkanes by tri-*n*-propylsilane: removal of unwanted hydroxy groups from organic molecules, 344
- Chlorosilanes**, kinetic and stereochemical evidence for nucleophilic assistance in the nucleophilic hydrolysis of, 649
- Chlorosulphite**, *syn*-9-bicyclo[4.2.1]nona-2,4,7-trienyl; generation of *endo*-9-chloro-*cis*-bicyclo[4.3.0]nona-2,4,7-triene by flash vacuum pyrolysis of, 545
- Cholesterol**, fate of the 16 $\beta$ -hydrogen atom of, in the biosynthesis of tomatidine and solanidine, 286
- Cholic acid** and conessine, perylene solubilisation and dye spectral changes with aqueous solutions of some derivatives of: bis-steroids as potential enzyme models, 809
- Chromium**, bisnaphthalene-, and related components, metal atom preparation and ligand displacement reactions, 912  
 Ferromagnetic monoalkylammonium tetrabromochromates(II), 172  
 Interaction of magnesium dialkyls with binuclear transition metal acetates; crystal structure of bis(trimethylsilylmethyl) bis(trimethylphosphine)bis-( $\mu$ -trimethylsilylmethyl)-dichromium(II), 283  
 Intergrowth structure of  $\text{Eu}_{1-p}\text{Cr}_2\text{Sc}_{4-p}$  ( $p = 0.29$ ) and isotopic compounds. A novel type of crystal structure with three incommensurate periodicities in one direction: *X*-ray study, 879  
 Novel columnar anion in potassium tetrafluorochromate(III); *X*-ray crystal structure, 533  
 Photoanation reactions of hexa(dimethyl sulphoxide)chromium(III) ion by azide and thiocyanate: evidence for associative reaction, 138  
 Photochemistry and photophysics of tris(2,2'-bipyridine)-chromium(III), 491  
 Ring expansion in a metal-dithiocarbamate complex by oxygen insertion; synthesis and properties of  $[\text{Cr}(\text{S}_2\text{CNR}_2)_2(\text{OS}_2\text{CNR}_2)]$ . The *X*-ray structure of bis[*NN*-diethyl(dithiocarbamate-SS')][*NN*-diethyl(dithioperoxy-carbamato-OS)]-chromium(III), 99  
 1,3-shifts in  $[\{\eta^5\text{-C}_5\text{H}_5\}\text{Cr}(\text{CO})_3]$ . Application of the Forsen-Hoffman spin saturation method to a four-site  $^{13}\text{C}$  nuclear magnetic resonance problem, 626  
 Synthesis and *X*-ray structure of *fac*-{[1,3-dithian-2-ylidene(ethoxy)methyl(ethoxy)carbene-C,S]t-butyl isocyanide}tricarboxylchromium(0). One of a new class of metallocyclic complexes obtained by the generation of anions  $\alpha$  to coordinated sulphur atoms, 494  
 Tris[methylaminobis(difluorophosphine)]metal(0) derivatives of chromium, molybdenum, and tungsten: new volatile carbonyl-free zerovalent metal derivatives of high thermal and oxidative stabilities, 142
- Chromones**, new synthetic route to, 493
- $\alpha$ -**Chymotrypsin**, hemiacetal formation between, and hydrocinnamaldehyde, evidence for, by cross-saturation nuclear magnetic resonance spectroscopy, 815
- C.I.D.N.P.**, complex effects in the rearrangement of *O*-sulphinylated oximes, 540  
 photo-, in the tyrosyl unit: a new tool in high resolution nuclear magnetic resonance studies of peptides, 872
- Cinnamaldehyde**, hydro-, evidence for hemiacetal formation between  $\alpha$ -chymotrypsin and, by cross-saturation nuclear magnetic resonance spectroscopy, 815
- Cinnamic acid**, 3,4-dichloro-, participation of hydrocarbons in the photodimerization of, 247
- Circular dichroism**, characterisation of polysaccharide conformation and interactions by: anomalous chiroptical effects in hyaluronate systems, 44  
 magnetic, evidence for the paramagnetism of tetracarbonyliron(0); low-temperature matrix studies, 841

**Circular dichroism**—*continued*

- of bis- $\alpha$ - $\beta$ -unsaturated ketones, synthesis and: optically active spiro[4.4]nonane derivatives, 812
- of  $\beta$ -unsaturated ketones, synthesis and: optically active spiro[4.4]nonane derivatives, 542
- of homoconjugated dienes and diketimine derivatives, syntheses and: optically active spiro[4.4]nonane derivatives, 543
- of the nitrogen chromophore in the open-chain secondary amine (*R*)-3,3-dimethyl-2-methylaminobutane, 786
- Clathrate**, crystal structure of a, formed by a mercapto-analogue of Dianin's compound, 292
- host, a new type of: tris-(5-acetyl-3-thienyl)methane, 741
- Clavulanic acid** analogues, total synthesis *via* isomerization of 7-oxo-4-oxa-1-azabicyclo[3.2.0]hept-2-enes, 905
- oxidation of and a ready synthesis of the 7-oxo-4-oxa-1-azabicyclo[3.2.0]hept-2-ene ring system, 808
- total synthesis of  $\beta$ -lactamase inhibitors related to, 906
- ( $\pm$ )-**Clavulanic acid**, total synthesis of, 748
- Cleavage** of alkyl- or aryl-transition metal bonds by electro-philic, 892
- Cluster** complexes, synthesis and  $^{31}\text{P}$  nuclear magnetic resonance studies of trinuclear palladium; X-ray structure of  $[\text{Pd}_3\text{Cl}(\text{PPh}_2)_2(\text{PEt}_3)_3][\text{BF}_4]$ , 709
- compound, containing a  $\mu_3$ -trisubstituted- $\eta^5$ -cyclopentadienyl system: synthesis and crystal structure of  $[(\mu_2\text{-H})\text{Os}_3(\text{CO})_8\{\text{C}(\text{O}-)\text{C}(\text{CHMe})\text{-CHCHCet}\}]$ , 699
- Cobaloxime** complexes, investigation by deuterium-labelling of the isomerisation of dihydroxyalkyl radicals formed upon photolysis of, 693
- Cobalt** carbonyls, halide ion-induced disproportionation of; formation of  $[\text{Co}(\text{CO})_4]^-$  and subsequent cyclic ketone synthesis, 651
- Donor and ligand effects on acetylene reduction with cobalt(II) -thiol complex catalysts, 795
- Formation of benzoysilanes from the reaction of organosilyl-cobalt tetracarbonyl derivatives with phenyl-lithium, 73
- Formation of chlorobisethylenediaminecobalt(III)- $\mu$ -cyanopentacyanocobalt(III) and the high apparent nucleophile efficiency of the cyanide ligands of hexacyanocobaltate(III), 200
- Interaction of lanthanide shift reagents with co-ordination complexes; direct observation of nuclear magnetic resonance signals for free and complexed tris(pentane-2,4-dionato)-cobalt(III) at ambient temperature, and X-ray crystal and molecular structure of the 1:1 adduct formed, 778
- Isolation of trioxodinitrato(II) complexes of some first row transition metal ions, 247
- Mercaptide-bridged intramolecular electron transfer from copper(I) to cobalt(III), 153
- Novel bimetallic products from octacarbonyldicobalt and methylaminobis(difluorophosphine); X-ray crystal structures of  $[\{\text{MeN}(\text{PF}_2)_2\}_2\text{Co}_2(\text{PF}_2\text{NHMe}_2)_2]$  and  $[\{\text{MeN}(\text{PF}_2)_2\}_3\text{-Co}_2(\text{CO})_2]$ , 531
- Novel catalytic resolution and asymmetric transformation of  $\alpha$ -dichloro(triethylenetetra-amine)cobalt(III) dichloride, 258
- Novel mixed tris-complexes of cobalt(III) with  $\alpha$ - and  $\beta$ -amino-acids: isolation, adsorption chromatography and absorption spectra, 676
- Photosensitization of superoxo-bridged dicobalt(III) cations by tris-(2,2'-bipyridyl)ruthenium(II) in the excited state, 774
- Reduction of a cobalt(III) sulphenamide complex to (*R*)-cysteine and (*RR*)-cystine complexes. X-ray crystal structure of the cystine dimer, 199
- Relatively slow water exchange in a pentaco-ordinate macrocyclic cobalt(II) complex, 36
- rhodium, and iridium; derivatives of tricarbonylmetallates (-III) of, 686
- $\mu$ -Superoxodicobalt complex of a cofacial diporphyrin, 800
- Synthesis and crystal structures of the metallacyclopentane complexes ( $\eta^5$ -cyclopentadienyl)(triphenylphosphine)(butane-1,4-diyl) cobalt(II) and ( $\eta^5$ -pentamethylcyclopentadienyl)(triphenylphosphine)(butane-1,4-diyl)iridium(III), 811
- Synthesis and reactions of octakis-(*t*-butyl isocyanide)dicobalt and pentakis(*t*-butyl isocyanide)ruthenium; X-ray crystal and molecular structures of  $[\text{Co}_2(\text{Bu}^t\text{NC})_8]$  and  $[\text{Ru}(\text{Ph}_3\text{P})\text{-}(\text{Bu}^t\text{NC})_4]$ , 256
- Tris- and tetra- perhalogenoaryl metallates of cobalt(II), nickel(II), palladium(II) and platinum(II), 789
- $\pi$ -**Complexing**, evidence for the importance of. Reactivity patterns in phenolysis reactions, 5
- Conducting** compounds, preparation of highly, by the room temperature solid state reaction of  $\text{S}_4\text{N}_4$  with halogens, 464
- organic polymers, synthesis of electrically: halogen derivatives of polyacetylene,  $(\text{CH})_x$ , 578
- Conductivity**, heteronuclear *versus* homonuclear electron transfer mechanisms in the, of solid dithiolate mixtures with Methylene Blue or tetramethylammonium as cations, 455
- high-, new salts of bis(dicyanoethylenedithiolato) complex monoanions, 47
- very high electrical, in  $\text{AsF}_6^-$ -graphite intercalation compounds, 389
- Conessine** and cholic acid, perylene solubilisation and dye spectral changes with aqueous solutions of some derivatives of: bis-steroids as potential enzyme models, 809
- Conformational** enantiomers, enzyme discrimination between, as a means of effecting asymmetric syntheses, 469
- Copper**. An intermediate with a copper-carbon bond formed by the reaction of copper ions with  $\cdot\text{CH}_2\text{CO}_2\text{H}$  radicals in aqueous solutions, 127
- Calorimetric determination of macrocyclic enthalpy. Copper(II) and zinc(II) complexes with 1,4,8,11-tetra-azacyclotetradecane, 244
- Electron spin resonance spectrum of bis(4-phenylamino-2-phenyliminopent-3-enato-*NN'*)copper(II); a complex having both a low  $A_{zz}$  and low-energy *d-d* band, 618
- Formation of copper(I) isocyanate complexes by the reaction of carbon dioxide and copper(I) bis(trimethylsilyl)amide complexes, 468
- Interaction of arylmetal compounds of group IB with copper(I) and silver(I) trifluoromethanesulphonate; a novel biaryl synthesis and a route to hexanuclear aryl-CuAg, -AgAu, and -CuAu clusters, 203
- Interactions of metal ions with nucleotides. Metal bonding to N(7) in the ternary copper(II)-inosine 5'-phosphate complex  $[\text{Cu}(5'\text{-IMP})\text{-}(2,2'\text{-bipyridyl})(\text{H}_2\text{O})_2]\cdot\text{NO}_3\cdot\text{H}_2\text{O}$ : X-ray crystal structure analysis; and metal bonding to both N(7) and phosphate in the binary complex  $[\text{Cu}(5'\text{-IMP})\cdot\text{H}_2\text{O}]$ : X-ray characterization, 600
- Mechanism of formation of surface isocyanate during the  $\text{SnO}_2\cdot 0.55\text{CuO}$ -catalysed oxidation of carbon monoxide by nitric oxide, 398
- Mercaptide-bridged intramolecular electron transfer from copper(I) to cobalt(III), 153
- $[(\text{MePh}_2\text{P})_3\text{CuBH}_4]$ : a single M-H bridged tetrahydroborate, 137
- Novel preparation of  $\sigma$ -alkynyl complexes of transition metals by copper(I) iodide-catalysed dehydrohalogenation, 291
- Oxyseleation of olefins by the use of aryl or alkyl selenocyanates and copper or nickel halides, 166
- perchlorates; radical cations in the decomposition of diphenyldiazomethane induced by, 326
- Stabilisation of high oxidation states by strong electron donors: the crystal structure of tetra-*n*-butylammonium *o*-phenylene-bisbiuretatecuprate(III)-chloroform, 444
- Stopped-flow kinetic studies on electron-transfer reactions of blue copper proteins. Evidence for an initial association in reactions of plastocyanin with inorganic complexes, 764
- Structural features of di- $\mu$ -5,7,7-trimethyl-4,8-diazaundec-4-ene-1,11-diolato(1-)-*NN'O'*-dicopper(II) perchlorate, a diamagnetic copper(II) compound; X-ray crystal and molecular structure, 572
- Synthesis and X-ray crystal structure of a bis(2,2'-bipyridyl)-trithionatocopper(II) complex, 8
- Synthetic use of an unusual organocuprate intermediate, 761
- Two-metal-substrate interactions: the reversible reaction of a  $\text{Cu}^+ \cdots \text{Cu}^+$  complex with CO and  $\text{O}_2$ , 498
- Utilization of quinone bisacetal organocupper compounds in the synthesis of isoprenoid systems, 499
- X-ray crystal and molecular structure of  $[\text{Cu}(\text{nicotinamide})_2\text{-}(\text{H}_2\text{O})_2(\text{BF}_4)_2\cdot 2\text{H}_2\text{O}]$ , 461
- X-ray crystallographic characterization of the single hydrogen bridge attachment of the tetrahydroborate group in tris-(methyl)diphenylphosphine)tetrahydroborate copper, 593
- Copper(II)**, synthesis of a ternary complex containing L-histidine and L-asparagine and optical resolution of DL-histidine *via* complex formation, 718
- Copper(100)**, adsorption of carbon monoxide on, at 295 K, characterized by photoelectron spectroscopy, 377

- Coproporphyrinogen-1** and uroporphyrinogen-1, intermediates between, 696
- Corrin**, tetrahydro-, tertiary esters, transformations of some nickel, 787
- Coupling**,  $^{13}\text{C}$ - $^{13}\text{C}$ , use of induced, in terpenoid biosynthesis, 819
- Coupling constant**, nuclear spin-spin, O-H, sign: oxygen-17 n.m.r. spectroscopy, 922
- Coupling constants**, five- to nine-bond  $^{31}\text{P}$ - $^{31}\text{P}$  spin, in derivatives of benzene and naphthalene, 375
- Crotonate** and related esters, protection of alcoholic hydroxy groups as, 270
- Crown ethers**, bearing an intra-annular phenolic group; binding of ammonia and some amines to, 438  
Crystal structure of a complex showing simultaneous water-barium ion co-ordination to 6,7,9,10,12,13,20,21,23,24,26,27-dodecahydrodibenzo[*b,n*][1,4,7,10,13,16,19,22]octaoxacyclotetrasiloxane (dibenzo-24-crown-8), 804
- 18-Crown-6-potassium-ethyl acetoacetate enolate**. *X*-ray structure determination, 183
- Crowns**, chiral asymmetric; stereoselectivity in complexation of primary alkylammonium cations by the diastereotopic faces of, 481
- Cryptand 222**, a thermochemical cycle for the heat of complexing of  $\text{Na}^+$  and  $\text{K}^+$  cations with, in water and methanol, 893
- Cryptands**. Synthesis of in,out-3,6,9,12,16,19,22,25,27,30,33,36-dodecaoxabicyclo[12.12.10]hexatriacontane and the chiral cryptand in,out-(-)-3,6,9,12,15,18,21,24,26,29,32-undeca-oxabicyclo[12.10.9]tritiacontane. Out,in-in,out isomerism, 918
- Cuprate** reagent, synthesis of prostaglandin- $\text{F}_{2\alpha}$  by conjugate addition of a, to 3-*t*-butyldimethylsilyloxytricyclo[3.2.0.0 $^{2,7}$ ]heptan-6-one, 716
- Cyanide**, tetrabutylammonium, use of for photocyanation of aromatic compounds: phase transfer photochemistry, 885
- Cycloadditions**, [2 + 2] and [4 + 2], evidence for, of allylic Grignard reagents to benzyne, 454
- Cycloalkene** units, configurationally rigid tetrahedral nickel complexes used for conformational analysis of, 173
- Cycloalkanes**, interaction of, with polymers, 384  
rhoda-, five-, six-, and seven-membered, from  $[\text{RhI}_2(\text{PPh}_3)(\eta^5\text{-C}_6\text{Me}_6)]$  and  $\text{BrMg}[\text{CH}_2]_n\text{-MgBr}$  ( $n = 4, 5, \text{ or } 6$ ). Occurrence of carbon-carbon bond cleavage in the preparation of the rhodacyclopentane derivative, 52
- ( $\pm$ )-**Cyclobazzanene**, *X*-ray crystal and molecular structure of the *p*-bromobenzoate derivative of the sesquiterpene, obtained in the formic acid-catalysed reaction of (+)-bazzanene, 568
- Cyclobutadiene**, kinetics of nucleophilic addition to co-ordinated, 304
- Cyclobutane**, dihalogeno-, structure and chemistry of the conformationally rigid unit, of 6,7-di-iodobicyclo[3.1.1]heptane; *X*-ray structure of 6,7-di-iodobicyclo[3.1.1]heptane, 262
- Cyclobutanes**, methylene-, and related systems, palladium(II)-catalysed ring expansion of, 583
- Cyclobutanone**, 2-hydroxy- derivatives, efficient synthesis of; application to the synthesis of 1,4-diketones and cyclopentenones, 573
- Cyclohepta[*cd*]isobenzofuran-2,8-dione**, 6-acetoxy-7,9-diphenyl-, synthesis and *X*-ray structure of, 296
- Cyclohexane**, *trans*-1,2-dichloro, the ionization mechanism of in super acid ( $\text{FSO}_3\text{H-SbF}_5$ ). The 3-chloro(methyl)cyclopentyl cation and its reaction with carbon monoxide, 394
- Cyclohexanes**, stereoselective homogeneous hydrogenation of arenes to, catalysed by  $[\text{Rh}(\eta^5\text{-C}_6\text{Me}_6)\text{Cl}_2]_2$ , 427
- Cyclohexene**, poly-; homopolymerisation of cyclohexene under mild conditions, 363
- Cyclohexenes**, 1-cyano-, photorearrangements of. A 'type A' process involving the acrylonitrile chromophore, 75
- Cyclohex-2-enyl esters**, stereochemistry of the  $\text{S}_{\text{N}}2'$  reaction in, 722
- Cyclonona-1,5-diene**, 1-methyl-9-methoxy-(*E,Z*)-, cyclization, 275
- Cyclononadienes**, bicyclic, from 1,7-cycloaddition of tetracyanoethylene to divinylcyclopropane systems, 593
- Cyclo-octadiene**, bonded, conversion into a cyclo-octadienyl ligand and cleavage of boron-phenyl bonds of arene-bonded tetraphenylborate anions in ruthenium(II) systems: *X*-ray crystal and molecular structures of  $[\text{Ru}(\eta^6\text{-C}_6\text{H}_5\text{BL}_2)(1\text{-}3,5,6\text{-}\eta^2\text{-C}_8\text{H}_{11})]$  ( $\text{L} = \text{Ph or F}$ ), 937
- Cyclo-octadienones**, synthesis of bicyclic: photolysis of divinylcyclopropanes induced by pentacarbonyliron, 827
- $\eta^2$ -**Cyclo-octatetraene**: crystal and molecular structure of  $[\text{Mn}(\text{CO})_2(\eta^6\text{-C}_8\text{H}_8)(\eta^5\text{-C}_5\text{H}_5)]$ , 404
- Cyclopentadiene**, vinylidene-, and phenylcarbene, automerization in, 210
- Cyclopentadienone** epoxide, the intermediacy of a. 4-Pyrene photochemistry, 598
- Cyclopentadienones**, isolation, spectral properties, and photochemistry of unstable substituted, 537
- Cyclopentadienyl**, mono- $\eta$ -, -chloro derivatives of niobium and tantalum and improved routes to -chloro, -oxochloro, and -oxo derivatives of molybdenum, 59  
 $\mu_3$ -trisubstituted- $\eta^5$ -system, a cluster compound containing a: synthesis and crystal structure of  $[(\mu_2\text{-H})\text{Os}_3(\text{CO})_8\text{-}\overline{\text{C}}\{\text{C}(\text{O})\text{-C}(\text{CHMe})\text{-CHCHCEt}\}]$ , 699
- Cyclopentane**, metalla- complexes, synthesis and crystal structures of the, ( $\eta^5$ -cyclopentadienyl)(triphenylphosphine)-(butane-1,4-diyl)cobalt(III) and ( $\eta^5$ -pentamethylcyclopentadienyl)(triphenylphosphine)(butane-1,4-diyl)iridium(III), 811  
metalla-, -olefin interchange reaction, 864
- Cyclopentene**, stereochemistry of 2 + 2 photoaddition of, to hexafluorobenzene, 365
- Cyclopent-2-enone**, 2-hydroxy-3-methyl-, easy synthesis of, 712
- Cyclopentenones** and 1,4-diketones, application to the synthesis of; efficient synthesis of 2-hydroxycyclobutanone derivatives, 573
- Cyclopentyl**, the 3-chloro(methyl)- cation and its reaction with carbon monoxide. The ionization mechanism of *trans*-1,2-dichlorocyclohexane in super acid ( $\text{FSO}_3\text{H-SbF}_5$ ), 394
- Cyclophanes**, [2.2.2]-, unsymmetrically tris-bridged. Synthesis of [2.2.2](1,2,4)(1,3,5)cyclophane, 206
- Cyclopropane**, divinyl-, systems, bicyclic cyclononadienes from 1,7-cycloaddition of tetracyanoethylene to, 593  
ring, synthesis of new nucleosides containing a fused; 1- $\{(\text{R},3\text{R},5\text{R})\text{-}2\text{-oxabicyclo[3.1.0]hexan-3-yl}\}$ -thymine and -uracil, 248
- Cyclopropanes**, alkoxy-, thermal rearrangement of, 124  
1-alkoxy-2-methylene-, thermal rearrangement of, 122  
divinyl-, and divinyl- $\Delta^1$ -pyrazolines, thermal decomposition of bicyclic, 330  
divinyl-, photolysis of, induced by pentacarbonyliron: synthesis of bicyclic cyclo-octadienones, 827
- Cyclopropenium** bromides, triaryl-, oxidative addition of, to  $\text{Pd}^0$  and  $\text{Pt}^0$  compounds: the synthesis and *X*-ray structure of  $\text{Pd}_3\{\mu\text{-}[\eta^2\text{-C}_3(\text{Ph})(p\text{-MeOC}_6\text{H}_4)_2]\text{-}(\text{acac})_2(\text{Pd-Pd-Pd})\}$ , 178  
1-(2,3-diphenylcycloprop-2-enylidene)methyl)-2,3-diphenyl-, perchlorate; synthesis and  $^{13}\text{C}$  nuclear magnetic resonance spectrum of, 232
- Cyclopropyl**, 1-fluoro- radicals, electron spin resonance study of inversion isomers of, 373
- Cyclotetradecadiene**, tetra-aza-, structure of, formed from benzylideneacetone and ethylenediamine; *X*-ray crystal structure analysis of its reduction product, 150
- Cyclotetradecane**, 1,4,8,11-tetra-aza-, the reaction of glyoxal with a, and the *X*-ray crystal structure of the product: a new tetracyclic ring system, 150
- Cysteine**, novel reaction of, with phenolic amino-acids in hydrobromic acid: reversible formation of 3-cystein-S-yltyrosine and cystein-S-yl-dopas, 251
- (*R*)-**Cysteine** and (*RR*)-cystine complexes; reduction of a cobalt(III) sulphenamide complex to; *X*-ray crystal structure of the cystine dimer, 199
- (*RR*)-**Cysteine** and (*R*)-cystine complexes; reduction of a cobalt(III) sulphenamide complex to. *X*-ray crystal structure of the cystine dimer, 199
- Cytochrome C**: novel method for the investigation of the electrochemistry of metalloproteins, 771
- Cytochrome C oxidase**: isolation, crystallisation, and synthesis of porphyrin A dimethyl ester, 278
- Darzens condensation**, extension of the, to the synthesis of di- and tri-substituted *N*-phenyl-aziridines, 602  
interfacial, stereochemical control, 902
- Deca-2,8-diene**, reaction of, with catalysts formed from  $\text{Me}_3\text{Sn-WCl}_6$  and  $\text{Me}_3\text{Al}_2\text{Cl}_3\text{-}(\text{Ph}_3\text{P})_2(\text{NO})_2\text{Cl}_2\text{Mo}$ , 634
- Decaprenoxanthin**, the structure of; synthesis of  $\text{C}_{50}$  carotenoids, 357

- Decarboxylation**, anodic, of dihydroaromatic acids, 82  
of *endo*- and *exo*-6-isobutyl-1,4-dimethyl-2,7-dioxabicyclo[2.2.1]heptane-6-carboxylic acids, 35
- Dehydroamino-acid** esters, and triazolines, a new synthesis of selected, 125
- Deoxyerythrolaccin**, synthesis of; intermediates in the 1:2-addition of 1,1-diethoxyethene to quinones, 297
- Dethioacetalisation**, novel, by photolysis, 680
- Deuterium** as a tracer in polyketide biosynthesis: a new method for the detection of chain starter units, 921  
as a tracer in polyketide biosynthesis: incorporation of [ $2\text{-}^{13}\text{C}$ ,  $2\text{-}^2\text{H}_3$ ]acetate into terrein, 624  
isotope effect and base catalysis in  $\sigma$ -complex formation between 1,3,5-trinitrobenzene and aniline, 55  
labelling, investigation by, of the isomerisation of dihydroxyalkyl radicals formed upon photolysis of cobaloxime complexes, 693  
labelling, use of, to elucidate the stereochemistry of the initial step of the cyclization reaction in zeaxanthin biosynthesis in a *Flavobacterium*, 655
- Dewar** benzenes, *cis* and *trans* (1 $\alpha$ ,4 $\alpha$ - and 1 $\alpha$ ,4 $\beta$ -bicyclo[2.2.0]-hexa-2,5-dienes), electrocyclic ring opening of: MNDO (modified neglect of diatomic overlap) semiempirical molecular orbital calculations, 728
- Dialkylamino**-compounds, rotational isomerism and dual luminescence in dipolar, 352
- Diamines**, symmetrical, insoluble polymer supports as mono-blocking agents of, 798
- 1, k + 2-Diazabicyclo[k.l.m.]alkanes**, syntheses of medium-ring, by reductive cleavage of hydrazinium dications, 747
- Diazoacetate**, ethyl,  $^{13}\text{C}$  and  $^{15}\text{N}$  nuclear magnetic resonance parameters of, 366
- $\alpha$ -Diazoketones**, phenolic, intramolecular cyclisation of. Novel synthesis of the spiro[4.5]decane carbon framework, 888
- Diazomethane**, diphenyl-, radical cations in the decomposition of, induced by copper perchlorates, 326  
kinetics and mechanism of the acid-catalysed hydrolysis of, 347  
unconventional reaction of, with 1,3,6-trihydroxy-2-methyl-4-nitrobenzene; X-ray crystal structure of (*E*)-3,6-dihydroxy-2-methyl-1,4-benzoquinone 4-methoxyimine *N*-oxide, 471
- Diazotization**, an unusual rearrangement during, of a 5-aminoimidazole nucleoside, 151
- Dibenzo-24-crown-8** (6,7,9,10,12,13,20,21,23,24,26,27-dodecahydrodibenzo[*b,n*][1,4,7,10,13,16,19,22]octaoxacyclotetradecane); crystal structure of a complex showing simultaneous water-barium ion co-ordination to, 804
- $\beta$ -Dicarbonyl** compounds, mono-*C*-alkylation of, using tetraethylammonium fluoride, 64
- endo-Dicyclohexadiene** (*endo*-1,4,4a,7,8,8a-hexahydro-1,4-ethanonaphthalene), photo-reactivity of, 577
- Diels-Alder** reaction, evidence for the reaction of nitroso-carbonyl compounds as heterodienes in the, 702  
reaction, the. A quantitative probe for resonance energies, 817
- Dienes** and olefins; formation of dihydropyrans in the photocycloaddition of a steroidal enedione to, 700  
conjugated. Relative reactivities of, towards silicon difluoride, 6  
formation of lactones from, *via* iron carbonyl complexes, 581  
homoconjugated, and diketimine derivatives, syntheses and circular dichroism of: optically active spiro[4.4]nonane derivatives, 543  
New approach to the introduction of functionalised angular substituents *via* tricarbonyliron complex intermediates, 339
- Dienoic acids**, hepta-2,6- and hepta-3,6-, transition metal-catalysed rearrangement of allyl but-3-enoate to, 793
- Dienophile**, an active, and ethoxycarbonylketen equivalent in the synthesis of antibiotic *C*-nucleosides; 1,3-diethoxy-carbonylallene, 582
- Dienophiles**, quinzarin boroacetate and 1,4-diaminoanthraquinone diboroacetate as dienophiles, 745
- Dihydropyrans**, formation of, in the photocycloaddition of a steroidal enedione to olefins and dienes, 700
- Dihydrosterculic acid**, a source of, and *cis*-9,10-methylenehexadecanoic acid, from *Litchi sinensis* seed oil, 78
- Dihydroxyalkyl** radicals formed upon photolysis of cobaloxime complexes, investigation by deuterium-labelling of the isomerisation of, 693
- Diketen** as a butenoic acid synthon in regioselective olefin syntheses, 500
- Diketimine** derivatives, and homoconjugated dienes, syntheses and circular dichroism of: optically active spiro[4.4]nonane derivatives, 543
- Dimethyl 9,10-cyclopropano-9,10-dihydroanthracene-11,12-dicarboxylate**, photorearrangement of, 93
- Dinitrogen**. Mechanism of alkylation of dinitrogen co-ordinated to molybdenum(0) and tungsten(0), 299
- Dinitrogen tetraoxide**, novel method of activating thiols by their conversion into thionitrites with, 407
- Dinitrogen trioxide** addition to 2-methylpropene, orientation of, and structure of the addition product, 766
- Diols**, vicinal, conversion of, into olefins, *via* the derived bisdithiocarbamates, 866
- 1,4,6,7-Dioxadiazocin** ring system, formation of the novel: photolysis of pyridazine 1,2-dioxides, 133
- 1,3-Dioxans**, 2-isopropyl-5-iodo-, large preference for equatorial iodine, 911
- 1,4,2-Dioxazole** synthesis by the reaction of nitrosocarbonyl compounds with 2,5-dimethylfuran, 703
- Dioxetan** decomposition, alternative mechanism for, 946  
decomposition, singlet excited states from, 944  
evidence for an intermediate: mechanism of Schiff base chemiluminescence, 874
- 1,2-Dioxetan**, X-ray structure of the, dispiro(adamantane-2,3'-[1,2]dioxetan-4',2''-adamantane), 591
- Diphenyl sulphanuric chloride**, (1-chloro-3,5-diphenyl-1*H*,3*H*,5-*H*-1,3,5,2,4,6-trithiatriazene 1,3,5-trioxide), nucleophilic substitution of, by secondary amines, 195
- Diphosphines**, olefinic, unsymmetrical, stereospecific, transition metal-mediated synthesis, 903  
( $\pm$ )-**Diplodialide-A**, total synthesis of, 337
- 1,4-Disilacyclohexa-2,5-diene**, [PdCl<sub>2</sub>(PEt<sub>3</sub>)<sub>2</sub>]-catalysed formation of, from 1-silacyclopropene, 352
- Disulphur dinitride**, helium I photoelectron spectrum of, 217
- Dithiocarbamate**. Ring expansion in a metal-dithiocarbamate complex by oxygen insertion; synthesis and properties of [Cr(S<sub>2</sub>CNR<sub>2</sub>)<sub>2</sub>(OS<sub>2</sub>CNR<sub>2</sub>)]. The X-ray structure of bis[*NN*-diethyl(dithiocarbamate-*SS'*)] [*NN*-diethyl(dithioperoxy-carbamato-*OS*)]chromium(III), 99
- 1,3-Dithiolan** protecting groups, removal of, by benzene seleninic anhydride, 751
- 1,3-Dithiolan-2-thione**, reversible oxidation of, 643
- Dithiolate**, solid mixtures with Methylene Blue or tetraethylammonium as cations; heteronuclear *versus* homonuclear electron transfer mechanisms in the conductivity of, 455
- DNA**, oxidative bonding of natural oestrogens to, by chemical and metabolic means, 386
- Dodecamethylcyclohexasilane**, simple and convenient method for preparing, 704
- 3,6,9,12,16,19,22,25,27,30,33,36-Dodecaoxabicyclo[12.12.10]-hexatriacontane**,  $\lambda$ in,out-, and the chiral cryptand in,out-(-)-3,6,9,12,15,18,21,24,26,29,32-undecaobicyclo[12.10.9]tritiacontane. Out,in-in,out isomerism, 918
- ( $\pm$ )-**Eburunamenine**, alternative synthesis of, *via* cleavage of a cyclic dithioacetal of an  $\alpha$ -oxo-thione, 68
- Echinuline** and flavoglucine, pattern of incorporation of leucine samples asymmetrically labelled with  $^{13}\text{C}$  in the isopropyl unit into the C<sub>5</sub>-isoprenoid units of, 474
- ( $\pm$ )-**Edunol**, X-ray structure and absolute configuration of, 349
- Elaeodendroside A**: a novel cytotoxic cardiac glycoside from *Elaeodendron glaucum*, 255
- Electrode**, a new material: polymeric sulphur nitride, 9
- Electrodes**, glass, concentration profiles in the surface layer on, by argon-ion beam sputtering, 792
- Electron** diffraction, gas phase-molecular structure of high- and low-spin 1,1'-dimethylmanganocenes determined by, 14
- Electron donors**, stabilisation of high oxidation states by strong; the crystal structure of tetra-*n*-butylammonium *o*-phenylenebisbiuretatoacetate(III)-chloroform, 444
- Electron microscopy**, high resolution, discovery of new types of chain silicates by, 910
- Electron spin resonance** and pulse radiolysis studies in aqueous solution. Spectroscopic evidence for non-polarity in nickel(III) complexes of macrocyclic ligands, 755  
detection of free radicals in the reaction of titanium(III) tartrate complexes with oxygen in aqueous alkaline solution, 876



**Electron spin resonance**—*continued*

spectrum of bis(4-phenylamino-2-phenyliminopent-3-enato-*NN'*)copper(II); a complex having both a low  $A_{zz}$  and low-energy  $d-d$  band, 618

study of iminyl and triazenyl radicals derived from organic azides, 320

study of an unusually tight ion-pair, 682

**Electron-transfer** mechanisms, homonuclear *versus* heteronuclear, in the conductivity of solid dithiolate mixtures with Methylene Blue or tetraethylammonium as cations, 455

mercaptide-bridged intramolecular, from copper(II) to cobalt(III), 153

photoinduced ternary, reactions: a novel application to electron transfer sensitization, 515

reaction between *N*-propyl-1,4-dihydropyridinamide and ferricyanide ion, 784

reaction, rate of the, between tetracyanoquinodimethane and *NNN'*-tetramethyl-*p*-phenylenediamine in acetonitrile, 273

reactions of blue copper proteins, stopped-flow kinetic studies on. Evidence for an initial association in reactions of plastocyanin with inorganic complexes, 764

reduction of fluorenone with *n*-butyl-lithium mediated by an iron-sulphur cluster, 412

**Enamines**, new synthesis of 1,2,3,4-tetrafluorocarbazoles from, 341

preparation, characterisation, and some properties of secondary, 565

**Enamino-ketones**, intramolecular photoarylation of: simple synthesis of hexahydroapocerysopine dimethyl ether, 644

**$\beta$ -Endorphin**, human: application of polyamide resins to polypeptide synthesis, 819

**Ene** reaction of chloral with olefins catalysed by Lewis acids, and some applications in organic synthesis, 380

reaction of chloral with (1*S*, 5*S*)-(–)- $\beta$ -pinene, asymmetric induction in the; control of stereoselectivity by the choice of Lewis acid catalyst, 382

reaction, novel carbanion-induced type of, 838

**Enedione**, steroidal; formation of dihydropyrans in the photocycloaddition of  $\alpha$ ,  $\beta$  to olefins and dienes, 700

**Energies**, relative, of the ground and core hole states of the 1-propyl and 2-norbornyl carbocations, 276

**Enolato-** and acyl ligands, interconversion and degradation of, in trisium clusters, 472

**Enthalpy**, macrocyclic, calorimetric determination of. Copper(II) and zinc(II) complexes with 1,4,8,11-tetra-azacyclotetradecane, 244

**Enynes**, highly general stereo-, regio-, and chemo-selective synthesis of terminal and internal conjugated, by the Pd-catalysed reaction of alkynylzinc reagents with alkenyl halides, 683

**Enzyme-bound intermediates**, detection of, by cross-saturation in nuclear magnetic resonance spectroscopy; an investigation of the papain-*N*-benzoylaminoacetaldehyde complex, 451

discrimination between conformational enantiomers as a means of effecting asymmetric syntheses, 469

models, bis-steroids as potential: perylene solubilisation and dye spectral changes with aqueous solutions of some derivatives of coenzyme and cholic acid, 809

**Enzymes**. Catalysed hydrolysis of *S-p*-nitrophenyl thioacetate by human carbonic anhydrase, 638

Chemical mutations of papain. The preparation of Ser 25- and Gly 25-papain, 923

Enzymically generated triplet acetone, 442

Intramolecular, 1,3-suprafacial hydrogen shift in the enzymic conversion of 3-carboxymuconolactone into 3-oxoadipic acid, 459

Stereochemistry of the conversion of serine and tyrosine into pyruvate by tyrosine phenol-lyase, 85

Stereospecificity of thymidylate synthetase, 218

**Epimerisation**, mechanism of, of penicillanic acid derivatives, 57

**Epoxidation** with hydrogen peroxide-tris(acetylacetonato)iron(II) system, novel stereochemical feature, 948

**Epoxidations**, metallo-porphyrin catalysed, with molecular oxygen, 821

**Epoxides**, new and selective method for deoxygenating: use of the organic tellurium reagent, sodium *OO*-diethyl phosphotelluroate, 658

resolution of racemic, on g.l.c. columns containing optically active lanthanoid complexes, 570

**Epoxyolefin** cyclisation, a synthon for, 497

**Eremophilanes**, *in vitro* and *in vivo* rearrangement of eudesmanes to; substantiation of Robinson's hypothesis, 230

**Ester**, novel preparation of a  $\beta\gamma$ -unsaturated methyl, from allylic alcohol, 594

**Esters**, conversion of amines into; pyridines as leaving groups in synthetic transformations, 701

$\omega$ -hydroxy- $\alpha\beta$ -unsaturated, preference for 6-*Exo-Trigonal* closures, 77

ortho, novel method for preparation of, combining two monosaccharide units, and disaccharides; reactions of sugar 1-carbonates with sugar derivatives bearing a hydroxy-group, 90

transformations of some nickel tetrahydrocorrin tertiary, 787

**Ethane** and buta-1,3-diene, novel conversion of ethylene into, catalysed by titanium metallocenes, 560

**Ethanethiol**: an infrared and microwave spectroscopic study, 483

**Ethene**, 1,1-diethoxy-, intermediates in the 1:2-addition of, to quinones: synthesis of deoxyerythrolaccin, 297

$\pi$ -**Ethene**-platinum(II) complexes, nucleophilic attack: *cis*-isomers, 926

**Ether**-tetracyanoethylene systems, photoaddition of the charge-transfer complexes of, 884

vinyl, stereo- and regio-specific synthesis by the Horner-Wittig reaction, 314

**Ethers**, aryldiazo alkyl, aryl radical formation during the thermal decomposition of, 769

perfluoropoly(ethylene glycol);  $CF_3-[O-CF_2-CF_2]_n-O-R_f$  ( $R_f = CF_3$  or  $C_2F_5$ ;  $n = 1-5$ ), 259

[ $^{14}C$ ]Ethylene and [ $^{14}C$ ]acetylene, adsorption of, on supported metal catalysts: relevance to the selective hydrogenation of acetylene, 323

**Ethylene**, diphenyl-, ready dimerization of. Chemical conversions using sheet silicates, 67

isolation of stable  $\beta$ -alkoxyethylpalladium complexes and the first direct evidence for *trans* alkoxy-palladation of, 610

novel conversion of, into ethane and buta-1,3-diene catalysed by titanium metallocenes, 560

Oxygen species contributing to the formation and the decomposition of an intermediate in the complete oxidation of ethylene over a silver catalyst, 71

photochemical addition of, to pentafluoropyridine: formation of 1:1- and 2:1-adducts, 669

*trans* doubly-bridged-. Preparation of ( $\pm$ )-*trans*-bicyclo[10.8.0]icos-1(12)-ene, 346

**cis-Eudesmane**, 4,11-epoxy-, stereospecific synthesis of; a tricyclic sesquiterpene defence secretion from the termite *Amitermes evuncifer*, 111

**Eudesmanes**, *in vitro* and *in vivo* rearrangement of, to eremophilanes. Substantiation of Robinson's hypothesis, 230

**Europium**. Intergrowth structure of  $Eu_{1-p}Cr_2Se_{4-p}$  ( $p = 0.29$ ) and isotopic compounds. A novel type of crystal structure with three incommensurate periodicities in one direction: *X*-ray study, 879

**Evernitrose**, stereochemistry at C-3 of: a fallacy in the determination of stereochemistry at quaternary centres using nuclear magnetic resonance spectroscopy. *X*-ray crystal structure of methyl 3-acetamido-2,3,6-trideoxy-3-*c*,4-*O*-dimethyl-*L*-xylo-hexopyranoside, 313

**EXAFS** (extended *X*-ray absorption fine structure), structure of bromotris(triphenylphosphine)rhodium(I) by, 628

**Excimer**. Geometrical requirements for fluorescent intramolecular excimer formation and fluorescence quenching, 361

**Exciton chirality** method; (1*S*,5*S*,6*R*) absolute stereochemistry of (–)-*cis,trans*-spiro[4.4]nonane-1,6-diyl bis(*p*-dimethylaminobenzoate) as determined by the, 495

**Falaconitine**, and mithaconitine, structures of. Two novel diterpenoid alkaloids from *Aconitum falconeri* stapf., 12

**6-Farnesyl**-5,7-dihydroxy-4-methylphthalide, synthesis in a cell-free preparation from *Penicillium brevicompactum*. Biosynthesis of mycophenolic acid, 949

**Farnesyl** pyrophosphate, substrate stereochemistry: 5,7-dihydroxy-4-methylphthalide farnesyl transferase from *Penicillium brevicompactum*. Biosynthesis of mycophenolic acid, 950

**Fatty acid** esters, unsaturated, heterogeneous metathesis of, 198

**Ferredoxins**, four-iron, and rubredoxin, peptide analogues, direct formation from their components, 908

- Ferric chloride**-catalysed conversion of  $\alpha$ -*t*-butoxy- or  $\alpha$ -acetoxy-acrylonitriles into imides, 298
- Ferricyanide** ion, alkali-metal ion acceleration of the electron-transfer reaction between *N*-propyl-1,4-dihydrnicotinamide and, 784
- ion, reaction of *N*-propyl-1,4-dihydrnicotinamide with, 181
- Ferrocenyl**-stabilized carbocations, nucleophilic addition to: a test of the generality of the  $N_{+}$ -correlation, 529
- Ferromagnetic** monoalkylammonium tetrabromochromates(II), 172
- Field ionisation**, preferred, of olefins at a silver nitrate surface, 463
- Flash photolysis**, transients in the, of indan-2-ones. Absorption spectra and decay kinetics of *o*-xylylenes, 721
- Flavin**, 5-deaza- (pyrimido[4,5-*b*]quinoline-2(3*H*), 4(10*H*)-dione), dehydrogenation of alcohols by, 825
- Flavins**, 8-chloro-, one-step synthesis of by the cyclization of 5-nitro-6-(*N*-substituted-anilino)uracils with the Vilsmeier reagent. Vilsmeier reagent as a reducing agent, 681 (isoalloxazines), hydrolysis of, in the ground and excited states, 175
- Flavobacterium**, use of deuterium labelling to elucidate the stereochemistry of the initial step of the cyclization reaction in zeaxanthin biosynthesis in a, 655
- Flavoglucine** and echinuline, pattern of incorporation of leucine samples asymmetrically labelled with  $^{13}\text{C}$  in the isopropyl unit into the  $\text{C}_6$ -isoprenoid units of, 474
- Fluorenone**, electron-transfer reduction of, with *n*-butyl-lithium mediated by an iron-sulphur cluster, 412
- Fluorescence**. Geometrical requirements for fluorescent intramolecular excimer formation and fluorescence quenching, 361
- Fluorination**, preservation of metal-carbon bonds during direct; a practical synthetic method. The synthesis of tetrakis(trifluoromethyl)germanium, 450
- Fluorine**. Mono-*C*-alkylation of  $\beta$ -dicarbonyl compounds using tetraethylammonium fluoride, 64
- Phenylpentafluorosilicate anion;  $^{19}\text{F}$  nuclear magnetic resonance evidence, 671
- Photochemical addition of ethylene to pentafluoropyridine: formation of 1:1- and 2:1- adducts, 669
- The radical anion  $[\text{C}_6\text{F}_5\text{I}]^-$ , 408
- Very high electrical conductivity in  $\text{AsF}_5$ -graphite intercalation compounds, 389
- Fluoroalkyl** radicals, effect of lone-pair repulsion on the reactivity and selectivity of, 504
- $\Delta^{11-9\alpha}$ -**Fluoro-steroids**: *X*-ray crystal and molecular structure of 17 $\alpha$ ,21-dipropionyloxy-9 $\alpha$ -fluoro-16 $\beta$ -methylpregna-1,4,11-triene-3,20-dione, 611
- Folate** conjugates, improved synthesis of, 144
- Forsén-Hoffman** spin saturation method to a four-site  $^{13}\text{C}$  nuclear magnetic resonance problem, application of the 1,3-shifts in  $[(\eta^6\text{-C}_6\text{H}_6)\text{Cr}(\text{CO})_3]$ , 626
- Free-radical** polymerisation reactions, generalisation of a theory of compartmentalised, 783
- Free radicals**, electron spin resonance detection of, in the reaction of titanium(III) tartrate complexes with oxygen in aqueous alkaline solution, 876
- Fulvalene**, isostructural tetrathia- and tetraselena-, salts of 2,5-diethyltetracyano-*p*-quinodimethane 'organic metals', 526
- tetra-aminotria-, synthesis and characterization of the dication, 850
- Fulvalenes**, new synthesis of substituted diselenadithia-(DSDT) and tetraselena-(TSF), 505
- triselenathia-: a novel sulphur-selenium interchange on trimethyl phosphite coupling of substituted 1,3-diselenole-2-thiones, 835
- Fulvene**. Reaction of thiobenzophenones with the dicarbonyl-cyclopentadienyliron anion: a novel fulvene synthesis *via* desulphurization, 126
- Fumarates**, *N*-alkylamino-, heterocyclic products from the oxidation of, 854
- Fungus**, *Marasmius alliaceus* (Jacques ex Fr.)Fr; alliacolide, a new bicyclic sesquiterpene epoxy-lactone with a novel carbon skeleton from cultures of the; *X*-ray structure, 727
- Furan**, 2,5-dimethyl-; 1,4,2-dioxazole synthesis by the reaction of nitrosocarbonyl compounds with, 703
- Furanoid glycols**, a method for the preparation of, 552
- Furanyl**-containing Schiff base macrocycles, alkaline earth metal complexes of; *X*-ray crystal and molecular structure of the strontium complex, 623
- Furoates**, ethyl 2-, reductive silylation reactions of, 76
- Furoquinoline**, a new *C*-prenylated phenylated; tectleaverdoor-nine, 652
- Gabriel** reagent, a modified, for the introduction of *t*-butoxy-carbonylamino groups; *t*-butyl methyl aminodicarboxylate potassium salt, 758
- Gallium**. Selectivities in Brønsted acid-catalysed reactions of alkenes on  $\text{Ga}_2\text{O}_3$ , 896
- Gas-liquid chromatography**. Resolution of racemic epoxides on g.l.c. columns containing optically active lanthanoid complexes, 570
- Gas-phase** reactions on platinum. Mechanism of the 1,2-bond shift rearrangement of alkanes, 95
- Geometry** changes on negative ion formation, 797
- Germanes**, kinetic determination of the bond dissociation energy  $D(\text{Me}_3\text{Ge-H})$  and its implications for bond strengths in, 446
- Germanium**. Co-ordination chemistry of bivalent group 4B heavy metal donors  $\text{M}[\text{N}(\text{SiMe}_3)_2]_2$  ( $\text{M} = \text{Ge}$  or  $\text{Pb}$ ) or  $\text{Ge}[\text{CH}(\text{SiMe}_3)_2]_2$ ; and the crystal and molecular structure of  $[\text{Cr}(\text{CO})_5(\text{Ge}\{\text{CH}(\text{SiMe}_3)_2\}_2)]$ , 458
- tetrakis(trifluoromethyl)-, the synthesis of. Preservation of metal-carbon bonds during direct fluorination; a practical synthetic method, 450
- Germination** inhibitors from *Aegilops ovata* L., novel, 794
- Gibberellin** biosynthesis, removal of C-20, 919
- Glucagon**, duck, synthesis of the nonacosapeptide corresponding to the entire amino acid sequence of, 909
- Glucosides**. Vetspirane sesquiterpene glucosides from flue-cured Virginia tobacco: structure, absolute stereochemistry, and synthesis. *X*-ray structure of the *p*-bromobenzene-sulphonate of one of the derived aglycones, 27
- Glutaraldehyde**-treated protein, identification of a 3-(2-piperidyl)pyridinium derivative ('anabilysine') as a cross-linking entity in a, 759
- Glycols**, furanoid, a method for the preparation of, 552
- Glycine**. Solvolysis of *cis*- $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$  in dimethyl sulphoxide and reactions of glycine with  $[\text{PtCl}_3(\text{Me}_2\text{SO})]^-$  as probed by  $^{195}\text{Pt}$  nuclear magnetic resonance shifts and  $^{195}\text{Pt}$ - $^{15}\text{N}$  coupling constants, 861
- Glycoside**, a novel antileukaemic quassinoid, from *Brucea javanica*, Bruceoside-A, 69
- a novel cytotoxic cardiac, from *Elaeodendron glaucum*; elaeodendroside A, 255
- Glyoxal**, the reaction of, with a 1,4,8,11-tetra-azacyclotetradecane and the *X*-ray crystal structure of the product: a new tetracyclic ring system, 150
- Gold**. Interaction of arylmetal compounds of group 1B with copper(I), and silver(I) trifluoromethane sulphonate; a novel biaryl synthesis and a route to hexanuclear aryl-CuAg, -AgAu, and -CuAu clusters, 203
- X*-Ray crystal and molecular structure of  $\text{Au}_4\text{Cl}_6$ , the product of the reduction of  $\text{Au}_2\text{Cl}_6$  by  $\text{Au}(\text{CO})\text{Cl}$ , 31
- Graminin A**, a new toxic metabolite from *Cephalosporium gramineum* Nisikado and Ikata, 774
- Graphite**. Very high electrical conductivity in  $\text{AsF}_5$ -graphite intercalation compounds, 389
- Grignard** reagents, allylic; evidence for [2 + 2] and [4 + 2] cycloadditions of, to benzyne, 454
- reagents, inorgano-. Preparation, reactions and *X*-ray crystal structure of bis( $\eta$ -cyclopentadienyl)hydridomolybdenum[bromo(bistetrahydrofuran)magnesium], 135
- Griseofulvin** and dehydrogriseofulvin, microbial transformation of:  $^2\text{H}$  N.m.r. and mass spectrometric studies of stereochemical courses of microbial hydrogenation and hydroxylation, 415
- Guanosine**, conversion of, into its  $\text{N}^2$ -methyl derivative, 447
- 2',3',5'-tri-*O*-acetyl-, acylation of, 791
- Haemins** and haemoproteins, nuclear magnetic resonance studies of the binding of  $^{15}\text{N}$ -labelled ligands to solvent effects on the  $^{15}\text{N}$  paramagnetic shifts of iron-bound  $\text{C}^{15}\text{N}^-$  in low-spin haemin cyanide complexes and cyano haemoproteins, 616
- Haemoglobin** model compound having conformationally linked haems, 732

- Haemoproteins** and haemins, nuclear magnetic resonance studies of the binding of  $^{15}\text{N}$ -labelled ligands to. Solvent effects on the  $^{15}\text{N}$  paramagnetic shifts of iron-bound  $\text{C}^{15}\text{N}^-$  in low-spin haemin cyanide complexes and cyano haemoproteins, 616
- Halide** ion-induced disproportionation of cobalt carbonyls; formation of  $[\text{Co}(\text{CO})_4]^-$  and subsequent cyclic ketone synthesis, 651
- A novel pseudo-polyhalide anion  $[\text{Me}_2\text{N}(\text{ICl})_2]$ , preparation and X-ray structure of, 403
- Halides**, bicyclic di-, potassium t-butoxide dehalogenations of, 661
- Halogenobenzenes**. The radical anion  $[\text{C}_6\text{F}_6\text{I}]^-$ , 408
- Halogenes**, preparation of highly conducting compounds by the room temperature solid state reaction of  $\text{S}_4\text{N}_4$  with, 464
- Helicene**, hexa-, photosynthesis of optically enriched; chiral solvent-induced asymmetric synthesis, 47
- $\alpha$ -**Helix**, shortest critical peptide size for development of the, in the solid state. Protected decapeptide *ortho*-nitrophenylsulphenyl-(L-leucyl-L-alanyl) $_5$ -ethyl ester  $[\text{Nps}-(\text{L-Leu-L-Ala})_5\text{-OEt}]$ , 805
- Hemiacetal** formation between  $\alpha$ -chymotrypsin and hydrocinnamaldehyde, evidence for, by cross-saturation nuclear magnetic resonance spectroscopy, 815
- Hemin C**, synthesis of, from hemin, 249
- Heptaene** macrolide antibiotics, 67-121-A and 67-121-C, structural elucidation of, 710
- Heptan-6-one**, 3-t-butyl dimethylsilyloxytricyclo[3.2.0.0 $^2$ .7]-, synthesis of prostaglandin- $\text{F}_{2\alpha}$  by conjugate addition of a cuprate reagent to, 716
- Hept-2-ene**, 7-oxo-4-oxa-1-azabicyclo[3.2.0]-, ring system; oxidation of clavulanic acid and a ready synthesis of, 808
- Heteroaromatic** compounds, polycyclic, synthesis *via* quinone methide intermediates, 916
- Heterocycles**, dipolar, structure and reactivity of, 109
- metathesis of, 307
- Heterodienes**, evidence for the reaction of nitrosocarbonyl compounds as, in the Diels-Alder reaction, 702
- Heterogeneous** and homogeneous catalysis, joint: a synergistic effect, 423
- Heteropolyanion**, X-ray crystal structure of a new,  $[\text{P}_4\text{W}_9\text{O}_{40}]^{12-}$ , with an X:M ratio of 1:2, 674
- 19 $\beta$ -Heteroyohimbine** alkaloids, 'one-pot' biomimetic synthesis of, 636
- Hexa-2,5-dienes**, 1 $\alpha$ ,4 $\alpha$ - and 1 $\alpha$ ,4 $\beta$ -bicyclo[2.2.0]-, (*cis* and *trans* Dewar benzenes), electrocyclic ring opening of; MNDO (modified neglect of diatomic overlap) semiempirical molecular orbital calculations, 728
- Hexahydroapoerysopine** dimethyl ether, simple synthesis of: intramolecular photoarylation of enamino-ketones, 644
- n-Hexane**. Enantiomeric 1-phenylpropyl and 1-phenylbutyl 9-anthroates as novel chiral inclusion complexing agents. Preparation and X-ray analysis of the 6:1 inclusion complexes with n-hexane, 928
- Hikizimycin**, structural identity of, with Anthelmycin, 41.
- L-Histidine** and L-asparagine, synthesis of a ternary copper(II) complex containing, and optical resolution of DL-histidine *via* complex formation, 718
- Homogeneous** and heterogeneous catalysis, joint: a synergistic effect, 423
- Homosolvolysis**, 171
- Horner-Wittig**, reaction, stereo- and regio-specific vinyl ester synthesis by the, 314
- Hyaluronate** systems, anomalous chiroptical effects in: characterisation of polysaccharide conformation and interactions by circular dichroism, 44
- Hydrazine** and amines, reaction of 8,2'-O-cycloadenosine with. Convenient preparations of 9- $\beta$ -D-arabinofuranosyladenine and its derivatives, 414
- NN*-dimethyl, ligands; dimeric ruthenium(II) complexes with bridging: X-ray analysis of the structure of  $[\{\text{RuHCl}(\text{cyclo-octa-1,5-diene})_2\text{NH}_2\text{NMe}_2\}]$ , 757
- Hydrazines**, aryl, reduction of arenediazonium fluoroborates to, by benzeneselenol, 131
- Hydrazinium** dications, syntheses of medium-ring, 1,*k*+2-diazabicyclo[*k.l.m*]alkanes by reductive cleavage of, 747
- Hydrazone**, aldehyde dimethyl-, stereochemistry of anions, 486
- Hydrazones**. Interception of a metallo-intermediate in the oxidation of a bis-hydrazone: reactions of benzil (toluene-*p*-sulphonyl)hydrazones with lead(IV) and mercury(II) acetates, 622
- Hydrazones**—*continued*
- oximes and semicarbazones, regeneration of ketones from, by benzeneseleninic anhydride, 445
- Hydrocarbons**, aromatic, a key step in the rapid hydrogenation with HF-, HF-TaF $_5$ -, and HF-BF $_3$ -noble metal catalysts: noble metal catalysed hydrogenation of carbocations, 575
- novel kinetics and their implications for activation of saturated. Catalysis by chlorohydrindobis(triphenylphosphine) ruthenium(II) species, 550
- Hydrocoumarin-nitro-**, formation and possible intermediacy of a spiro-lactone in the nitrative cyclisation of methyl  $\beta$ -aryl-isovalerate to a, 479
- Hydrogen-bond**, the strongest? *Ab initio*-LCAO-MO-SCF calculations, 225
- Hydrogen bonding**, infrared evidence for, in the sodium salts of lasalocid A (X-537A), 684
- Hydrogen** exchange between amines and chloroform catalysed by palladium(II) amine complexes containing a  $\beta$ -diketonate anion in the outer sphere, 914
- Hydrogen peroxide**-tris(acetylacetonato)iron(II) system, novel feature of epoxidation with, 948
- Hydrogen tunnelling**, a unique example of; hydrogen and carbonyl scrambling in  $[\text{Rh}_{13}(\text{CO})_{24}\text{H}_{5-n}]^{n-}$  ( $n = 2$  and  $3$ ), 39
- Hydrogenation**, of carbocations, noble metal catalysed: a key step in the rapid hydrogenation of aromatic hydrocarbons with HF-, HF-TaF $_5$ -, and HF-BF $_3$ -noble metal catalysts, 575
- Hydroxy-bearing carbon atoms**, easy identification of, in  $^{13}\text{C}$  nuclear magnetic resonance spectroscopy: a new method for signal assignment in carbohydrates, 509
- groups, acidic, description of a characteristic infrared frequency for, in zeolites, 743
- groups, alcoholic, protection of as crotonate and related esters, 270
- groups, removal of unwanted, from organic molecules: radical-initiated reduction of chloroformates to alkanes by tri-n-propylsilane, 344
- and imidazole functional groups; catalysis of amide hydrolysis due to micelles containing, 401
- $\beta$ -**Hydroxy-acids**, asymmetric synthesis of, using chiral  $\alpha$ -sulphenyl ester enolate ions, 162
- Hydroxylation**, nitroaromatic compounds for selective photochemical, 868
- 8-Hydroxyquinoline**, ('oxine'), as a reagent for protection of internucleotidic bonds in oligonucleotide synthesis, 190
- Hypodite** thermolysis-cyclization reaction. Convenient synthesis of 4-homoprotadamantan-4-one (tricyclo[5.3.1.0 $^3$ .9]-undecan-4-one) from 3-homoadamantanol, 478
- Imidazole**, 4-acetyl-5-methyl-2-phenyl-, X-ray structure of, formed from 3-hydroxyiminopentane-2,4-dione and benzylamine, 443
- and adenine nucleosides, synthesis of some D-mannofuranosyl and D-lyxofuranosyl, and anomalous  $^1\text{H}$  nuclear magnetic resonance spectra of related anomers, 753
- and hydroxy functional groups; catalysis of amide hydrolysis due to micelles containing, 401
- kinetics of binding of, to  $\alpha\beta\gamma\delta$ -tetraphenylporphyratoiron(III) in dimethyl sulphoxide, 106
- 1,2,4-thiadiazolo[4,5-*a*]benz-, novel synthesis and X-ray crystal structure analysis of the ring system, 736
- Imides**, ferric chloride-catalysed conversion of  $\alpha$ -t-butoxy- or  $\alpha$ -acetoxyacrylonitriles into, 298
- Imidosulphur**, *NN'*-diaryldi-, complexes of zerovalent platinum, intramolecular rearrangement of, to a compound of bivalent platinum involving N=S bond cleavage and concomitant hydrogen migration and N-C(aryl) bond formation; X-ray crystal structure of one of the products, 739
- Imine N-oxide**, (*E*)-3,6-dihydroxy-2-methyl-1,4-benzoquinone 4-methoxy-, X-ray crystal structure of; unconventional reaction of diazomethane with 1,3,6-trihydroxy-2-methyl-4-nitrobenzene, 471
- Imines**, asymmetric synthesis at nitrogen by oxidation of, with *m*-chloroperoxybenzoic acid in the presence of optically active alcohols, 731
- thio- and seleno-, X-ray evidence for partial bonding between sulphur or selenium and oxygen in, 325
- Iminodicarboxylate**, t-butyl methyl-, potassium salt: a modified Gabriel reagent for the introduction of t-butoxycarbonylamino groups, 758

- Iminophthalans** (imino-1,3-dihydroisobenzofurans) from the nitration of some *p*-xylonitrile derivatives, 341
- Iminyl** and triazenyl radicals, electron spin resonance study of, derived from organic azides, 320
- Imogolite**, synthesis of; a tubular aluminium silicate polymer, 462
- Inclusion** complexing agents, chiral, novel, enantiomeric 1-phenylpropyl and 1-phenylbutyl 9-anthraotes. Preparation and X-ray analysis of the 6:1 inclusion complexes with n-hexane, 928
- Indanones**, hydroxy-, photoreactions of, 239
- Indan-2-ones**, transients in the flash photolysis of. Absorption spectra and decay kinetics of *o*-xylylenes, 721
- Indole**, nucleophilic substitutions at a  $\beta$ -position, 432
- Indoles**, palladium(II)-catalysed formation of, from 2,2-diphenyl-2*H*-azirines, 664
- 2-substituted, novel access to, and a convenient synthesis of secodine-type alkaloids, 742
- Indolizidines**, 6,7-diphenylhexahydro, biosynthesis of phenanthroindolizidine alkaloids from, 955
- Inductive effect**, an anisotropic, as an important factor in the hydride reduction of 3-alkyl bicyclo[2.2.2]octan-2-ones, 372
- Infrared** evidence for hydrogen bonding in the sodium salts of lasalocid A (X-537A), 684
- frequency, description of a characteristic, for acidic hydroxy-groups in zeolites, 743
- spectra of the surface of silica immersed in a three-component liquid mixture, 621
- spectroscopic study, an. The N-H link as a 'probe' for the electronic structure of the phosphorus-nitrogen bond in aminophosphines, 614
- Insertion**, carbon atom: an efficient synthesis of isharane, 587
- Intercalation** compounds, very high electrical conductivity in AsF<sub>5</sub>-graphite, 389
- Intercalation complex**, X-ray crystal structure of a 2:2 chloroterpyridineplatinum(II)-adenosine-5'-monophosphate 2:2, 824
- Intergrowth** structure of Eu<sub>1-p</sub>Cr<sub>2</sub>Se<sub>4-p</sub> (*p* = 0.29) and isotopic compounds. A novel type of crystal structure with three incommensurate periodicities in one direction: X-ray study, 879
- Iodine**, equatorial, large preference for in 2-isopropyl-5-iodo-1,3-dioxans, 911
- Preparation and X-ray structure of a novel pseudo-polyhalide anion [Me<sub>2</sub>N(ICI)<sub>2</sub>]<sup>-</sup>, 403
- The radical anion [C<sub>6</sub>F<sub>5</sub>I]<sup>-</sup>, 408
- trifluoride dioxide, X-ray crystal structure of, 519
- Ion-exchange** rate, ultrasonic fields as a factor affecting the, in molecular sieves, 34
- Ionization potentials**. Linear correlations between the ionization potentials of molecules and changes in ionization potentials by alkyl groups, 141
- Ion-pair**, electron spin resonance study of an unusually tight, 682
- Ion-radical** salts, synthesis of a new class of highly conducting organic, 177
- Iridium**. Dinuclear dihydrides complexes of iridium(III) of the type [Ir(H)( $\mu$ -SBU)(CO)(PR<sub>3</sub>)<sub>2</sub>] with single metal-metal bonds, 518
- Evidence for an anionic intermediate in the mechanistic pathway of the oxidative addition reaction of [(cyclo-octadiene)-IrCl(PEtPh<sub>2</sub>)] with hydrochloric acid, 845
- Hydrogen reduction of co-ordinated carbon monosulphide in [IrH(CS)(PPh<sub>3</sub>)<sub>3</sub>] to the methanethiolato-ligand and an iridium thioformyl compound [Ir(CHS)Cl<sub>2</sub>(CO)(PPh<sub>3</sub>)<sub>2</sub>], 781
- Kinetics and mechanism of the substitution reactions of the four- (X = Cl) and five-co-ordinate (X = I or SCN) iridium complexes [(cyclo-octa-1,5-diene)Ir(1,10-phenanthroline)X], 520
- Large-ring complexes formed from diacetylene diphosphines of the type Bu<sub>3</sub>PC=C[CH<sub>2</sub>]<sub>n</sub>C≡CPBu<sub>3</sub>, (*n* = 4 or 5); X-ray structure of [IrCl(CO){Bu<sub>3</sub>PC=C[CH<sub>2</sub>]<sub>5</sub>C≡CPBu<sub>3</sub>}], 311
- Novel dinuclear iridium(I) and mixed iridium(I)-rhodium(I) complexes. X-ray crystal structure of di- $\mu$ -benzenethiolato-bis[dicarbonyliridium(I)], 47
- rhodium, and cobalt; derivatives of tricarbonylmetallates(-III) of, 686
- Synthesis and crystal structures of the metallacyclopentane complexes ( $\eta^5$ -cyclopentadienyl)(triphenylphosphine)(butane-1,4-diyl)cobalt(III) and ( $\eta^5$ -pentamethylcyclopentadienyl)(triphenylphosphine)(butane-1,4-diyl)iridium(III), 811
- Iridium**—continued
- Synthesis and X-ray structure of an unusual iridium ylide or carbene complex, 589
- Iron**. Application of iron carbonyls to organic synthesis. Mediation of nucleophilic addition to alkenes *via* tetracarbonyl-iron complexes, 20
- Bis(diazadiene)iron complexes, (R<sup>1</sup>N=CR<sup>2</sup>-CR<sup>2</sup>=NR<sup>1</sup>)<sub>2</sub>FeI, 24
- carbonyl complexes, formation of lactones from dienes *via*, 581
- Crystal and molecular structure of [Fe<sub>4</sub>(CO)<sub>11</sub>(NEt)(ONeT)]: a new *quadro* iron cluster with two face-bridging organic ligands, 387
- Electron-transfer reduction of fluorenone with *n*-butyl-lithium mediated by an iron-sulphur cluster, 412
- Isolation of trioxodinitrato(II) complexes of some first row transition metal ions, 247
- Kinetics of binding of imidazole to  $\alpha\beta\gamma\delta$ -tetraphenylporphinatoiron(III) in dimethyl sulphoxide, 106
- New approach to the introduction of functionalised angular substituents *via* tricarbonyldieneiron complex intermediates, 339
- New synthesis of  $\alpha$ -diketones from aldehydes and alkyl iodides using, 691
- Novel stereochemical feature of epoxidation with hydrogen peroxide-tris(acetylacetonato)iron(III) system, 948
- Novel transformation of [( $\eta^1$ -C<sub>5</sub>H<sub>5</sub>)<sub>2</sub>SnFe(CO)<sub>4</sub>]<sub>2</sub>: Crystal structure of [(C<sub>5</sub>H<sub>5</sub>)Fe(CO)<sub>2</sub>]<sub>2</sub>Sn<sub>2</sub>Fe<sub>3</sub>(CO)<sub>2</sub>, 390
- pentacarbonyl, intermediate complex in the reduction of trimethylamine oxide by: its use as catalyst in the addition of carbon tetrachloride to carbon-carbon double bonds, 705
- pentacarbonyl-, photolysis of divinylcyclopropanes induced by: synthesis of bicyclic cyclo-octadienones, 827
- Reaction of carbon tetrachloride with 5,10,15,20-tetraphenylporphinatoiron(II) [(TPP)Fe<sup>II</sup>]: evidence for the formation of the carbene complex [(TPP)Fe<sup>II</sup>(CCL<sub>2</sub>)], 648
- Reaction of thiobenzophenones with the dicarbonylcyclopentadienyl iron anion: a novel fulvene synthesis *via* desulphurization, 126
- Solution structure and reactivity of M<sup>+</sup>[Fe(CO)<sub>3</sub>(NO)]<sup>-</sup>, M = Na, K, or PPN [PPN = (Ph<sub>3</sub>P)<sub>2</sub>N], 362
- Stable paramagnetic carbenemetal complex; syntheses and properties of low spin *d*<sup>7</sup> (1,3-dimethylimidazolidin-2-ylidene)iron(I) tetrafluoroborates, 411
- Synthesis, chemical reactivity, and X-ray molecular structure of pentakis(*t*-butyl isocyanide)iron, 853
- (*o*), tetracarbonyl-; magnetic circular dichroism evidence for the paramagnetism of: low-temperature matrix studies, 841
- X-Ray crystal and molecular structure of [Et<sub>3</sub>NCFe(CO)<sub>3</sub>]<sub>2</sub>: an example of the division of an alkyne into two separate units by rupture of the C=C bond, 30
- X-ray structure of the non-classically bonded carbonium ion [( $\eta^5$ -C<sub>5</sub>H<sub>5</sub>)Fe(CO)<sub>2</sub>]<sub>2</sub>(C<sub>3</sub>H<sub>5</sub>)<sup>+</sup>, 656
- Isatins**, phenylpentyl-; a novel class of alkaloids from *Melochia tomentosa*, 535
- Ishwarane**, an efficient synthesis of: carbon atom insertion, 587
- ( $\pm$ )-**Ishwarone**, stereoselective total synthesis of, 880
- Isoalloxazines** (flavins), hydrolysis of, in the ground and excited states, 175
- Isococculidine**, biosynthesis of, 211
- Isocomene**, a novel sesquiterpene from *Isocoma Wrightii*. X-ray crystal structure of the corresponding diol, 456
- Isocyanate**, mechanism of formation of surface, during the SnO<sub>2</sub>-0.55CuO-catalysed oxidation of carbon monoxide by nitric oxide, 398
- silyl, crystal structure of, at 140 K, 744
- Isocyanides**, thermal carbenoid insertion reactions of, 855
- Isodomedin**, structure of, a novel *ent*-kaurenoid diterpene, 555
- Isolavone** reduction, stereochemistry of, during pterocarpan biosynthesis: an investigation using deuterium nuclear magnetic resonance spectroscopy, 338
- Isoucoesterol** biosynthesis in *Pinus pinea*, stereochemistry of hydrogen migration from C-24 to C-25 during, 889
- Isoindole**, 1-alkylthio-2-alkyl-; preparation of a stable, fluorescent, 374
- Isoprenoid**, C<sub>5</sub> units of echinuline and flavoglucaine; pattern of incorporation of leucine samples asymmetrically labelled with <sup>13</sup>C in the isopropyl unit into the, 474
- systems; utilization of quinone bisacetal organocopper compounds in the synthesis of, 499
- (E)-9-Isopropyl-6-methyldeca-5,9-dien-2-one**, a terpenoid C<sub>14</sub>-ketone with a novel skeleton, 353

- Isothiazole**, 1,2-benzo-, 1,1-dioxides; flash vacuum pyrolysis of. Benzoxazole and benzonitrile formation, 673
- Isovalerate**, methyl  $\beta$ -aryl-, formation and possible intermediacy of a spiro-lactone in the nitrate cyclisation of, to a nitro-hydrocoumarin, 479
- Isovincoside** (Strictosidine): the key intermediate in the biosynthesis of monoterpenoid indole alkaloids, 646
- Isoxazolidines**, photochemically induced oxidation of some steroidal, by molecular oxygen, 749
- Isoxazoline** *N*-oxide derivatives, preparation of, from a nitrosugar and *S*-ylides, 7
- ent-Kaurenoid** diterpene, a novel; structure of isodomedin, 555
- keten** acetals, preparation of dithio-, thioseleno-, thiosilyl, and thiostannyl-, 522
- di-, reactions of with arenethiols: preparation of arylthioisocrotonic acids and *S*-aryl thioacetate esters, 609
- ethoxycarbonyl-, equivalent in the synthesis of antibiotic *C*-nucleosides, and an active dienophile: 1,3-diethoxycarbonylallene, 582
- methylene-, generation of an aliphatic. Photolysis of *N*-methyl-4,4-dimethyl-3-isopropylideneazetid-2-one, 53
- Ketenimines**, *N*-aryl-, cycloaddition of, to thiobenzophenones. Formation of 4*H*-3,1-benzothiazine and 2-iminothietan derivatives, 43
- $\beta$ -**Keto-ester** dianions, alkylation of, with  $\alpha$ -chloroethers, 91
- $\alpha$ -**Keto-esters**, effective homogeneous hydrogenation of, catalysed by neutral rhodium(I) complexes with phosphine ligands and application to the asymmetric synthesis of lactates, 428
- Ketone** enolates, stereoelectronic control in the endocyclic alkylation of. Rules for ring-closure, 233
- Ketones** and aldehydes, conversion of, into nitriles containing an additional carbon atom, 280
- bis- $\alpha\beta$ -unsaturated-, synthesis and circular dichroism of: optically active spiro[4.4]nonane derivatives, 812
- cage, thermal reactions of, possessing an oxygen-containing bridge or a hydroxy substituent, 532
- conversion of, into lactones with benzeneseleninic acid and hydrogen peroxide (benzeneperoxyseleninic acid); a new reagent for the Baeyer-Villiger reaction, 870
- cyclic and dimethyl(vinyl)sulphonium salts; new synthesis of 8 $\alpha$ -hydroxy-2-thiadealins and spirocyclopropanes from, 675
- 1,4-di-, and cyclopentenones, application to the synthesis of, efficient synthesis of 2-hydroxycyclobutanone derivatives, 573
- $\alpha$ -di-, new synthesis of from aldehydes and alkyl iodides using pentacarbonyliron, 691
- homogeneous catalytic oxidation of secondary alcohols to, by molecular oxygen under mild conditions, 157
- o*-hydroxyphenylalkyl, reaction of, with phosphorus trichloride. Formation of 1,3,2-dioxaphosphorinans *via*  $\alpha$ -proton abstraction, 569
- phenolic  $\alpha$ -diazo-, intramolecular cyclisation of. Novel synthesis of the spiro[4.5]decane carbon framework, 888
- racemic, enantioselective reduction of, by yeast, 315
- regeneration of, from hydrazones, oximes, and semicarbazones by benzeneseleninic anhydride, 445
- $\beta\gamma$ -unsaturated, syntheses and circular dichroism of: optically active spiro[4.4]nonane derivatives, 542
- Ketyl**, sodium diphenyl-, alkylation by chiral electrophilic reagents, 877
- Kinetic acidity function**,  $H^{\ddagger}_c$  constant selectivity in proton transfer reactions to carbon bases in aqueous sulphuric acid, 101
- Kirkwood-Westheimer** electrostatic field effect model, prediction by the: transmission of polar effects, 608
- Kodo-cytochalasin-1**, *X*-ray crystal and molecular structure of, 105
- $\beta$ -**Lactamase** inhibitors related to clavulanic acid, total synthesis, 906
- $\beta$ -**Lactams**, asymmetric synthesis of, 302
- photochemical synthesis of a novel, 678
- Structure elucidation of MM 17880, a new fused  $\beta$ -lactam antibiotic isolated from *Streptomyces olivaceus*; a mild  $\beta$ -lactam degradation reaction, 952
- two new, fused, isolated from *Streptomyces olivaceus*; Structures of olivanic acid derivatives MM 4550 and MM 13902, 523
- Lactates**, effective homogeneous hydrogenation of  $\alpha$ -keto esters catalysed by neutral rhodium(I) complexes with phosphine ligands and application to the asymmetric synthesis of, 428
- Lactones**, bicyclic, new route to: use of benzeneselenenyl chloride, 484
- conversion of ketones into, with benzeneseleninic acid and hydrogen peroxide (benzeneperoxyseleninic acid): a new reagent for the Baeyer-Villiger reaction, 870
- formation of, from dienes *via* iron carbonyl complexes, 581
- Lactonization**, phenylsulphenyl-, an easy and synthetically useful lactonization procedure, 293
- Lanthanide** induced shifts, synthesis and stereochemical assignments using; 1-oxadethiapenicillins, 405
- shift reagents, interaction of, with co-ordination complexes; direct observation of nuclear magnetic resonance signals for free and complexed tris(pentane-2,4-dionato)cobalt(III) at ambient temperature, and *X*-ray crystal and molecular structure of the 1:1 adduct formed, 778
- Structure of lanthanide(III) mono- and bis-dipicolinates in solution, 527
- Lanthanoid** complexes, resolution of racemic epoxides on g.l.c. columns containing optically active, 570
- Lasalocid A** (X-537A), infrared evidence for hydrogen bonding in the sodium salts of, 684
- Laser** photoelectrochemistry as a tool for studies of metal complex excited states, 425
- Lead**. Co-ordination chemistry of bivalent group 4B heavy metal donors  $M[N(SiMe_3)_2]_2$  ( $M = Ge$  or  $Pb$ ) or  $Ge[CH(SiMe_3)_2]_2$ ; and the crystal and molecular structure of  $[Cr(CO)_5(Ge\{CH(SiMe_3)_2\}_2)]$ , 458
- Interception of a metallo-intermediate in the oxidation of a bis-hydrazone: reactions of benzil(toluene-*p*-sulphonyl)hydrazones with lead(IV) and mercury(II) acetates, 622
- The  $Pb^{2+}$  ion as a template in the synthesis of macrocyclic ligands; *X*-ray structure of 3,15,21-triaza-6,9,12-trioxabicyclo[15.3.1]heneicosa-1,(21),2,15,17,19-pentaene(thiocyanato)(isocyanato)lead(II), 274
- Leaving groups**, leaving ability and basicity of, attached by first-row elements, 767
- Leucine**, samples asymmetrically labelled with  $^{13}C$  in the isopropyl unit, pattern of incorporation of, into the  $C_8$ -isoprenoid units of echinuline and flavoglucine, 474
- Lewis acid** catalyst, control of stereoselectivity by the choice of; asymmetric induction in the ene reaction of chloral with (1*S*,5*S*)-(–)- $\beta$ -pinene, 382
- Lewis acids**, ene reaction of chloral with olefins catalysed by, and some applications in organic synthesis, 380
- Ligand** labilization in transition metal photochemistry, solvent control of selective, 730
- Lipid** structures in the Caldariella group of extreme thermophilic bacteria, 514
- Litchi sinensis** seed oil: a source of dihydrosterculic acid and *cis*-9,10-methylenehexadecanoic acid, 78
- Lithium**, *n*-butyl-, electron-transfer reduction of fluorenone with, mediated by an iron-sulphur cluster, 412
- ion, effect of, on the torsional barrier in amides, 350
- phenyl-, formation of benzoylsilanes from the reaction of organosilylcobalt tetracarbonyl derivatives with, 73
- Lithium bromide**. Addition of  $Li^{80m}Br$  to polyhalogenoarynes, 933
- Loganin**, a new synthesis of: allyl silanes in organic synthesis, 81
- Lone-pair** repulsion, effect of, on the reactivity and selectivity of fluoroalkyl radicals, 504
- Luminescence**, dual, rotational isomerism and, in dipolar dialkyl amino-compounds, 352
- Macrocycles**, furanyl-containing Schiff base, alkaline earth metal complexes of; *X*-ray crystal and molecular structure of the strontium complex, 623
- polyoxa-polyaza-, metal complexes from, 549
- Macrocyclic** complex, molecular association without co-ordination in an adduct of 1,10-phenanthroline with a manganese(II); *X*-ray crystal and molecular structure, 558
- ligand, Molecular association in a silver(I) complex of a planar; *X*-ray crystal structure of a binuclear silver(I) complex, 370
- ligands. Crystal structures of four complexes of quinquecentate macrocyclic ligands with novel co-ordination geometries containing five co-ordinate silver(I), six co-ordinate cad-

- Macrocyclic**, ligands—*continued*  
mium(II), six co-ordinate mercury(II) and seven co-ordinate cadmium(II), 167  
ligands, spectroscopic evidence for non-planarity in nickel(III) complexes of. Pulse radiolysis and electron spin resonance studies in aqueous solution, 755  
ligands, the Pb<sup>2+</sup> ion as a template in the synthesis of; X-ray structure of 3,15,21-triaza-6,9,12-trioxabicyclo[15.3.1]heneicoso-1(21),2,15,17,19-pentaene(thiocyanato)(isothiocyanato)lead(II), 274  
nickel(II) complex, pH-induced co-ordination geometry change in a, 15
- Macrolide**, heptaene, antibiotics 67-121-A and 67-121-C, structural elucidation of, 710
- Macromolecular** matrices bearing ammonium groups, stereo-ordered; as catalysts in alkylation and carbenation reactions, 231
- Magnesium**, influence of Mg<sup>2+</sup> ion on the reduction of *N*-methylacridinium ion with 1,4-dihydropyridinamide, 848  
Inorgano-Grignard reagents. Preparation, reactions and X-ray crystal structure of bis-( $\eta$ -cyclopentadienyl)hydridomolybdenum[bromo(bistetrahydrofuran)magnesium], 135
- Magnesium dialkyls**, interaction of with binuclear transition metal acetates: crystal structure of bis(trimethylsilylmethyl)-bis(trimethylphosphine)bis-( $\mu$ -trimethylsilylmethyl)-dichromium(II), 283
- Manganese**.  $\eta^2$ -cyclo-octatetraene: crystal and molecular structure of [Mn(CO)<sub>2</sub>( $\eta^2$ -C<sub>8</sub>H<sub>8</sub>)( $\eta^5$ -C<sub>5</sub>H<sub>5</sub>)], 404  
Isolation of trioxodinitrato(II) complexes of some first row transition metal ions, 247  
Kinetics of reactions of bromine and iodine with some substituted dimanganese and dirhenium carbonyls, 265  
Molecular association without co-ordination in an adduct of 1,10-phenanthroline with a manganese(II) macrocyclic complex; X-ray crystal and molecular structure, 558  
Molecular structure of high- and low-spin 1,1'-dimethylmanganocenes determined by gas phase electron diffraction, 14  
Preparation and crystal structure of [Mn<sub>4</sub>S<sub>4</sub>(CO)<sub>16</sub>]; oxidation at sulphur of [({CO})<sub>4</sub>Mn-S-SnMe<sub>3</sub>]<sub>2</sub>, 782  
Synthesis of the unsymmetrical tricarbonylalkoxymanganese trimers and X-ray crystal structure of dimethylphenylphosphineoctacarbonyltriethoxytrimanganese, 285  
tetracarbonylnitrosyl-, determination of the structure of, by matrix isolation studies, 717
- Mass spectrometric** and <sup>2</sup>H n.m.r. studies of stereochemical courses of microbial hydrogenation and hydroxylation: microbial transformation of dehydrogriseofulvin and griseofulvin, 415
- Mass spectrometry**, consecutive fragmentations in, 724
- Matrix isolation** studies, determination of the structure of tetracarbonylnitrosylmanganese by, 717
- 7—9-Membered rings**, saturated, simple, model compounds for: X-ray crystal and molecular structure of hexa-, hepta-, and octa-methylenammonium salts, 939
- Mercaptide**-bridged intramolecular electron transfer from copper(I) to cobalt(III), 153
- Mercury**. Crystal structures of four complexes of quinque-entate macrocyclic ligands with novel co-ordination geometries containing five co-ordinate silver(I), six co-ordinate cadmium(II), six co-ordinate mercury(II) and seven-co-ordinate cadmium(II), 167  
inorganic, photomethylation of, by aliphatic  $\alpha$ -amino-acids, 158  
Interception of a metallo-intermediate in the oxidation of a bis-hydrazone: reactions of benzil (toluene-*p*-sulphonyl)-hydrazones with lead(IV) and mercury(II) acetates, 622  
Mercury-bis[methanidylenebis(dimethylphosphonium methylide)]: the first tetra-alkyl mercurate(II) compound, 334  
Progressive cage-opening in *d*<sup>6</sup>, *d*<sup>8</sup>, *d*<sup>10</sup>, and *d*<sup>10</sup> *s*<sup>2</sup> metallacarboranes: crystal and molecular structures of 3-triphenylphosphino-3-mercuria-1,2-dicarbadodecaborane and triphenylmethylphosphonium 3-thalla-1,2-dicarbadodecaborate, 737
- Mesembrine**, late stages in the biosynthesis of: skeletonone as a precursor to the *cis*-3a-(3,4-dimethoxyphenyl)octahydroindole alkaloids, 60
- Metabolite**, a stress, from infected potato tubers, total synthesis and stereostructure of ( $\pm$ )-solavetivone; X-ray crystal and molecular structure of an intermediate in the synthesis, 554  
granurin A, a new toxic, from *Cephalosporium gramineum* Nisakado and Ikata, 774
- Metal atom** preparation and ligand displacement reactions of bisnaphthalenechromium and related compounds, 912  
—carbon bonds, preservation of during direct fluorination; a practical synthetic method. The synthesis of tetrakis-(trifluoromethyl)germanium, 450
- Metal vapour** synthesis of complexes of methylphenylsiloxane polymers, 466
- Metallacarboranes**, X-ray crystallographic and theoretical studies on 'slipped', 605
- Metallacyclopentane**—olefin interchange reaction, the, 864
- Metallocenes**, titanium, novel conversion of ethylene into ethane and buta-1,3-diene catalysed by, 560
- Metalloproteins**, novel method for the investigation of the electrochemistry of; cytochrome C, 771
- Methane**, semi-empirical and *ab initio* calculations on the auto-merization of methane, 213
- Methanethiolato**-ligand; hydrogen reduction of co-ordinated carbon monosulphide in [IrH(CS)(PPh<sub>3</sub>)<sub>2</sub>] to the, and an iridium thioformyl compound [Ir(CHS)Cl<sub>2</sub>(CO)(PPh<sub>3</sub>)<sub>2</sub>], 781
- Methanol**—aromatic compounds—1,2,4,5-tetracyanobenzene systems, photo-induced 1:1:1 reactions of, 667  
photochemical 1,3-addition of, to *t*-butylbenzene, 780  
photochemical and thermal addition of, to 2-phenyl-3,1-benzoxazepine-5-carboxylate: reverse stereoselectivities in the two reactions, 899
- Methenocyclopenta[ $\alpha$ ]pentalene, perhydro-**. Analysis of the thermodynamic and kinetic factors which control entry into, and Wagner-Meerwein rearrangement within, the C<sub>12</sub>H<sub>18</sub><sup>+</sup> systems, 941
- Methionine** S-oxide, dinuclear complex of, with platinum(II) involving imido-bridging; X-ray crystal structure of di- $\mu$ [(2S,SS)-2-amino-4-methylsulphinylbutanoato(-2)-S,O- $\mu$ -N]diplatinum(II), 607
- Methylaminobis(difluorophosphine)**, novel bimetallic products from octacarbonyldicobalt and; X-ray crystal structures of [ {MeN(PF<sub>2</sub>)<sub>2</sub> }<sub>3</sub>Co<sub>2</sub>(PF<sub>2</sub>NHMe)<sub>2</sub> ] and [ {MeN(PF<sub>2</sub>)<sub>2</sub> }<sub>3</sub>Co<sub>2</sub>(CO)<sub>2</sub> ], 531
- Methylenammonium** salts, hexa-, hepta-, and octa-, X-ray crystal and molecular structure; model compounds for simple saturated 7—9-membered rings, 939
- Methylene**. Synthesis and X-ray crystal structure of hexabis-(trimethylphosphine)tris- $\mu$ -methylene-diruthenium(III), 865
- Methylene Blue** or tetraethylammonium as cations; heteronuclear *versus* homonuclear electron transfer mechanisms in the conductivity of solid dithiolate mixtures with, 455
- cis-9,10-Methylenehexadecanoic acid**, a source of dihydrostercularic acid and, from *litchi sinensis* seed oil, 78
- Mica**, zinc, novel, K<sub>2</sub>H<sub>2</sub>Zn<sub>3</sub>[ZnSi<sub>7</sub>O<sub>20</sub>](OH)<sub>4</sub>, synthesis: evidence for the replacement of silicon by a divalent cation, 905
- Micellar** systems, reactions using: photochemical dimerization of acenaphthylene, 887
- Micelle**, cationic, facile acyl transfer from imidazole to the hydroxy-group in a, in the hydrolysis of *p*-nitro-phenyl acetate, 29
- Micelles**, containing imidazole and hydroxy functional groups, catalysis of amide hydrolysis due to, 401
- Michael**-additions, 'naked' fluoride-catalysed, 237
- Microbial** transformation of dehydrogriseofulvin and griseofulvin: <sup>2</sup>H N.m.r. and mass spectrometric studies of stereochemical courses of microbial hydrogenation and hydroxylation, 415
- Micrococcin P**, total structure of the polythiazole-containing antibiotic. A <sup>13</sup>C nuclear magnetic resonance study, 706
- Migratory** aptitudes of substituted vinyl groups and evidence for *exo*-selectivity; 1,5-shift of unsaturated groups, 688
- Mithaconitine**, and falaconitine, structures of. Two novel diterpenoid alkaloids from *Aconitum falconeri* Stapf., 12
- MM 17880**, structure elucidation, a new fused  $\beta$ -lactam antibiotic isolated from *Streptomyces olivaceus*; a mild  $\beta$ -lactam degradation reaction, 952
- MNDO** (modified neglect of diatomic overlap) molecular orbital calculations: bisdehydroxyridines, 539  
semiempirical molecular orbital calculations: electrocyclic ring opening of 1 $\alpha$ ,4 $\alpha$ - and 1 $\alpha$ ,4 $\beta$ -bicyclo[2.2.0]hexa-2,5-dienes (*cis* and *trans* Dewar benzenes), 728
- Molecular orbital** calculations, MNDO (modified neglect of diatomic overlap): bisdehydroxyridines, 539

- Molybdenum.** Inorgano-Grignard reagents. Preparation, reactions and X-ray crystal structure of bis-( $\eta$ -cyclopentadienyl)hydridomolybdenum[bromo(bistetrahydrofuran)magnesium], 135  
 Mechanism of alkylation of dinitrogen co-ordinated to molybdenum(o) and tungsten(o), 299  
 Mono- $\eta$ -cyclopentadienylchloro derivatives of niobium and tantalum and improved routes to mono- $\eta$ -cyclopentadienylchloro, -oxochloro, and -oxo derivatives of molybdenum, 59  
 Novel asymmetric benzoyldiazenido-bridged complex of molybdenum. X-ray crystal structure of  $[\text{Mo}_2\text{O}(\text{PhCON}_2)_2(\text{S}_2\text{CNET}_2)_2]$ , 70  
 Oxidation of dihydropyran with  $\text{MoO}_5\text{HMPA}$ , 205  
 Reaction of hexafluorobut-2-yne with halogenodicarbonyl( $\eta^7$ -cycloheptatrienyl)molybdenum complexes; crystal and molecular structure of  $[\text{Mo}_2(\mu\text{-Cl})_3(\eta^7\text{-C}_7\text{H}_7)_2]^+[\text{MoCl}(\text{CF}_3\text{C}_6\text{CF}_3)_2]^-$ , 245  
 sulphide catalyst; change from a  $\sigma$ -alkyl intermediate to a carbonium ion intermediate in reactions of olefins on a, 180  
 Synthesis and  $^{17}\text{O}$  nuclear magnetic resonance spectroscopic structure determination of  $[(\text{PhAs})_4\text{Mo}_{12}\text{O}_{46}]^{4-}$ , 201  
 Synthesis and reactions of molybdenocene dimers: X-ray crystal structure of the salt  $\{(\eta\text{-C}_6\text{H}_5)_2\text{Mo}\}_2(\mu\text{-OH})(\mu\text{-H})\{\mu\text{-}(\eta^5\text{-C}_5\text{H}_4\text{-}\eta^5\text{-C}_6\text{H}_4)\}_2\text{PF}_6\cdot\frac{1}{2}\text{H}_2\text{O}$ , 145  
 Tris[methylaminobis(difluorophosphine)]metal(o) derivatives of chromium, molybdenum, and tungsten: new volatile carbonyl-free zerovalent metal derivatives of high thermal and oxidative stabilities, 142
- Monamycin**, synthesis of a congener of the cyclohexadepsipeptide antibiotic, 635
- Morpholine.** Synthesis and X-ray crystal structures of dimorpholino-di-, -tri-, and -tetra-selane, and dipiperidinotetra-selane, 833  
 X-ray crystal structure of the novel bis-quaternary dispiro system obtained from the reaction of, with hexakis(bromomethyl)benzene, 525
- Mössbauer**, recoil-free fraction, temperature dependence of the, as a probe of the lattice structure of tin compounds, 603
- Muconolactone**, 3-carboxy-, an intramolecular 1,3-suprafacial hydrogen shift in the enzymic conversion of, into 3-oxoadipic acid, 459
- Mycophenolic acid**, biosynthesis. Substrate stereochemistry of farnesyl pyrophosphate: 5,7-dihydroxy-4-methylphthalide farnesyl transferase from *Penicillium brevicompactum*, 950  
 biosynthesis. The synthesis of 6-farnesyl-5,7-dihydroxy-4-methylphthalide in a cell-free preparation from *Penicillium brevicompactum*, 949
- Mytiloxanthin** and triketentriodhin, synthesis of the enolic  $\beta$ -diketone carotenoids, 467
- $N_+$ -correlation**, a test of the generality of the: nucleophilic addition to ferrocenyl-stabilized carbocations, 529
- Naphthalene**, and benzene; five-to-nine-bond  $^{31}\text{P}$ - $^{31}\text{P}$  spin coupling constants in derivatives of, 375  
*endo*-1,4,4a,7,8,8a-hexahydro-1,4-ethano-, (*endo*-dicyclohexadiene), photoreactivity of, 577  
 Metal atom preparation and ligand displacement reactions of bisnaphthalenechromium and related compounds, 912
- Naphth[2,3-*d*]imidazole-4,9-dione**, 5,8-dimethoxy-1,2-dimethyl-, photochemical nucleophilic substitution of. An unusual long-range directing effect in the photoexcited state, 396
- 1-Naphthoxide anion**, photo-induced dimerization of: a new type of photochemical reaction, 81
- 1,5-Naphthyridine** derivatives, C-alkylation of, by methyl iodide, 87
- Nacléfine**, a synthesis of: regiospecific cyclisation of 1,2,3,4-tetrahydro-1-methylene-2-nicotinoyl- $\beta$ -carbolines, 319
- Negative ion** formation, geometry changes on, 797
- Neopentane**, isomerization of; direct evidence for the intermediacy of adsorbed alkyl species in the, on platinum, 563
- Nickel.** Activating effect of metallic palladium on the reduction rate of  $\text{Ni}^{2+}$  ions in an X type zeolite, 102  
 and platinum, bridging acetylene complexes; X-ray crystal structure of  $[\text{Pt}_3(\text{Et}_3\text{P})_4(\text{PhC}_2\text{Ph})_2]$ , 930  
 Configurationally rigid tetrahedral nickel complexes used for conformational analysis of cycloalkene units, 173  
 Crystal structure of the nickel complex of 2,3,7,8,12,13,17,18-octaethyl-1,19(21*H*,24*H*)-bilindione (octaethylbilatriene-*abc*), 83
- Nickel—continued**  
 Effect of temperature of reduction on the activity and selectivity of a coprecipitated  $\text{Ni-Al}_2\text{O}_3$  catalyst for the Fischer-Tropsch and methanation reactions, 734  
 Isolation of trioxodinitrato(II) complexes of some first row transition metal ions, 247  
 Ligand substitution at five-co-ordinate centres: associative mechanism for the high-spin complex 2,9-dimethyl-1,10-phenanthrolinebis-(*OO'*-dimethyl dithiophosphato)nickel(II), 942  
 Oxy-selenation of olefins by the use of aryl or alkyl selenocyanates and copper or nickel halides, 166  
 pH-induced co-ordination geometry change in a macrocyclic nickel(II) complex, 15  
 Spectroscopic evidence for non-planarity in nickel(III) complexes of macrocyclic ligands. Pulse radiolysis and electron spin resonance studies in aqueous solution, 755  
 Transformations of some nickel tetrahydrocorrin tertiary esters, 787  
 Tris- and tetra-perhalogenoaryl metallates of cobalt(II), nickel(II), palladium(II), and platinum(II), 789  
 Tris[triphenylphosphinehexachloronaphthalene-1,8-dithiolato-nickel(II)],  $[\text{Ni}_3(\text{PPh}_3)_3(\text{S}_2\text{C}_{10}\text{Cl}_6)_3]$ , a  $\text{Ni}_3\text{S}_6$  metal-sulphur cluster compound; preparation and crystal and molecular structure, 714
- Nicotinamide**, 1,4-dihydro-; influence of  $\text{Mg}^{2+}$  ion on the reduction of *N*-methylacridinium ion with, 848  
*N*-propyl-1,4-dihydro-, alkali-metal ion accelerated electron-transfer reaction between, and ferricyanide ion, 784  
*N*-propyl-1,4-dihydro-, reaction of, with ferricyanide ion, 181  
 X-ray crystal and molecular structure of  $[\text{Cu}(\text{nicotinamide})_2(\text{H}_2\text{O})_2(\text{BF}_4)_2\cdot 2\text{H}_2\text{O}]$ , 461
- Niobium.** Mono- $\eta$ -cyclopentadienylchloro derivatives of niobium and tantalum and improved routes to mono- $\eta$ -cyclopentadienylchloro, -oxochloro, and -oxo derivatives of molybdenum, 59
- Nitration** of *NN*-dimethyl-*p*-toluidine. Spectroscopic evidence for the bulk formation of a  $\sigma$ -complex formed by *ipso*-attack, 301
- Nitric oxide**, mechanism of formation of surface isocyanate during the  $\text{SnO}_2\cdot 0.55\text{CuO}$ -catalysed oxidation of carbon monoxide by, 398
- Nitrile**, benzo-, and benzoxazole formation. Flash vacuum pyrolysis of 1,2-benzisothiazole 1,1-dioxides, 673
- Nitriles**, chiral, asymmetric synthesis of amines from, and racemic alcohols, 86  
 conversion of aldehydes and ketones into, containing an additional carbon atom, 280  
 $\alpha$ -metallated; reactivity of 2,3-dimethylthiiren 1,1-dioxide as an ambident electrophile, 931  
 new method for converting thioamides into: use of diethyl azodicarboxylate and triphenylphosphine, 220
- Nitrite**, peroxy-, rearrangement of, 754
- Nitroaromatic** compounds for selective photochemical hydroxylation, 868
- Nitrobenzene**, 1,3,6-trihydroxy-2-methyl-4-; unconventional reaction of diazomethane with; X-ray crystal structure of (*E*)-3,6-dihydroxy-2-methyl-1,4-benzoquinone 4-methoxyimine *N*-oxide, 471
- Nitrogen**, asymmetric synthesis at, by oxidation of imines with *m*-chloroperoxybenzoic acid in the presence of optically active alcohols, 731  
 centre, pyramidal, asymmetric synthesis at a, in a chiral medium, 51  
 chromophore, circular dichroism of the, in the open-chain secondary amine (*R*)-3,3-dimethyl-2-methylaminobutane, 786  
 effects of substituents on the reactivity of the pyridine, 897  
 Modification of the electronic properties of  $(\text{SN})_x$  by halogens; properties of  $(\text{SNBr}_{0.4})_x$ , 407  
 A new cationic S-N ring system,  $\text{S}_4\text{N}_4^{2+}$ . The crystal structure of cyclotetraziazyl bis(hexachloroantimonate(v)),  $[\text{S}_4\text{N}_4]^{2+}[\text{SbCl}_6]^{2-}$ , and cyclotetraziazyl hexafluoroantimonate(v) tetradecafluorotriantimonate,  $[\text{S}_4\text{N}_4][\text{SbF}_6][\text{Sb}_3\text{F}_{14}]$ , 253  
 Novel route to metallic polythiazyl bromides: direct bromination of  $\text{S}_4\text{N}_4$ , 846  
 Orientation of dinitrogen trioxide addition to 2-methylpropene and structure of the addition product, 766  
 Preparation of highly conducting compounds by the room temperature solid state reaction of  $\text{S}_4\text{N}_4$  with halogens, 464

**Nitrogen**—*continued*

- Synthesis of the trisulphur trinitride anion,  $S_3N_3^-$ , 453  
 The N-H link as a 'probe' for the electronic structure of the phosphorus-nitrogen bond in aminophosphines. An infrared spectroscopic study, 614  
 Trimethylsilyl migration from nitrogen to carbon in a silicon-nitrogen-phosphorus compound, 308
- Nitrogen dioxide**, isomerization of *cis*-but-2-ene induced by adsorbed, 830
- Nitrones**, cycloadditions of chiral, 303
- 4-Nitrophenylnitromethane**, kinetics and isotope effects in the reaction of, with amidines in toluene, 695
- Nitrosocarbonyl** compounds, 1,4,2-dioxazole synthesis by the reaction of, with 2,5-dimethylfuran, 703  
 compounds as heterodienes in the Diels-Alder reaction, evidence for the reaction of, 702
- Nitrosocarbonylbenzene**, [3,3] sigmatropic rearrangement of an *N*-benzoyl-3,6-dihydro-1,2-oxazine derived from ergosteryl acetate and, 23
- 2-Nitrosophenols**, deoxygenation of, and of their metal complexes with triphenylphosphine. Synthesis of phenazines, dihydrophenazines, triphenyl (*o*-hydroxyphenylimino)phosphoranes and their metal complexes, 400
- Nitrosyl** cluster, a new: nonacarbonyl(dinitrosyl)triosmium, 477  
 coupling in transition metal complexes: the molecular structure of  $[(Ph_3P)_2Pt(N_2O_2)]$ , 354
- Nitroxide** free radicals, ready reduction of some, with ascorbic acid, 345
- Noble metal** catalysed hydrogenation of carbocations: a key step in the rapid hydrogenation of aromatic hydrocarbons with  $HF^-$ ,  $HF-TaF_5^-$ , and  $HF-BF_3^-$ -noble metal catalysts, 575
- Nonane**, spiro[4.4]-derivatives, optically active: syntheses and circular dichroism of bis- $\alpha$ -unsaturated ketones, 812
- Nona-2,4,7-triene**, *endo*-9-chloro-*cis*-bicyclo[4.3.0]-, generation of by flash vacuum pyrolysis of *syn*-9-bicyclo[4.2.1]nona-2,4,7-trienyl chlorosulphite, 545
- Norbornyl** iodide, novel oxidative elimination in a, 321
- Nuclear magnetic resonance** antipeptide shift induced by substituents, background of the; an analogy of the mesomeric effect with borane skeletons, 561  
 $^{13}C$  and  $^{15}N$ , parameters of ethyl diazoacetate, 366  
 $^{13}C$ , and *X*-ray analyses; the structure of  $[Os_7(CO)_{21}]$ , 385  
 $^{13}C$ , a study. Total structure of the polythiazole-containing antibiotic, micrococin P, 706  
 dynamic  $^1H$  and  $^{15}N$ , of free-base  $^{15}N$ -porphyrins, 184  
 $^{19}F$  evidence; phenylpentaffluorosilicate anion, 671  
 $^2H$ , and mass spectrometric studies of stereochemical courses of microbial hydrogenation and hydroxylation: microbial transformation of dehydrogriseofulvin and griseofulvin, 415  
 gas-phase, spectroscopic study of the molecular structure of beryllium borohydride,  $Be(BH_4)_2$ , 224  
 low temperature flow; detection of transient intermediates on the actual reaction pathway in nucleophilic aromatic substitution, 335  
 $^{15}N$ , spectra of octaethylporphyrin, 226  
 $^{17}O$ , synthesis and spectroscopic structure determination of  $[(PhAs)_4Mo_{12}O_{46}]^{4-}$ , 201  
 problem, application of the Forsén-Hoffman spin saturation method to a four-site  $^{13}C$ . 1,3-shifts in  $[(\eta^6-C_6H_6)Cr(CO)_3]$ , 626  
 shifts,  $^{195}Pt$ , and  $^{195}Pt$ - $^{15}N$  coupling constants; solvolysis of *cis*- $[Pt(NH_3)_2Cl_2]$  in dimethyl sulphoxide and reactions of glycine with  $[PtCl_3(Me_2SO)]^-$  as probed by, 861  
 spectra, fourier transform platinum-195, of  $[Pt_n(CO)_{2n}]^{2-}$  ( $n = 3, 6, \text{ or } 9$ ); stereochemical non-rigidity of a metal polyhedron, 309  
 spectroscopy  $^{13}C$ ; easy identification of hydroxy-bearing carbon atoms in: a new method for signal assignment in carbohydrates, 509  
 spectroscopy, cross-saturation; evidence for hemiacetal formation between  $\alpha$ -chymotrypsin and hydrocinnamaldehyde by, 815  
 spectroscopy, detection of enzyme-bound intermediates by cross-saturation in; an investigation of the papain-*N*-benzoyl-aminoacetaldehyde complex, 451  
 spectroscopy, deuterium, an investigation using: stereochemistry of isoflavone reduction during pterocarpan biosynthesis, 338

**Nuclear magnetic resonance**—*continued*

- spectroscopy, high field  $^{15}N$ , of peptides. Assignments in viomycin sulphate, 546  
 studies of peptides, a new tool in high resolution; photo-CIDNP in the tyrosyl unit, 872  
 studies of the binding of  $^{15}N$ -labelled ligands to haemins and haemoproteins. Solvent effects on the  $^{15}N$  paramagnetic shifts of iron-bound  $C^{15}N^-$  in low-spin haemin cyanide complexes and cyano haemoproteins, 616  
 studies,  $^{31}P$ , and synthesis, of trinuclear palladium cluster complexes; *X*-ray structure of  $[Pd_3Cl(PPh_3)_2(PEt_3)_3][BF_4]$ , 709
- Nuclear quadrupole resonance** spectra,  $^{14}N$ , of co-ordinated thiocyanate, 599  
 spectroscopy, conformational studies of chlorotetrahydropyrans by, 19
- Nucleophilic** aromatic substitution, low temperature flow nuclear magnetic resonance detection of transient intermediates on the actual reaction pathway in, 335
- Nucleoside**, a 5-aminoimidazole, an unusual rearrangement during diazotization of a, 151  
 Transnucleosidation: adenine analogue of the nucleoside skeleton of the polyoxins, 159
- C-Nucleosides**, antibiotic, an active dienophile and ethoxycarbonylketen equivalent in the synthesis of: 1,3-diethoxycarbonyllallene, 582
- Nucleosides**. Conversion of guanosine into its  $N^2$ -methyl derivative, 447  
 2'-deoxy pseudouridine, 460  
 synthesis of new, containing a fused cyclopropane ring: 1- $\{(1R,3R,5R)\text{-}2\text{-oxabicyclo[3.1.0]hexan-3-yl}\}$ -thymine and -uracil, 248  
 synthesis of some D-mannofuranosyl and D-lyxofuranosyl imidazole and adenine, and anomalous  $^1H$  nuclear magnetic resonance spectra of related anomers, 753  
 trifluoromethylated pyrimidine, simple synthesis of, 536
- Nucleotide**, oligo-; 'oxine' (8-hydroxy-quinoline) as a reagent for protection of internucleotidic bonds in synthesis, 190  
 oligo-, synthesis, a new phosphorylating agent for: 4-nitrophenyl phenyl phosphorochloridate, 802  
*X*-ray crystal structure of a stable metal-5'-uridine monophosphate (UMP) complex,  $[Cu(5'\text{-UMP})(2,2'\text{-dipyridylamine})\text{-}(H_2O)]_2$ , 272
- Nucleotides**, interactions of metal ions with. Metal bonding to N(7) in the ternary copper(II)-inosine 5'-phosphate complex  $[Cu(5'\text{-IMP})2,2'\text{-bipyridyl}](H_2O)_2 \cdot NO_3 \cdot H_2O$ : *X*-ray crystal structure analysis; and metal bonding to both N(7) and phosphate in the binary complex  $[Cu(5'\text{-IMP})] \cdot H_2O$ : *X*-ray characterization, 600
- ( $\pm$ )-**Ocoteine**, synthesis of, by non-phenolic coupling with thallium tris(trifluoroacetate) (TTFA). Thallium in organic synthesis, 538
- Octan-2-ones**, 3-alkyl bicyclo[2.2.2]-, an anisotropic inductive effect as an important factor in the hydride reduction of. Asymmetric induction, 372
- Oestrogens**, oxidative bonding of natural, to DNA by chemical and metabolic means, 386
- Oleate**, methyl, allylic hydroperoxides from the autoxidation of, 364
- Olefin**, epoxy-, cyclisation, a synthon for, 497  
 -metallacyclopentane interchange reaction, the, 864  
 metathesis, initiation of: reaction of deca-2,8-diene with catalysts formed from  $Me_4Sn-WCl_6$  and  $Me_3Al_2Cl_3-(Ph_3P)_2(NO)_2Cl_2Mo$ , 634  
 syntheses, diketene as a butenoic acid synthon in regioselective, 500
- Olefins**, activated, stoichiometric reduction of, by co-ordinated and free tertiary alkyl phosphines, 155  
 and dienes; formation of dihydropyrans in the photocycloaddition of a steroidal enedione to, 700  
 aziridination of. Formation of aziridines in the oxidation of  $\beta$ -aminoalkylpalladium complexes by bromine, 413  
 Change from a  $\sigma$ -alkyl intermediate to a carbonium ion intermediate in reactions of olefins on a molybdenum sulphide catalyst, 180  
 conversion of vicinal diols into, *via* the derived bisdithiocarbonates, 866  
 ene reaction of chloral with, catalysed by Lewis acids, and some applications in organic synthesis, 380



- Olefins**—*continued*  
 epoxidation of, induced by electrophiles. Activation and transfer of oxygen atom from dioxygen—metal complexes, 204  
 hydrogenation of, by supported transition metal complexes, 510  
 metathesis of, having a quaternary ammonium group, 502  
 oxyseleation of, by the use of aryl or alkyl selenocyanates and copper or nickel halides, 166  
 preferred field ionisation of, at a silver nitrate surface, 463  
 reaction of singlet oxygen with hindered; evidence for a peroxide intermediate, 517
- E-Olefins**, stereoselective synthesis of, by the reaction of alkenylboranes with palladium acetate, 852
- Olivanic acid** derivatives MM 4550 and MM 13902, structures of; two new, fused  $\beta$ -lactams isolated from *Streptomyces olivaceus*, 523
- Organocuprate** intermediate, synthetic use of an unusual, 761
- Osmium**, Co-ordinated thioformaldehyde monomer. Synthesis and reactions of  $[\text{Os}(\eta^2\text{-CH}_2\text{S})(\text{CO})_2(\text{PPh}_3)_2]$ , 901  
 Interconversion and degradation of acyl and enolato-ligands in trisium clusters, 472  
 Nonacarbonyl(dinitrosyl)triosmium: a new nitrosyl cluster, 477  
 Stereospecific exchange of carbon monoxide in clusters of the type  $[\text{Os}_3(\text{CO})_{10}\text{X}_2]$ , 329  
 The structure of  $[\text{Os}_2(\text{CO})_{21}]$ ; X-ray and  $^{13}\text{C}$  nuclear magnetic resonance analyses, 385
- 4-Oxa-1-azabicyclo[3.2.0]hept-2-enes**, 7-oxo-, total synthesis of clavulanic acid analogues *via* isomerization of, 905
- 1,2,4-Oxadiazolones**, diphenyl- $\Delta^3$ -, and diphenyl- $\Delta^4$ -; thermolysis of, 489
- 1,3-Oxathian**, alkylation of, 814
- 1,3,2-Oxazaphosph(v)oles**, 2,5-dihydro-, preparation and properties, 934
- Oxazetidone**, 2,3-dialkyl-4-alkylamino-1,2-; proton-assisted ring opening of a, 831
- Oxazine**, *N*-benzoyl-3,6-dihydro-1,2-, [3,3]sigmatropic rearrangement of an, derived from ergosteryl acetate and nitroso-carbonylbenzene, 23
- Oxazines**, 4a,7a-dihydrocyclopenta[*e*][1,2]-, synthesis of pyridines by thermolysis of, 252
- Oxaziridines**, 2-arylsulphonyl-3-phenyl-, a new class of stable oxaziridine derivatives, 25
- Oxazole**, benz-, and benzonitrile formation. Flash vacuum pyrolysis of 1,2-benzisothiazole 1,1-dioxides, 673  
 phenanthro[9,10-*d*]-, mechanism of the photomethylation of, in ethanol, 511
- Oxazol-5(4H)-one**, an, derived from a benzyloxycarbonyl-amino-acid, 281
- Oxidation**, chemical and microbiological remote, of (–)-bornyl acetate, 358  
 homogeneous catalytic, of secondary alcohols to ketones, by molecular oxygen under mild conditions, 157  
 of carbon monoxide, oscillations of the platinum-catalysed, induced by inhibitors, 882  
 Oxygen species contributing to the formation and the decomposition of an intermediate in the complete oxidation of ethylene over a silver catalyst, 71  
 reactivity of oxygen species adsorbed on silver for CO, 37  
 states, stabilisation of high, by strong electron donors: the crystal structure of tetra-*n*-butylammonium *o*-phenylenebis-biuretato cuprate(II)—chloroform, 444
- N-Oxides**, pyridine, photochemistry of. Trapping of the main primary product with base, 837
- Oximes**, hydrazones and semicarbazones, regeneration of ketones from, by benzeneseleninic anhydride, 445  
*O*-sulphonylated, complex C.I.D.N.P. effects in the rearrangement of, 540
- 'Oxine'** (8-hydroxyquinoline) as a reagent for protection of internucleotidic bonds in oligonucleotide synthesis, 190
- 7-Oxo-4-oxa-1-azabicyclo[3.2.0]heptane**, ring system, novel synthesis of the, 359
- Oxyfluoro** species. Preparation and Raman spectra of  $\text{XeOF}_2$ ,  $\text{XeOF}_3^-$ , and  $\text{XeO}_3\text{F}_3^-$ , 595
- Oxygen**. Activation and transfer of oxygen atom from dioxygen—metal complexes. Epoxidation of olefins induced by electrophiles, 204  
 singlet, reaction of, with hindered olefins: evidence for a peroxide intermediate, 517
- Oxygen**—*continued*  
 X-ray crystal structure of a new heteropolyanion,  $[\text{P}_4\text{W}_8\text{O}_{40}]^{12-}$  with an X:M ratio of 1:2, 674
- Oxygen-17** nuclear magnetic resonance spectroscopy: the sign of the O–H nuclear spin–spin coupling constant, 922
- Palladium** acetate, stereoselective synthesis of *E*-olefins by the reaction of alkenylboranes with, 852  
 (II)-catalysed formation of indoles from 2,2-diphenyl-2*H*-azirines, 664  
 (II)-catalysed ring expansion of methylene cyclobutanes and related systems, 583  
 chloride- $\pi$ -allyl complexes from calciferol and related compounds, 799  
 cluster complexes, synthesis and  $^{31}\text{P}$  nuclear magnetic resonance studies of trinuclear; X-ray structure of  $[\text{Pd}_3\text{Cl}(\text{PPh}_2)_2(\text{PEt}_2)_3][\text{BF}_4]$ , 709  
 Formation of aziridines in the oxidation of  $\beta$ -aminoalkyl-palladium complexes by bromine. Aziridination of olefins, 413  
 High barrier to rotation about the Pd–N bond in *trans*-dichlorodihydrazonepalladium(II) complexes, 89  
 Highly general stereo-, regio-, and chemo-selective synthesis of terminal and internal conjugated enynes by the Pd-catalysed reaction of alkenylzinc reagents with alkenyl halides, 683  
 Hydrogen exchange between amines and chloroform catalysed by palladium(II) amine complexes containing a  $\beta$ -diketonate anion in the outer sphere, 914  
 Isolation of stable  $\beta$ -alkoxyethylpalladium complexes and the first direct evidence for *trans* alkoxy-palladation of ethylene, 610  
 Mechanism of the formation of cyclobutadiene–palladium chloride complexes: the X-ray structures of  $[\text{Pd}(\text{bipy})\{\text{C}_4\text{Me}_4\text{CMe}=\text{C}_4\text{Me}_4\text{Cl}\}]\text{Cl}$  and  $[\text{Pd}_2\text{Cl}_3(\eta^4\text{-C}_4\text{Me}_2\text{Me}_2)_2][\text{Pd}_2\text{Cl}_6]$ , 289  
 metallic, activating effect of, on the reduction rate of  $\text{Ni}^{2+}$  ions in an X type zeolite, 102  
 $[\text{PdCl}_2(\text{PET}_3)_2]$ -catalysed formation of 1,4-disilacyclohexa-2,5-diene from 1-silacyclopentene, 352  
 Oxidative addition of triaryl cyclopropenium bromides to  $\text{Pd}^0$  and  $\text{Pt}^0$  compounds: the synthesis and X-ray structure of  $\text{Pd}_3\{\mu\text{-}[\eta^3\text{-C}_3(\text{Ph})(p\text{-MeOC}_6\text{H}_4)_2]_2\}(\text{acac})_2$  (*Pd–Pd–Pd*), 178  
 Stereochemistry of the hydroxypalladation step in the Wacker process, 264  
 Tris- and tetra-perhalogenoaryl metallates of cobalt(II), nickel(II), palladium(II) and platinum(II), 789  
 X-ray crystal and molecular structure of  $\mu$ -carbonylbis- $\mu$ -(bis-diphenylarsinomethane)dichlorodipalladium(I); a binuclear compound of palladium(I) without a Pd–Pd bond, 823
- Papain**–*N*-benzoylaminoacetaldehyde complex, an investigation of the; detection of enzyme-bound intermediates by cross-saturation in nuclear magnetic resonance spectroscopy, 451  
 chemical mutations. The preparation of Ser 25- and Gly 25-papain, 923
- Patchouli alcohol**, reaction of, with lead tetra-acetate; a new regio-specific fragmentation of patchouli alcohol, 120
- Penem**, 1-oxadethia-, ring system, the synthesis of the; syntheses based on 1,2-secopenicillins, 720
- Penicillanic acid** derivatives, mechanism of epimerisation of, 57
- Penicillins**, 1-oxadethia-; synthesis and stereochemical assignments using lanthanide induced shifts, 405  
 1,2-seco-, syntheses based on; the synthesis of the 1-oxadethiapenem ring system, 720
- Pentalenes**, hetero-, a new series of. Loss of nitrogen in acylation reactions of 5-amino-1,2,3,4-thiaziazole, 143
- Pentane-2,4-dione**, 3-hydroxyimino-, and benzylamine; X-ray structure of 4-acetyl-5-methyl-2-phenylimidazole formed from, 443
- Peptide** analogues of rubredoxin and four-iron ferredoxins, direct formation from their components, 908
- Peptides**, a new tool in high resolution nuclear magnetic resonance studies of: photo-CIDNP in the tyrosyl unit, 872  
 high field  $^{15}\text{N}$  nuclear magnetic resonance spectroscopy of. Assignments in viomycin sulphate, 546  
 oligo-, novel conformational  $\beta \rightarrow \alpha$  transformation in the solid state by shear stress, 924

**Peptides**—*continued*

Protected decapeptide *ortho*-nitrophenylsulphenyl-(*L*-leucyl-*L*-alanyl)<sub>5</sub>-ethyl ester [Nps-(*L*-Leu-*L*-Ala)<sub>5</sub>-OEt]. Shortest critical peptide size for development of the  $\alpha$ -helix in the solid state, 805

Synthesis of the nonacosapeptide corresponding to the entire amino acid sequence of duck glucagon, 909

**Perepoxyde** intermediate, evidence for a: reaction of singlet oxygen with hindered olefins, 517

**Perfluoro** compound, synthesis of a, of phosphorus and silicon. Tris(trifluorosilyl)phosphine, 564

**Perhalogenoaryl**, tris- and tetra-metallates of cobalt(II), nickel(II), palladium(II), and platinum(II), 789

**Peroxides**, allylic hydro-, from the autoxidation of methyl oleate, 364

**Peroxy acid**, stereochemistry and mechanism of cleavage of the platinum-carbon  $\sigma$ -bond by, 241

**Peroxynitrite** esters, rearrangement of, 754

**Phase-transfer** catalysts, heterogeneous: high efficacy of catalysts bonded by a long chain to a polymer matrix, 639 catalysts, silica gel as a polymeric support for, 641

photochemistry: use of tetrabutylammonium cyanide for photocyanation of aromatic compounds, 885

**Phenanthrene**, an improved synthesis: a simple route to ( $\pm$ )-tylophorine, 826

1,2- and 3,4-epoxydihydro-, chemical resolution and racemization of, 873

**Phenanthroindolizidine** alkaloids, biosynthesis from 6,7-diphenylhexahydroindolizidines, 953

**1,10-Phenanthroline**, molecular association without co-ordination in an adduct of, with a manganese(II) macrocyclic complex; X-ray crystal and molecular structure, 558

**Phenazines**, dihydrophenazines, triphenyl(*o*-hydroxyphenylimino)phosphoranes and their metal complexes, synthesis of. Deoxygenation of 2-nitrosophenols and of their metal complexes with triphenylphosphine, 400

**Phenol**, *p*-nitro-, synergism in the hydrogenation of, on platinumised WO<sub>3</sub>, 193

**Phenols**, *ortho*-alkenyl-, cyclofunctionalisation of: a new method for introducing the benzeneseleno-group, 725

**Phenolysis** reactions, reactivity patterns in. Evidence for the importance of  $\pi$ -complexing, 5

***o*-Phenylenediamines**, new route to nucleophilically substituted, 189

**Phospha-alkenes**, electronic structure of, 322

**Phosphine**, hydridotriphenyl-, complexes of ruthenium; interactions of alkenes with, 59

**Phosphines**, diacetylene di-, of the type Bu<sub>2</sub>PC $\equiv$ C[CH<sub>2</sub>]<sub>*n*</sub>-C $\equiv$ CPBu<sub>2</sub> (*n* = 4 or 5), large-ring complexes formed from; X-ray structure of [IrCl(CO){Bu<sub>2</sub>PC $\equiv$ C[CH<sub>2</sub>]<sub>6</sub>C $\equiv$ CPBu<sub>2</sub>}], 311

rapid transfer of selenium from tertiary phosphine selenides to tertiary, 708

tertiary alkyl, stoichiometric reduction of activated olefins by co-ordinated and free, 155

**Phosphinothioic** halides, stereoselective synthesis of. Novel reaction of phosphinothioic methanesulphonic anhydride with aluminium halides, 66

**Phosphonatase** model, a new. Metal ion- and pyridoxal-catalysed transamination and dephosphonylation of 2-amino-3-phosphonopropionic acid, 342

**Phosphonic** diesters, *ortho*-substituted aroyl-, ring-forming deoxygenation of, 216

**Phosphonopropionic acid**, 2-amino-3-, metal ion- and pyridoxal-catalysed transamination and dephosphonylation of. A new phosphonatase model, 342

**Phosphorane**, a new bicyclic, 156  
silylamino-substituted, synthesis of a, 111

**Phosphoranes**, triphenyl(*o*-hydroxyphenylimino)-, phenazines, dihydrophenazines and their metal complexes, synthesis of. Deoxygenation of 2-nitrosophenols and of their metal complexes with triphenylphosphine, 400

**Phosphorinans**, 1,3,2-dioxo-, formation of *via*  $\alpha$ -proton abstraction. Reaction of *o*-hydroxyphenyl alkyl ketones with phosphorus trichloride, 569

**Phosphorochloridate**, 4-nitrophenyl phenyl: a new phosphorylating agent for oligonucleotide synthesis, 802

**Phosphorus** and silicon, synthesis of a perfluoro compound of. Tris(trifluorosilyl)phosphine, 564

**Phosphorus**—*continued*

route to chiral imidate esters of: synthesis and hydrolysis of (S)-(+)-*O*-ethyl *N*-*t*-butyl methylphenylphosphinimidate, 33  
Solution structure and reactivity of M<sup>+</sup>[Fe(CO)<sub>3</sub>(NO)]<sup>-</sup>, M=Na, K, or PPN [PPN=(Ph<sub>3</sub>P)<sub>3</sub>N], 362

The N-H link as a 'probe' for the electronic structure of the phosphorus-nitrogen bond in aminophosphines. An infrared spectroscopic study, 614

trichloride, reaction of *o*-hydroxyphenyl alkyl ketones with. Formation of 1,3,2-dioxaphosphorinans *via*  $\alpha$ -proton abstraction, 569

Trimethylsilyl migration from nitrogen to carbon in a silicon-nitrogen-phosphorus compound, 308

X-ray crystal structure of a new heteropolyanion, [P<sub>4</sub>W<sub>8</sub>O<sub>40</sub>]<sup>12-</sup>, with an X:M ratio of 1:2, 674

**Photoelectron** spectroscopy, adsorption of carbon monoxide on copper(100) at 295 K, characterized by, 377  
spectrum, helium I, of disulphur dinitride, 217

**Photo-induced** dimerization of 1-naphthoxide anion: a new type of photochemical reaction, 81

**Photomethylation** of inorganic mercury by aliphatic  $\alpha$ -aminoacids, 158

**Phthalide**, 6-farnesyl-5,7-dihydroxy-4-methyl-, synthesis in a cell-free preparation from *Penicillium brevicompactum*. Biosynthesis of mycophenolic acid, 949

5,7-dihydroxy-4-methyl-, farnesyl transferase, from *Penicillium brevicompactum*: substrate stereochemistry of farnesyl pyrophosphate. Biosynthesis of mycophenolic acid, 950

**Phytoalexin** mimic, production of a grapevine: oxidative dimerisation of 4-hydroxystilbenes *in vitro*, 208

**(1S,5S)-(-)- $\beta$ -Pinene**, asymmetric induction in the ene reaction of chloral with; control of stereoselectivity by the choice of Lewis acid catalyst, 382

**Piperidine**. Synthesis and X-ray crystal structures of dimorpholino-di-, -tri-, and -tetra-selane, and dipiperidinotetra-selane, 833

**3-(2-Piperidyl)pyridinium** derivative ('anabilsine'), identification of, as a cross-linking entity in a glutaraldehyde treated protein, 759

**Plastocyanin**, evidence for an initial association in reactions of, with inorganic complexes, Stopped-flow kinetic studies on electron-transfer reactions of blue copper proteins, 764

**Platinum** and nickel, bridging acetylene complexes; X-ray crystal structure of [Pt<sub>3</sub>(Et<sub>3</sub>P)<sub>4</sub>(PhC<sub>2</sub>Ph)<sub>2</sub>], 930  
catalysed oxidation of carbon monoxide, oscillations of the, induced by inhibitors, 882

Dinuclear complex of methionine S-oxide with platinum(II) involving imido-bridging; X-ray crystal structure of di- $\mu$ -[(2S,SS)-2-amino-4-methylsulphonylbutanoato(-2)-S,*O*- $\mu$ -N]diplatinum(II), 607

direct evidence for the intermediacy of adsorbed alkyl species in the isomerization of neopentane on, 563

Five co-ordinate complexes of platinum(II), 212

gas-phase reactions on. Mechanism of the 1,2-bond shift rearrangement of alkanes, 95

Intramolecular rearrangement of NN'-diaryldi-imidosulphur complexes of zerovalent platinum to a compound of bivalent platinum involving N=S bond cleavage and concomitant hydrogen migration and N-C(aryl) bond formation; X-ray crystal structure of one of the products, 739

New route to the direct synthesis of mixed metal chain oligomers. Identification of a platinum complex having an intense emission in the visible spectrum in aqueous solution, 62

Nitrosyl coupling in transition metal complexes: the molecular structure of [(Ph<sub>3</sub>P)<sub>2</sub>Pt(N<sub>2</sub>O<sub>2</sub>)], 354

Nucleophilic attack on  $\pi$ -etheneplatinum(II) complexes: *cis*-isomers, 926

Oxidative addition of triarylcyclopropenium bromides to Pd<sup>0</sup> and Pt<sup>0</sup> compounds: the synthesis and X-ray structure of Pd<sub>3</sub>{ $\mu$ -[ $\eta^3$ -C<sub>3</sub>(Ph)(*p*-MeOC<sub>6</sub>H<sub>4</sub>)<sub>2</sub>]<sub>2</sub>}(acac)<sub>2</sub>(Pd-Pd-Pd), 178

Polarised specular reflectance of the new one-dimensional 'metals' K<sub>1-75</sub>[Pt(CN)<sub>4</sub>].1.5H<sub>2</sub>O, Rb<sub>1-75</sub>[Pt(CN)<sub>4</sub>].1.5H<sub>2</sub>O, and Cs<sub>1-75</sub>[Pt(CN)<sub>4</sub>].1.5H<sub>2</sub>O, 186

—rhenium catalysts, alumina-supported, hydrogen spillover on, 631

Solvolytic of *cis*-[Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>] in dimethyl sulphoxide and reactions of glycine with [PtCl<sub>3</sub>(Me<sub>2</sub>SO)]<sup>-</sup> as probed by <sup>195</sup>Pt nuclear magnetic resonance shifts and <sup>195</sup>Pt-<sup>15</sup>N coupling constants, 861

**Platinum**—*continued*

- Stereochemical non-rigidity of a metal polyhedron; Fourier transform platinum-195 nuclear magnetic resonance spectra of  $[\text{Pt}_n(\text{CO})_{2n}]^{2-}$  ( $n = 3, 6$  or  $9$ ), 309
- Stereochemistry and mechanism of cleavage of the platinum-carbon  $\sigma$ -bond by peroxy acid, 241
- Tris- and tetra-perhalogenoaryl metallates of cobalt(II), nickel(II), palladium(II) and platinum(II), 789
- X-ray crystal structure of a 2:2 chloroterpentine platinum(II)-adenosine-5'-monophosphate intercalation complex, 824
- Polar** effects, transmission of: prediction by the Kirkwood-Westheimer electrostatic field effect model, 608
- Polarised specular reflectance** of the new one-dimensional 'metals'  $\text{K}_{1.75}[\text{Pt}(\text{CN})_4] \cdot 1.5\text{H}_2\text{O}$ ,  $\text{Rb}_{1.75}[\text{Pt}(\text{CN})_4] \cdot 1.5\text{H}_2\text{O}$ , and  $\text{Cs}_{1.75}[\text{Pt}(\text{CN})_4] \cdot 1.5\text{H}_2\text{O}$ , 186
- Polyacetylene**  $(\text{CH})_x$ , halogen derivatives of: synthesis of electrically conducting organic polymers, 578
- Polyamide** resins, application of, to polypeptide synthesis: human  $\beta$ -endorphin, 819
- Polyketide** biosynthesis, deuterium as a tracer in: a new method for the detection of chain starter units, 921
- biosynthesis, deuterium as a tracer in: incorporation of  $[2\text{-}^{13}\text{C}, 2\text{-}^2\text{H}_3]\text{acetate}$  into terrein, 624
- Polymer** supports, insoluble, a monoblocking agents of symmetrical diamines, 798
- Polymerisation**, homo-, of cyclohexene under mild conditions: polycyclohexene, 363
- reactions, generalisation of a theory of compartmentalised free-radical, 783
- Theory of compartmentalised free-radical polymerisation reactions, 148
- Polymers**, chemical modification of. Borohydride reducing agents derived from anion exchange resins, 815
- interaction of cycloalkanes with, 384
- Polynuclear** cation, chiral, barrier to racemization of the framework of a, 393
- Polyoxins**, adenine analogue of the nucleoside skeleton of the, transnucleosidation, 159
- Polypeptide** synthesis, application of polyamide resins to: human  $\beta$ -endorphin, 819
- Polysaccharide** conformation and interactions by circular dichroism, characterisation of: anomalous chiroptical effects in hyaluronate systems, 44
- Polythiazole**—containing antibiotic micrococin P, total structure of the. A  $^{13}\text{C}$  nuclear magnetic resonance study, 706
- Poly(thiazyl bromide)**,  $(\text{SNBr}_{0.4})_x$ ; a 'metallic' derivative of polymeric sulphur nitride, 473
- Porphyrim**. A dimethyl ester; isolation, crystallisation and synthesis of: cytochrome C oxidase, 278
- di-,  $\mu$ -superoxidocobalt complex of a cofacial, 800
- metallo-, catalysed epoxidations with molecular oxygen, 821
- octaethyl-,  $^{15}\text{N}$  nuclear magnetic resonance spectra of, 226
- Porphyrim**, biosynthesis of the natural (type-III): proof that rearrangement occurs after head-to-tail bilane formation, 113
- Dihalide complexes of titanium(IV) tetraphenylporphyrin. Precursors to low-valent titanium porphyrins, 763
- Enzymic formation of the type-III porphyrin macrocycle from unrearranged AP.AP pyrromethane, 115
- free-base  $^{15}\text{N}$ -, dynamic  $^1\text{H}$  and  $^{15}\text{N}$  nuclear magnetic resonance of, 184
- Intermediates between uroporphyrinogen-1 and coproporphyrinogen-1, 696
- Kinetics of binding of imidazole to  $\alpha\beta\gamma\delta$ -tetraphenylporphyrinatoiron(III) in dimethyl sulphoxide, 106
- Mechanistic study of the enzymic incorporation of unrearranged AP.AP pyrromethane into uro'gen-III, 117
- Reaction of carbon tetrachloride with 5,10,15,20-tetraphenylporphyrinato(II)  $[(\text{TPP})\text{Fe}^{\text{II}}]$ : evidence for the formation of the carbene complex  $[(\text{TPP})\text{Fe}^{\text{II}}(\text{CCl}_2)]$ , 648
- synthesis of *meso*-substituted, 771
- Potassium**. A thermochemical cycle for the heat of complexing of  $\text{Na}^+$  and  $\text{K}^+$  cations with cryptand 222 in water and methanol, 893
- t*-butoxide dehalogenations of bicyclic dihalides, 661
- Polarised specular reflectance of the new one-dimensional 'metals'  $\text{K}_{1.75}[\text{Pt}(\text{CN})_4] \cdot 1.5\text{H}_2\text{O}$ ,  $\text{Rb}_{1.75}[\text{Pt}(\text{CN})_4] \cdot 1.5\text{H}_2\text{O}$ , and  $\text{Cs}_{1.75}[\text{Pt}(\text{CN})_4] \cdot 1.5\text{H}_2\text{O}$ , 186
- Solution structure and reactivity of  $\text{M}^+[\text{Fe}(\text{CO})_3(\text{NO})]^-$ ,  $\text{M} = \text{Na}, \text{K}$ , or PPN  $[\text{PPN} = (\text{Ph}_3\text{P})_2\text{N}]$ , 362

**Potassium**—*continued*

- tetrafluorochromate(III), novel columnar anion in: X-ray crystal structure, 533
- Prephytoene** and presqualene alcohols, resolution of, 860
- Presqualene** and prephytoene alcohols, resolution of, 860
- Proacacipetalin** and acacipetalin, 952
- Propanamide**, *NN*-dimethyl-, *NN*-diethylacetamide, *NN*-dipropylacetamide, tetramethylurea, and tetraethylurea: solvents for alkali metals, 188
- [3.3.3]Propellane-2,8,9-trione**: X-ray molecular structure of a highly symmetrical triketone, 430
- Propene**, 2-methyl-, orientation of dinitrogen trioxide addition to, and structure of the addition product, 766
- Propylamide**, potassium 3-amino-, novel synthesis of an  $\omega$ -alkynylorganometallic reagent *via* triple bond isomerization with;  $\omega$ -(9-borabicyclo[3.3.1]nonan-9-yl)alk-1-ynes, 318
- Prostacyclin**. Prostacyclin (PGX), an isomer, synthesis of (4*E*)-9-deoxy-6,9 $\alpha$ -epoxy- $\Delta^4$ -PGF<sub>12</sub>, 331
- Prostacyclin (PGI<sub>2</sub>), simple efficient synthesis of, 630
- Prostaglandin**. Prostaglandin-C<sub>9</sub>, 9 $\alpha$ -hydroxy-9-deoxy-, synthesis of alkyl and trialkylsilyl derivatives of, 886
- Prostaglandin-F<sub>2 $\alpha$</sub> , synthesis of, by conjugate addition of a cuprate reagent to 3-*t*-butyldimethylsilyloxytricyclo[3.2.0.0<sup>2,7</sup>]heptan-6-one, 716
- Prostaglandins**, a synthesis of: allyl silanes in organic synthesis, 79
- Prostanoids**, photosynthetic routes to. Synthesis of alkyl and trialkylsilyl derivatives of 9 $\alpha$ -hydroxy-9-deoxyprostaglandin-C<sub>2</sub>, 886
- Protein**, glutaraldehyde-treated, identification of a 3-(2-pyridyl)pyridinium derivative ('anabilylsine') as a cross-linking entity in a, 759
- Proteins**. Chemical mutations of papain. The preparation of Ser 25- and Gly 25-papain, 923
- metallo-, novel method for the investigation of the electrochemistry of; cytochrome c, 771
- stopped-flow kinetic studies on electron-transfer reactions of blue copper. Evidence for an initial association in reactions of plastocyanin with inorganic complexes, 764
- Protic** solvents, anion solvation in, 174
- Proton** transfer reactions, constant selectivity in, to carbon bases in aqueous sulphuric acid; the kinetic acidity function  $\text{H}_2^+$ , 101
- Pseudopotential** calculations on aminophosphine  $\text{H}_2\text{P-NH}_2$ , 615
- Pseudo-rotation** in seven-co-ordination: implications in catalysis. X-ray crystal structure of  $[\text{HMo}(\text{C}_2\text{H}_4)_2(\text{cis-Ph}_2\text{PCH}=\text{CHPh})_2]^+$ , 662
- Pseudouridine**, 2'-deoxy-, 460
- Pterocarpan**, biosynthesis; stereochemistry of isoflavone reduction during; an investigation using deuterium nuclear magnetic resonance spectroscopy, 338
- Pulse radiolysis** and electron spin resonance studies in aqueous solution. Spectroscopic evidence for non-planarity in nickel(III) complexes of macrocyclic ligands, 755
- Pyran**, dihydro-, oxidation of, with  $\text{MoO}_5 \cdot \text{HMPA}$ , 205
- Pyranoside**, methyl 3-acetamido-2,3,6-trideoxy-3-*c*,4-*O*-dimethyl-*L*-xylo-hexo-, X-ray crystal structure of. Stereochemistry of C-3 of evernitrose: a fallacy in the determination of stereochemistry at quaternary centres using nuclear magnetic resonance spectroscopy, 313
- Pyrazines**, 2,5-diaryl-, unusual formation from  $\alpha\alpha'$ -dibromoacetophenone azines and hydrazine, 13
- $\Delta^1$ -**Pyrazolines**, divinyl-, and divinylcyclopropanes, thermal decomposition of bicyclic, 330
- Pyrazolo[4,3-*d*]pyrimidines**, new synthesis of, 556
- Pyridazine** 1,2-dioxides, correction to the structure of the photo-isomers of; X-ray crystal structure analysis, 856
- 1,2-dioxides, photolysis of; formation of the novel 1,4,6,7-dioxadiazocin ring system, 133
- Pyridine**, 2,2'-bi-, direct evidence for a rate-determining chelate ring closure mechanism during the reaction of, with the hexakis(dimethyl sulphoxide)aluminium(III) ion in nitromethane solution, 586
- nitrogen, effects of substituents on the reactivity of the, 897
- N*-oxides, photochemistry of. Trapping of the main primary product with base, 837
- pentafluoro-, photochemical addition of ethylene to: formation of 1:1- and 2:1- adducts, 669

- Pyridines** and pyrimidines, new route to annulated, 663  
as leaving groups in synthetic transformations: conversion of amines into esters, 701  
bisdehydro-: MNDO (modified neglect of diatomic overlap) molecular orbital calculations, 539  
synthesis of, by thermolysis of 4a,7a-dihydrocyclopenta[*e*]-[1,2]oxazines, 252
- Pyridinium bromides**, *N*-phenacyl, linear free energy relationships for carbon-13 chemical shifts in, 119
- Pyrimidine**, trifluoromethylated, nucleosides, simple synthesis of, 536
- Pyrimidines** and pyridines, new route to annulated, 663  
pyrazolo[4,3-*d*]- new synthesis of, 556
- Pyrimido[4,5-*b*]quinoline-2(3H),4(10H)-dione** (5-deazaflavin) dehydrogenation of alcohols by, 825
- Pyrolysis**, flash vacuum, of 1,2-benzisothiazole 1,1-dioxides. Benzoxazole and benzonitrile formation, 673  
flash vacuum, of *syn*-9-bicyclo[4.2.1]nona-2,4,7-trienyl chlorosulphite; generation of *endo*-9-chloro-*cis*-bicyclo[4.3.0]nona-2,4,7-triene by, 545
- 4-Pyrone** photochemistry. The intermediacy of a cyclopentadienone epoxide, 598
- Pyrrrole**, *N*-trifluoroacetyl-, hydration of. First evidence for hydration of amides, 857
- Pyrrolidine**, 3-cyano-3-methoxycarbonyl-2,4,4,5-tetraphenyl-, as a precursor of benzyldenammonium benzylyde, 768
- Pyrrrolizidine**, skeleton, transannular route to the. *X*-ray crystal structure of 1-bromopyrrrolizidine, 431
- Pyrrromethane**, enzymic formation of the type-III porphyrin macrocycle from unrearranged AP.AP, 115  
Mechanistic study of the enzymic incorporation of unrearranged AP.AP pyrrromethane into uro'gen-III, 117
- Quinizarin** boroacetate and 1,4-diaminoanthraquinone diboroacetate as dienophiles, 745
- Quinolones**, *N*-methyl-2-, conversion of anilines into, *via* [2,3]sigmatropic rearrangements, 694
- Quinone** bisacetal organocopper compounds, utilization of, in the synthesis of isoprenoid systems, 499  
methide intermediates, synthesis of a variety of polycyclic heteroaromatic compounds *via*, 916  
novel rearrangement of an *ortho*- to a *para*-, total synthesis of bikaverin involving the, 645
- Quinones**, intermediates in the 1:2-addition of 1,1-diethoxyethene to: synthesis of deoxyerythrolaccin, 297
- Radical anion**, the, [C<sub>6</sub>F<sub>6</sub>I]<sup>-</sup>, 408
- Radical-transfer** mechanism, cation, photosensitized dimerisation of styrene derivatives by a, 485
- Raman** optical activity due to isotopic substitution: [α-<sup>2</sup>H]-benzyl alcohol, 305  
spectra and preparation of XeOF<sub>2</sub><sup>-</sup>, XeOF<sub>3</sub><sup>-</sup>, and XeO<sub>2</sub>F<sub>3</sub><sup>-</sup>, 595  
spectrum of carbon monoxide on a platinum electrode surface, 235
- Reactivity** patterns in phenolysis reactions. Evidence for the importance of π-complexing, 5
- Reductases**, Δ<sup>4</sup>-3-ketosteroid, a non-enzymatic model of, 480
- Reduction**, stoichiometric, of activated olefins by co-ordinated and free tertiary alkyl phosphines, 155
- Resonance energies**, a quantitative probe for. The Diels-Alder reaction, 817  
per π electron, correlation between and Sondheimer's rates of formation of macrocyclic annulenes, 243
- Rhenium**. Kinetics of reactions of bromine and iodine with some substituted dimanganese and dirhenium carbonyls, 265  
platinum catalysts, alumina-supported, hydrogen spillover on, 631  
Tetrameric cyano-rhenium complexes with sulphur and selenium bridges: preparation and *X*-ray crystal structures of (Ph<sub>4</sub>P)<sub>4</sub>[Re<sub>4</sub>S<sub>4</sub>(CN)<sub>12</sub>].3H<sub>2</sub>O and (Ph<sub>4</sub>P)<sub>4</sub>[Re<sub>4</sub>Se<sub>4</sub>(CN)<sub>12</sub>].3H<sub>2</sub>O, 221
- Rhodium**. A stable monomeric compound with a superoxo-ligand: formation of [Rh(ethylenediamine)<sub>2</sub>(NO<sub>2</sub>)(O<sub>2</sub>)<sup>+</sup>], 58  
cobalt, and iridium: derivatives of tricarbonylmetallates(-III) of, 686  
Concomitant photoaquation-photoisomerism of *cis*-dichlorotetra-amminerhodium(III), *cis*-[Rh(NH<sub>3</sub>)<sub>4</sub>Cl<sub>2</sub>]<sup>+</sup>, 194  
Effective homogeneous hydrogenation of α-keto esters catalysed by neutral rhodium(I) complexes with phosphine ligands and application to the asymmetric synthesis of lactates, 428
- Rhodium**—*continued*  
Five-, six-, and seven-membered rhodacycloalkanes from [RhI<sub>2</sub>(PPh<sub>3</sub>)(η<sup>6</sup>-C<sub>6</sub>Me<sub>6</sub>)] and BrMg-[CH<sub>2</sub>]<sub>*n*</sub>-MgBr (*n* = 4, 5, or 6). Occurrence of carbon-carbon σ-bond cleavage in the preparation of the rhodacyclopentane derivative, 52  
Fluxional dirhodium complexes: crystal and molecular structure of [Rh<sub>2</sub>(CO)<sub>2</sub>(μ-SPh)<sub>2</sub>(C<sub>6</sub>H<sub>5</sub>)], 434  
Hydrogen and carbonyl scrambling in [Rh<sub>13</sub>(CO)<sub>24</sub>H<sub>5-*n*</sub>]<sup>*n*</sup> (*n* = 2 and 3); a unique example of hydrogen tunnelling, 39  
Isomerisation of [{Rh(μ-SR<sup>1</sup>)(η-C<sub>5</sub>H<sub>5</sub>R<sup>2</sup>)<sub>2</sub>}]<sup>+</sup>: <sup>1</sup>H nuclear magnetic resonance and electrochemical studies and the *X*-ray crystal structure of [*anti*-{Rh(μ-SPh)(η-C<sub>5</sub>H<sub>5</sub>)<sub>2</sub>}]<sub>2</sub>, 436  
Multiple rhodium(II)-rhodium(II) bond in the dimer [Rh<sub>2</sub>(O<sub>2</sub>CMe)<sub>4</sub>(H<sub>2</sub>O)<sub>2</sub>][ClO<sub>4</sub>].H<sub>2</sub>O; *X*-ray crystal structure, 760  
Novel dinuclear iridium(II) and mixed iridium(I)-rhodium(I) complexes. *X*-ray crystal structure of di-μ-benzenethiolatobis[dicarbonyliridium(II)], 47  
Stereoselective homogeneous hydrogenation of arenes to cyclohexanes catalysed by [Rh(η<sup>6</sup>-C<sub>6</sub>Me<sub>6</sub>)Cl<sub>2</sub>]<sub>2</sub>, 427  
Structure of bromotris(triphenylphosphine)rhodium(I) by extended *X*-ray absorption fine structure (EXAFS), 628
- Rhodomyacin** aglycones, total synthesis of, 140
- Rhoeadine** alkaloid skeleton, photochemical approach to the: synthesis of (±)-*cis*-alpinigenine, 419
- Ring-closure**, rules for. Stereoelectronic control in the endocyclic alkylation of ketone enolates, 233
- Ring closures**. Preference for 6-*Exo-Trigonal* closures of ω-hydroxy-α-β-unsaturated esters, 77
- Ring opening**, kinetics of the electrocyclic, of α-cyano-*cis*- and -*trans*-stilbene oxides, 439  
proton-assisted, of a 2,3-dialkyl-4-alkylamino-1,2-oxazetidine, 831  
stereochemistry of the thermal electrocyclic, of α-cyano-*cis*-stilbene oxide, 440
- Rishitin**, structure of M-1 and M-2, metabolites of rishitin in healthy potato tuber tissues, 670
- Rubidium**. Polarised specular reflectance of the new one-dimensional 'metals' K<sub>1.75</sub>[Pt(CN)<sub>4</sub>].1.5H<sub>2</sub>O, Rb<sub>1.75</sub>[Pt(CN)<sub>4</sub>].1.5H<sub>2</sub>O, and Cs<sub>1.75</sub>[Pt(CN)<sub>4</sub>].1.5H<sub>2</sub>O, 186
- Rubredoxin** and four-iron ferredoxins, peptide analogues, direct formation from their components, 908
- Ruthenium**-bipyridyl systems, novel species in, 776  
Catalysis by chlorohydridobis(triphenylphosphine)ruthenium(II) species. Novel kinetics and their implications for activation of saturated hydrocarbons, 550  
Conversion of bonded cyclo-octadiene into a cyclo-octadienyl ligand and cleavage of boron-phenyl bonds of arene-bonded tetraphenylborate anions in ruthenium(II) systems: *X*-ray crystal and molecular structures of [Ru(η<sup>6</sup>-C<sub>6</sub>H<sub>5</sub>BL)<sub>3</sub>](1-3,5,6-η-C<sub>8</sub>H<sub>11</sub>)] (L = Ph or F), 937  
(η<sup>4</sup>-cyclo-octa-1,4-diene)(η<sup>6</sup>-cyclo-octa-1,3,5-triene)ruthenium(0) chemistry: the role of molecular hydrogen in a new synthetic route to cyclo-olefin ruthenium complexes, 132  
Dimeric ruthenium(II) complexes with bridging *NN*-dimethylhydrazine ligands: *X*-ray analysis of the structure of [{RuHCl(cyclo-octa-1,5-diene)}<sub>2</sub>NH<sub>2</sub>NMe<sub>2</sub>], 757  
interactions of alkenes with hydridotriphenylphosphine complexes of, 59  
Photochemistry of a surfactant derivative of tris(2,2'-bipyridyl)-ruthenium(II), 777  
Photosensitization of superoxo-bridged dicobalt(III) cations by tris-(2,2'-bipyridyl)ruthenium(II) in the excited state, 774  
Preparation of new triple-bridged dimers of ruthenium(II) by protonation of basic ruthenium hydrides with the weak acids HX (X = OH, SH, SMe, or F); *X*-ray crystal and molecular structure of [Ru<sub>2</sub>(OH)<sub>3</sub>(PMe<sub>2</sub>Ph)<sub>6</sub>][BPh<sub>4</sub>], 936  
Preparation, *X*-ray crystal structure analysis and reactions of a novel, hydroxo-bridged, tetranuclear, π-arene ruthenium(II) quadrivalent cation [{(η<sup>6</sup>-C<sub>6</sub>H<sub>6</sub>)Ru(OH)}<sub>4</sub>](SO<sub>4</sub>)<sub>2</sub>.12H<sub>2</sub>O, 222
- Spontaneous *N*-aryl (rather than *P*-aryl) orthometallation in the system [RuCl<sub>2</sub>(PPh<sub>3</sub>)<sub>3</sub>]-[CN(Ar)(CH<sub>2</sub>)<sub>2</sub>NAr]<sub>2</sub> (Ar = C<sub>6</sub>H<sub>4</sub>Me-4); *X*-ray crystal and molecular structure of [RuCl(PEt<sub>3</sub>)<sub>2</sub>{CN(Ar)(CH<sub>2</sub>)<sub>2</sub>N(C<sub>6</sub>H<sub>3</sub>Me-4)}], a stereochemically rigid 5-co-ordinate Ru<sup>II</sup> complex with a short (2.2 Å) Ru . . . H contact, 196

**Ruthenium**—*continued*

- Synthesis and reactions of octakis(*t*-butyl isocyanide)dibcoba1 and pentakis(*t*-butyl isocyanide)ruthenium; X-ray crystal and molecular structures of  $[\text{Co}_2(\text{Bu}^t\text{NC})_6]$  and  $[\text{Ru}(\text{Ph}_3\text{P})(\text{Bu}^t\text{NC})_4]$ , 256
- Synthesis of optically active  $\eta^6$ -benzene-ruthenium complexes, 488
- Synthesis and X-ray crystal structure of hexakis(trimethylphosphine)-tris- $\mu$ -methylene-diruthenium(II), 865
- Saccharide**, penta-, synthesis of a branched: one of the core oligosaccharides of human blood-group substances, 449
- Saccharides**, steroidal oligo-, use of carbon-13 spin-lattice relaxation times for sugar sequence determination in, 613
- Samaderine**. Isolation and structure of samaderine A (X-ray analysis) and a new antileukaemic quassinoid samaderine E from *Samadera indica*: plant antitumour agents, 295
- Sceletenone**, as a precursor to the *cis*-3a-(3,4-dimethoxyphenyl)-octahydroindole alkaloids: late stages in the biosynthesis of mesembrine, 60
- Schiff base** chemiluminescence, mechanism of: evidence for an intermediate dioxetan, 874
- Secodine**-type alkaloids; novel access to 2-substituted indoles and a convenient synthesis of, 742
- Seleninic acid**, benzeneperoxy- (benzeneseleninic acid and hydrogen peroxide), conversion of ketones into lactones with: a new reagent for the Baeyer-Villiger reaction, 870
- Selenium**. Cyclofunctionalisation of *ortho*-alkenyl phenols: a new method for introducing the benzeneseleno-group, 725
- Intergrowth structure of  $\text{Eu}_{1-p}\text{Cr}_p\text{Se}_{4-p}$  ( $p = 0.29$ ) and isotypic compounds. A novel type of crystal structure with three incommensurate periodicities in one direction: X-ray study, 879
- New method for deoxygenation of sulphoxides: use of *OO*-diethyl hydrogenphosphoroselenoate, 657
- Preparation of dithio-, thioseleno-, thiosilyl-, and thio-stannylketen acetals, 522
- rapid transfer of, from tertiary phosphine selenides to tertiary phosphines, 708
- Removal of 1,3-dithiolan protecting groups by, 751
- Synthesis and X-ray crystal structure of dimorpholino-di-, -tri-, and -tetra-selane and dipiperidinotetraselane, 833
- Tetrameric cyano-rhenium complexes with sulphur and selenium bridges: preparation and X-ray crystal structures of  $(\text{Ph}_4\text{P})_4[\text{Re}_4\text{S}_4(\text{CN})_{12}]\cdot 3\text{H}_2\text{O}$  and  $(\text{Ph}_4\text{P})_4[\text{Re}_4\text{Se}_4(\text{CN})_{12}]\cdot 3\text{H}_2\text{O}$ , 221
- Triselenathiafulvalenes: a novel sulphur-selenium interchange on trimethyl phosphite coupling of substituted 1,3-diselenole-2-thiones, 835
- X-ray crystal structure of a new red, monoclinic form of cyclo-octaselenium,  $\text{Se}_8$ , 834
- Selenocyanates**, aryl or alkyl; oxy-selenation of olefins by the use of, and copper or nickel halides, 166
- Selenoimines**, phenyl-, preparation of, from phenols using diphenylseleninic anhydride and hexamethyldisilazane, 147
- Selenoselenophens**, nonclassical, 163
- Semicarbazones**, hydrazones, and oximes, regeneration of ketones from, by benzeneseleninic anhydride, 445
- Semi-empirical** and *ab initio* calculations on the automerization of methane, 213
- Serine**. Stereochemistry of the conversion of serine and tyrosine into pyruvate by tyrosine phenol-lyase, 85
- Sieves**, molecular, ultrasonic fields as a factor affecting the ion-exchange rate in, 34
- 1-Silacyclopropene**,  $[\text{PdCl}_2(\text{PEt}_3)_2]$ -catalysed formation of 1,4-disilacyclohexa-2,5-diene from, 352
- Silane**, dodecamethylcyclohexa-, simple and convenient method for preparing, 704
- tri-*n*-propyl-, radical-initiated reduction of chloroformates to alkanes by: removal of unwanted hydroxy groups from organic molecules, 344
- Silanes**, allyl, in organic synthesis: a new synthesis of loganin, 81
- allyl, in organic synthesis: a synthesis of prostaglandins, 79
- benzoyl-, formation of, from the reaction of organosilylcobalt tetracarbonyl derivatives with phenyl-lithium, 73
- chloro-, kinetic and stereochemical evidence for nucleophilic assistance in the nucleophilic hydrolysis of, 649
- Silica**, infrared spectra of the surface of, immersed in a three-component liquid mixture, 621
- Silica gel** as a polymeric support for phase-transfer catalysts, 641
- Silicate**, a tubular aluminium polymer: synthesis of imogolite, 462
- phenylpentafluoro-, anion;  $^{19}\text{F}$  nuclear magnetic resonance evidence, 671
- Silicates**, chain, new types, discovery by high resolution electron microscopy, 910
- sheet, chemical conversions using: ready dimerization of diphenylethylene, 67
- Silicon** and phosphorus, synthesis of a perfluoro compound of. Tris(trifluorosilyl)phosphine, 564
- A neutral silicon ether, linear at oxygen: X-ray crystal and molecular structure of oxo-bis[triphenyl-silicon(IV)], 632
- double-bonded divalent: *ab initio* calculations on the species  $\text{HSiN}$ ,  $\text{HNSi}$ ,  $\text{HCSiH}$ , and  $\text{H}_2\text{CSi}$ , 619
- Evidence for the replacement of silicon by a divalent cation: synthesis of a novel zinc mica,  $\text{K}_2\text{H}_2\text{Zn}_3[\text{ZnSi}_2\text{O}_{10}](\text{OH})_4$ , 905
- New  $\beta$ -acylcarbanion equivalent based on allyltrimethylsilane chemistry, 772
- nucleophilic substitution at; evidence for a parallel with addition reactions to  $\alpha, \beta$ -ethylenic ketones, 74
- Organosilicon chemistry: new applications to reductive nucleophilic acylation, 513
- Preparation of dithio-, thioseleno-, thiosilyl-, and thio-stannylketen acetals, 522
- Trimethylsilyl migration from nitrogen to carbon in a silicon-nitrogen-phosphorus compound, 308
- Silicon difluoride**, relative reactivities of conjugated dienes towards, 6
- Siloxane**, hexamethyldi-, the reaction of benzyldiyne chlorides with. Convenient synthesis of aromatic acid chlorides, 808
- methylphenyl-, polymers, metal vapour synthesis of complexes of, 466
- Silver**. Crystal structures of four complexes of quinquedentate macrocyclic ligands with novel co-ordination geometries containing five co-ordinate silver(I), six co-ordinate cadmium(II), six co-ordinate mercury(II), and seven co-ordinate cadmium(II), 167
- Interaction of arylmetal compounds of group IB with copper(I) and silver(I) trifluoromethanesulphonate; a novel biaryl synthesis and a route to hexanuclear aryl-CuAg, -AgAu, and -CuAu clusters, 203
- Molecular association in a silver(I) complex of a planar macrocyclic ligand. X-ray crystal structure of a binuclear silver(I) complex, 370
- nitrate surface, preferred field ionisation of olefins at a, 463
- Oxygen species contributing to the formation and the decomposition of an intermediate in the complete oxidation of ethylene over a silver catalyst, 71
- Reactivity of oxygen species adsorbed on silver for CO oxidation, 37
- Silyl anions**, formation and reactions of functional, 534
- isocyanate, crystal structure of, at 140 K, 744
- Silylation**, reductive-, reactions of ethyl-2-furoates, 76
- Sodium**. A thermochemical cycle for the heat of complexing of  $\text{Na}^+$  and  $\text{K}^+$  cations with cryptand 222 in water and methanol, 893
- diphenylketyl alkylation by chiral electrophilic reagents, 877
- Solution structure and reactivity of  $\text{M}^+[\text{Fe}(\text{CO})_5(\text{NO})]^-$ ,  $\text{M} = \text{Na}, \text{K}, \text{or PPN}$  [ $\text{PPN} = (\text{Ph}_3\text{P})_3\text{N}$ ], 362
- Solanidine** and tomatidine; fate of the 16 $\beta$ -hydrogen atom of cholesterol in the biosynthesis of, 286
- ( $\pm$ )-**Solavetivone**, total synthesis and stereostructure of, a stress metabolite from infected potato tubers; X-ray crystal and molecular structure of an intermediate in the synthesis, 554
- Solvation**, anion, in protic solvents, 174
- Solvent** control of selective ligand labilization in transition metal photochemistry, 730
- polarity effect on *trans-cis* photoisomerization and fluorescence of methyl 2-naphthylacrylate, 506
- Spin-lattice** relaxation times, use of carbon-13, for sugar sequence determination in steroidal oligosaccharides, 613
- Spiro**-compounds, preparation of highly strained: photochemistry of cyclic azo-compounds, 843
- Spirocyclopropanes**, and 8a-hydroxy-2-thiadecalins, new synthesis of, from dimethyl(vinyl)sulphonium salts and cyclic ketones, 675

- Spiro[4.5]decane** carbon framework, novel synthesis of the. Intramolecular cyclisation of phenolic  $\alpha$ -diazoketones, 888
- Spiro-lactone**, formation and possible intermediacy of a, in the nitrate cyclisation of methyl  $\beta$ -arylisovalerate to a nitro-hydrocoumarin, 479
- Spiro[4.4]nonane** derivatives, optically active: syntheses and circular dichroism of bis- $\alpha$ - $\beta$ -unsaturated ketones, 812  
derivatives optically active: syntheses and circular dichroism of homo-conjugated dienes and diketimine derivatives, 543  
derivatives, optically active: syntheses and circular dichroism of  $\beta$ -unsaturated ketones, 542
- (-)-*cis,trans*-**Spiro[4.4]nonane-1,6-diyl bis (p-dimethyl-aminobenzoate)**, (1*S*,5*S*,6*R*) absolute stereochemistry of, as determined by the exciton chirality method, 495
- Spiro**-system, di-, X-ray crystal structure of the novel bis-quaternary; obtained from the reaction of morpholine with hexakis(bromomethyl)benzene, 525
- Stereochemical** control of the interfacial Darzens condensation, 902
- Steroid**al isoxazolidines, photochemically induced oxidation of some, by molecular oxygen, 749  
oligosaccharides, use of carbon-13 spin-lattice relaxation times for sugar sequence determination in, 613
- Steroids**, bis-, as potential enzyme models: perylene solubilisation and dye spectral changes with aqueous solutions of some derivatives of conessine and cholic acid, 809  
 $\Delta^{11-9}$ - $\alpha$ -fluoro-, synthesis of: X-ray crystal and molecular structure of 17 $\alpha$ ,21-dipropionyloxy-9 $\alpha$ -fluoro-16 $\beta$ -methylpregna-1,4,11-triene-3,20-dione, 611
- Sterols** stereochemistry of hydrogen migration from C-24 to C-25 during isofucosterol biosynthesis in *Pinus pinea*, 889
- Stilbene oxide**,  $\alpha$ -cyano-*cis*-, stereochemistry of the thermal electrocyclic ring opening of, 440
- Stilbene oxides**,  $\alpha$ -cyano-*cis*-, and  $\alpha$ -cyano-*trans*-, kinetics of the electrocyclic ring opening of, 439
- Stilbenes**, 4-hydroxy-, oxidative dimerisation of *in vitro*: production of a grapevine phytoalexin mimic, 208
- Strictosidine** (isovincoside): the key intermediate in the biosynthesis of monoterpenoid indole alkaloids, 646
- Strontium**. Alkaline earth metal complexes of furanyl-containing Schiff base macrocycles; X-ray crystal and molecular structure of the strontium complex, 623
- Styrene** derivatives, photosensitized dimerisation of, by a cation radical transfer mechanism, 485
- Succinimide**, N-chloro, reaction of tetracycline hydrochloride with: X-ray crystal structure of the major product, 790
- Sugars**, deoxy-, photochemical preparations from carbohydrate esters: simple synthesis of methyl amicetoside, 927  
Reactions of sugar 1-carbonates with sugar derivatives bearing a hydroxy-group; novel method for preparation of orthoesters combining two monosaccharide units, and disaccharides, 90
- Sulphenate**, synthesis of a stable cyclic, by thermal decomposition of a chlorosulphurane in the crystalline state, 521
- Sulphinamides**, N-alkylidene-,  $\beta$ -asymmetric induction in the reduction of. Synthesis of optically active amines, 723  
N-alkylidene-, synthesis of optically active, 502
- $\alpha$ -**Sulphinylester** enolate ions, asymmetric synthesis of  $\beta$ -hydroxy-acids using chiral, 162
- Sulphonium** salts, dimethyl(vinyl)-, and cyclic ketones; new synthesis of 8 $\alpha$ -hydroxy-2-thiadicallins and spirocyclopropanes from, 675
- Sulphoxides**, new method for deoxygenation of: use of *OO*-diethyl hydrogenphosphoroselenoate, 657
- Sulphur**. A new cationic S-N ring system,  $S_4N_4^{2+}$ . The crystal structure of cyclotetrathiazyl bishexachloroantimonate(v),  $[S_4N_4][SbCl_6]_2$ , and cyclotetrathiazyl hexafluoroantimonate(v) tetradecafluorotriantimonate  $[S_4N_4][SbF_6][Sb_3F_{14}]$ , 253
- 1,3-bis-(4-methyl-5-phenyl-1,2-dithiol-3-ylidene)propane-2-thione, a five-sulphur compound related to 1,6,6aA<sup>4</sup>-trithiapentalenes, 851
- Electron-transfer reduction of fluorenone with n-butyl-lithium mediated by an iron-sulphur cluster, 412
- Intramolecular rearrangement of *NN'*-diaryldi-imidosulphur complexes of zerovalent platinum to a compound of bivalent platinum involving N=S bond cleavage and concomitant hydrogen migration and N-C(aryl) bond formation; X-ray crystal structure of one of the products, 739
- Sulphur**—*continued*
- Modification of the electronic properties of (SN)<sub>z</sub> by halogens; properties of (SNBr<sub>0.4</sub>)<sub>z</sub>, 407
- Novel route to metallic polythiazyl bromides: direct bromination of S<sub>4</sub>N<sub>4</sub>, 846
- Preparation and crystal structure of [Mn<sub>4</sub>S<sub>4</sub>(CO)<sub>15</sub>]; oxidation at sulphur of [(CO)<sub>4</sub>Mn-S-SnMe<sub>3</sub>]<sub>2</sub>, 782
- Preparation of dithio-, thioseleno-, thiosilyl-, and thiostannylketen acetals, 522
- Preparation of highly conducting compounds by the room temperature solid state reaction of S<sub>4</sub>N<sub>4</sub> with halogens, 464
- Synthesis and X-ray structure of *fac*-{[1,3-dithian-2-ylidene(ethoxy)methyl(ethoxy)carbene-C,S]t-butyl isocyanide}tricarboxylchromium(o). One of a new class of metallocyclic complexes obtained by the generation of anions  $\alpha$  to coordinated sulphur atoms, 494
- Synthesis of the trisulphur trinitride anion S<sub>3</sub>N<sub>3</sub><sup>-</sup>, 453
- Tetrameric cyano-rhenium complexes with sulphur and selenium bridges: preparation and X-ray crystal structures of (Ph<sub>4</sub>P)<sub>4</sub>[Re<sub>4</sub>S<sub>4</sub>(CN)<sub>12</sub>].3H<sub>2</sub>O and (Ph<sub>4</sub>P)<sub>4</sub>[Re<sub>4</sub>Se<sub>4</sub>(CN)<sub>12</sub>].3H<sub>2</sub>O, 221
- Triselenathiafulvalenes: a novel sulphur-selenium interchange on trimethyl phosphite coupling of substituted 1,3-diselenole-2-thiones, 835
- Tris(triphenylphosphinehexachloronaphthalene-1,8-dithiolatonicel(II)), [Ni<sub>3</sub>(PPh<sub>3</sub>)<sub>3</sub>(S<sub>2</sub>C<sub>10</sub>Cl<sub>6</sub>)<sub>3</sub>], a Ni<sub>3</sub>S<sub>6</sub> metal-sulphur cluster compound; preparation and crystal and molecular structure, 714
- Sulphur dioxide** extrusion from substituted thiiren 1,1-dioxides, 713
- Sulphur nitride**, a 'metallic' derivative of polymeric: poly(thiazylbromide), (SNBr<sub>0.4</sub>)<sub>z</sub>, 473  
A new phase of (SN)<sub>z</sub>, 49  
polymeric: a new electrode material, 9
- Sulphurane**, chloro-, synthesis of a stable cyclic sulphenate by thermal decomposition of a, in the crystalline state, 521
- Sulphuranyl**, trimethoxy-, radical; configurational selectivity in the formation of the, 228
- Sulphuryl chloride**, unusual reaction of a substituted benzothiazoline with: formation of a 2,2'-(ethane-1,2-diylidene)-bis-1,4-benzothiazine dye, 863
- Super acid** (FSO<sub>3</sub>H-SbF<sub>6</sub>), the ionization mechanism of *trans*-1,2-dichlorocyclohexane in. The 3-chloro(methyl)cyclopentyl cation and its reaction with carbon monoxide, 394
- '**Superoxo**'-ligand, a stable monomeric compound with a: formation of [Rh(ethylenediamine)<sub>2</sub>(NO<sub>2</sub>)(O<sub>2</sub>)]<sup>+</sup>, 58
- Surfactant** derivative of tris(2,2'-bipyridyl)ruthenium(II), photochemistry of a, 777
- Synergism** in the hydrogenation of *p*-nitrophenol on platinumised WO<sub>3</sub>, 193
- Tantalum**. Mono- $\eta$ -cyclopentadienylchloro derivatives of niobium and tantalum and improved routes to mono- $\eta$ -cyclopentadienyl-chloro, -oxochloro, and -oxo derivatives of molybdenum, 59
- Tecleaverdoornine**: a new C-prenylated phenylated furoquinoline, 652
- Tellurium**. Mechanism of the thermal decomposition of tetraaryltellurium species, 266  
New and selective method for deoxygenating epoxides: use of the organic tellurium reagent sodium *OO*-diethyl phosphorotellurate, 658
- Terpene**, sesqui-. Acanthamide, a melampolide amide from *Acanthospermum glabratum* (compositae), 376  
sesqui-, a novel, from *Isocoma Wrightii*; isocomene. X-ray crystal structure of the corresponding diol, 456  
sesqui-. Carbon atom insertion: an efficient synthesis of ishwarane, 587  
sesqui-, epoxy-lactone, alliacolide, a new bicyclic, with a novel carbon skeleton from cultures of the fungus *Marasmius alliaceus* (Jacques ex Fr.)Fr; X-ray structure, 727  
sesqui-. *In vitro* and *in vivo* rearrangement of eudesmanes to eremophilanes. Substantiation of Robinson's hypothesis, 230  
sesqui-, revised structure and absolute configuration of the, (+)-bazzanene, 566  
sesqui-. Stereoselective total synthesis of ( $\pm$ )-ishwarone, 880  
sesqui-, X-ray crystal and molecular structure of the *p*-bromobenzoate derivative of the, ( $\pm$ )-cyclobazzanene, obtained in the formic acid-catalysed reaction of (+)-bazzanene, 568

- Terpene**—*continued*  
 Stereospecific synthesis of 4,11-epoxy-*cis*-eudesmane, a tricyclic sesquiterpene defence secretion from the termite *Amitermes evuncifer*, 111  
 Structure of isodomedin, a novel *ent*-kaurenoid diterpene, 555
- Terpenes.** (*E*)-9-Isopropyl-6-methyldeca-5,9-dien-2-one, a terpenoid C<sub>14</sub>-ketone with a novel skeleton, 353  
 norsesqui-. Structure of rishitin M-1 and M-2, metabolites of rishitin in healthy potato tuber tissues, 670  
 Short and stereoselective construction of a key intermediate for synthesis of unsymmetrical pentacyclic triterpenes, 16  
 Structures of falaconitine and mithaconitine, two novel diterpenoid alkaloids from *Aconitum falconeri* Stapf., 12  
 Unusual rearranged abietanoic diterpenoids from *Solenostemon* species, 859  
 Tetaspirane sesquiterpene glucosides from flue-cured Virginia tobacco: structure, absolute stereochemistry and synthesis. X-ray structure of the *p*-bromobenzenesulphonate of one of the derived aglycones, 27
- Terpenoid biosynthesis**, use of induced <sup>13</sup>C-<sup>13</sup>C coupling in, 819
- Terrein**, deuterium as a tracer in polyketide biosynthesis: incorporation of [2-<sup>13</sup>C, 2-<sup>2</sup>H<sub>3</sub>]acetate into, 624
- Tetra-aminotriafulvalene** dication, synthesis and characterization of, 850
- Tetrabutylammonium** cyanide, use of for photocyanation of aromatic compounds: phase transfer photochemistry, 885
- Tetracarbonylnitrosylmanganese**, determination of the structure of by matrix isolation studies, 717
- 1,2,4,5-Tetracyanobenzene**—aromatic compounds—methanol systems, photo-induced 1:1:1 reactions of, 667
- Tetracyanoethylene**, bicyclic cyclononadienes from 1,7-cycloaddition of, to divinylcyclopropane systems, 593  
 —ester systems, photoaddition of the charge-transfer complexes of, 884  
 thermal and photochemical reactions of, with *NN*-dimethyl-*p*-toluidine in methanol, 348
- 7,7,8,8-Tetracyanoquinodimethane**, 2-(thiopyran-4-ylidene)-1,3-dithiole and its conducting salts with: synthesis of a new organic  $\pi$ -donor, 687
- Tetracyclic** ring system, new: the reaction of glyoxal with a 1,4,8,11-tetra-azacyclotetradecane and the X-ray crystal structure of the product, 150
- Tetracycline** hydrochloride, reaction of with *N*-chlorosuccinimide: X-ray crystal structure of the major product, 790
- Tetrafluoroborates**, low spin *d*<sup>7</sup> (1,3-dimethylimidazolidin-2-ylidene)iron(II), synthesis and properties of; stable paramagnetic carbenometal complexes, 411
- Tetrahydropyrans**, chloro-, conformational studies of, by nuclear quadrupole resonance spectroscopy, 19
- Tetrathiafulvalene**, *p*-phenylenebis-, 388
- Tetrathiafulvalenes**, monosubstituted, synthetic method for the preparation of, 161
- Tetrathioethylene** dications: endocyclic to exocyclic rearrangement, 11
- Thallium** in organic synthesis. Synthesis of ( $\pm$ )-ocoteine by non-phenolic coupling with thallium tris(trifluoroacetate) (TTFA), 538  
 Progressive cage-opening in *d*<sup>6</sup>, *d*<sup>8</sup>, *d*<sup>10</sup>, and *d*<sup>10s2</sup> metallacarboranes: crystal and molecular structures of 3-triphenylphosphino-3-mercuro-1,2-dicarbododecaborane and triphenylmethylphosphonium 3-thalla-1,2-dicarbododecaborate, 737  
 X-ray crystal structure of the thallium salt of carriomycin, a new polyether antibiotic, 590
- Thermochemical** cycle, a, for the heat of complexing of Na<sup>+</sup> and K<sup>+</sup> cations with cryptand 222 in water and methanol, 893
- Thiadecalins**, 8a-hydroxy-2- and spirocyclopropanes, new synthesis of, from dimethyl(vinyl)sulphonium salts and cyclic ketones, 675
- 1,2,4-Thiadiazolo[4,5- $\alpha$ ]benzimidazole**, ring system, novel synthesis and X-ray crystal structure analysis of the, 736
- 10-Thiaisoalloxazines**, synthesis of, 557
- Thiaziazole**, 5-amino-1,2,3,4-, loss of nitrogen in acylation reactions of. A new series of heteropentalenes, 143
- Thiazole**, a new synthesis: reaction of 5-chloropyridin-2-ylthioureas with phenacyl bromides. X-ray crystal structure of 5-(5-chloropyridin-2-yl)-2-diethylamino-4-phenylthiazole, 282
- Thiazyl bromides**, poly-, novel route to metallic: direct bromination of S<sub>4</sub>N<sub>4</sub>, 846
- Thietan**, 2,4-bisdicyanomethylene-1,3-di-, preparation and properties of; a sulphur analogue of tetracyanoquinodimethane, 207
- Thiiren** 1,1-dioxide, 2,3-dimethyl-, reactivity as an ambident electrophile. Reaction with  $\alpha$ -metallated nitriles, 931
- Thiiren** dioxides, substituted, sulphur dioxide extrusion from, 713
- Thiirenium** salts, the first example of stable, low temperature X-ray molecular structure of 1-methyl-2,3-di-*t*-butylthiirenium tetrafluoroborate, 576
- Thioacetaldehyde** as the only species fragmenting by hydrogen atom loss; isomerization of (C<sub>2</sub>H<sub>4</sub>S)<sup>+</sup> ions, 492
- Thioacetals**. Novel dethioacetalisation by photolysis, 680
- Thioacetate**, *S-p*-nitrophenyl-, catalysed hydrolysis of, by human carbonic anhydrase, 638
- Thioacetate esters**, *S*-aryl and arylthioisocrotonic acids, preparation of: reactions of diketene with arenethiols, 609
- Thioamides**, new method for converting into nitriles: use of diethyl azodicarboxylate and triphenylphosphine, 220
- Thiobenzophenones**, cycloaddition of *N*-arylketenimines to. Formation of 4*H*-3,1-benzothiazine and 2-iminothietan derivatives, 43  
 reaction of, with the dicarbonylcyclopentadienyliron anion: a novel fulvene synthesis *via* desulphurization, 126
- Thiocarbonates**, bisdi-, conversion of vicinal diols into olefins *via* the derived, 866
- Thiocyanate**, <sup>14</sup>N nuclear quadrupole resonance spectra of coordinated, 599  
 Photoanation reactions of hexa(dimethyl sulphoxide)chromium(III) ion by azide and thiocyanate: evidence for associative reaction, 138
- Thiofluorides**, transition-metal; preparation of WSF<sub>4</sub> and related anions, 424
- Thioformaldehyde**, formation of, from trithiolan. Unstable intermediates in the gas-phase, 287  
 monomer, co-ordinated. Synthesis and reactions of [Os( $\eta^2$ -CH<sub>2</sub>S)(CO)<sub>2</sub>(PPh<sub>3</sub>)<sub>2</sub>], 901
- Thioisocrotonic acids**, aryl-, and *S*-aryl thioacetate esters, preparation of: reactions of diketene with arenethiols, 609
- Thiol-cobalt(II) complex** catalysts, donor and ligand effects on acetylene reduction with, 795
- $\beta$ -Thiolactone**, epimerisation and alkylation of a, 92
- Thiols**, arene-, reactions of diketene with: preparation of arylthioisocrotonic acids and *S*-aryl thioacetate esters, 609  
 novel method of activating, by their conversion into thionitriles with dinitrogen tetroxide, 407
- Thione**, 1,3-bis-(4-methyl-5-phenyl-1,2-dithiol-3-ylidene)propane-2-, a five-sulphur compound related to 1,6,6a $\lambda^4$ -trithiapentalenes, 851  
 1,3,4,6-tetrathiapentalene-2,5-di-, electrochemical synthesis of, 660
- Thionitriles**, novel method of activating thiols by their conversion into, with dinitrogen tetroxide, 407
- Thiophen** derivatives, novel cyclisation of 1-(alkyl- or phenylthio)-4-(methylthio)buta-1,3-dienes to, 801
- 2-(Thiopyran-4-ylidene)-1,3-dithiole**, and its conducting salts with 7,7,8,8-tetracyanoquinodimethane: synthesis of a new organic  $\pi$ -donor, 687
- Thioureas**, 5-chloropyridin-2-yl-, reaction of, with phenacyl bromides; a new thiazole synthesis. X-ray crystal structure of 5-(5-chloropyridin-2-yl)-2-diethylamino-4-phenylthiazole, 282
- Threonine**, L- and D-, stereochemistry of the conversions *in vivo* of, into 2-oxobutanoic acid by the L- and D-threonine dehydratases of *Serratia marcescens*, 839
- Thymidylate** synthetase, stereospecificity of, 218
- Tin**. Mechanism of formation of surface isocyanate during the SnO<sub>2</sub>-0.55CuO-catalysed oxidation of carbon monoxide by nitric oxide, 398  
 New route to aryltin(IV) halides by spontaneous cyclometallation of benzylideneaminotin(IV) halides; X-ray crystal structure of the *ortho*-metallated ketimine, *o*-SnCl<sub>3</sub>-*p*-MeC<sub>6</sub>H<sub>4</sub>C(:NH)-*p*-C<sub>6</sub>H<sub>4</sub>Me, 215  
 Novel transformation of [( $\eta^1$ -C<sub>5</sub>H<sub>5</sub>)<sub>2</sub>SnFe(CO)<sub>4</sub>]<sub>2</sub>: Crystal structure of [(C<sub>5</sub>H<sub>5</sub>)Fe(CO)<sub>2</sub>]<sub>2</sub>Sn<sub>2</sub>Fe<sub>2</sub>(CO)<sub>2</sub>, 390  
 Novel transient tin-centred radical tris-(2-phenyl-2-methylpropyl)stannyl, 129

**Tin**—*continued*

- Preparation of dithio-, thioseleno-, thiosilyl-, and thiostannylketen acetals, 522
- Temperature dependence of the Mössbauer recoil-free fraction as a probe of the lattice structure of tin compounds, 603
- Titanium.** Dihalide complexes of titanium(IV) tetraphenylporphyrin. Precursors to low-valent titanium porphyrins, 763
- dioxide, mechanisms of the isomerization of butenes on, 883
- Insertion of acetylenes into carbon–titanium  $\sigma$ -bonds, 397
- metallocenes, novel conversion of ethylene into ethane and buta-1,3-diene catalysed by, 560
- Titanium(III) tartrate complexes; electron spin resonance detection of free radicals in the reaction of, with oxygen in aqueous alkaline solution, 876
- Toluidine**, *NN*-dimethyl-*p*-, nitration of. Spectroscopic evidence for the bulk formation of a  $\sigma$ -complex formed by *ipso*-attack, 301
- NN*-dimethyl-*p*-, thermal and photochemical reactions of tetracyanoethylene with, in methanol, 348
- Tomatidine** and solanidine; fate of the 16 $\beta$ -hydrogen atom of cholesterol in the biosynthesis of, 286
- Transition metal**, alkyl- or aryl-, bonds, competition between cleavage of, by electrophiles, 892
- complexes, nitrosyl coupling in; the molecular structure of [(Ph<sub>3</sub>P)<sub>2</sub>Pt(N<sub>2</sub>O<sub>2</sub>)], 354
- complexes, supported, hydrogenation of olefins by, 510
- mediated synthesis, stereospecific, of unsymmetrical olefinic diphosphines, 903
- thiofluorides; preparation of WSF<sub>4</sub> and related anions, 424
- Transition metals**, novel preparation of  $\sigma$ -alkynyl complexes of, by copper(I) iodide-catalysed dehydrohalogenation, 291
- Trianthranilide** derivatives, transannular ring stabilisation by hydrogen bonding in. *X*-ray structures of 5,11-dibenzyl and 5,11-dimethyl-tribenzo[*b*,*f*,*j*][1,5,9]triazacyclododecine-6-(5*H*),12(11*H*),18(17*H*)-trione (*NN'*-dibenzyl- and *NN'*-dimethyl-trianthranilide), 170
- Triazene**, 1-chloro-3,5-diphenyl-1*H*,3*H*,5*H*-1,3,5,2,4,6-trithia-, 1,3,5-trioxide, (diphenylsulphanuric chloride), nucleophilic substitution of, by secondary amines, 195
- Triazenyl** and iminyl radicals, electron spin resonance study of, derived from organic azides, 320
- Triazolidines**, new synthesis of selected dehydroamino-acid esters and, 125
- Trifluoroacetate** as a bridging ligand for antimony(V): *X*-ray molecular structure of  $\mu$ -oxo- $\mu$ -bis(trifluoroacetato)bis-[trifluoroantimony(V)], 584
- Triketiorhodin**, and mytiloxanthin, synthesis of the enolic  $\beta$ -diketone carotenoids, 467
- Trimethylamine oxide**, intermediate complex in the reduction of, by pentacarbonyl iron: its use as catalyst in the addition of carbon tetrachloride to carbon–carbon double bonds, 705
- Trioxan**, 3-isopropyl-6,6-dimethyl-5-(1-naphthylamino)-1,2,4-, *X*-ray crystal structure of the chemiluminescent, 63
- Trioxodinitrato**(II) complexes of some first row transition metal ions, isolation of, 247
- Tris-(5-acetyl-3-thienyl)methane**, a new type of clathrate host, 741
- Triselenathiafulvalenes**: a novel sulphur–selenium interchange on trimethyl phosphite coupling of substituted 1,3-diselenole-2-thiones, 835
- Tris(trifluorosilyl)phosphine**. Synthesis of a perfluoro compound of phosphorus and silicon, 564
- Trithiapentalenes**, 1,6,6a $\lambda^4$ -; 1,3-bis-(4-methyl-5-phenyl-1,2-dithiol-3-ylidene) propane-2-thione, a five-sulphur compound related to, 851
- Trithiolan**, formation of thioformaldehyde from. Unstable intermediates in the gas-phase, 287
- Tritium** exchange between the aldehyde group and sodium borohydride during the reduction of benzaldehyde in dimethyl sulphoxide solution, 182
- Tryptophan**, *N*-benzyloxycarbonyl-(*S*-), stereochemistry of the side-chain dehydrogenation of, by *Chromobacterium violaceum*, 842
- Tungsten.** Mechanism of alkylation of dinitrogen co-ordinated to molybdenum(O) and tungsten(O), 299
- Synergism in the hydrogenation of *p*-nitrophenol on platinumised WO<sub>3</sub>, 193
- Transition-metal thiofluorides; preparation of WSF<sub>4</sub> and related anions, 424

**Tungsten**—*continued*

- Tris[methylaminobis(difluorophosphine)]metal(O) derivatives of chromium, molybdenum, and tungsten: new volatile carbonyl-free zerovalent metal derivatives of high thermal and oxidative stabilities, 142
- X*-ray crystal structure of a new heteropolyanion, [P<sub>4</sub>W<sub>8</sub>O<sub>40</sub>]<sup>12-</sup>, with an X:M ratio of 1:2, 674
- ( $\pm$ )-**Tylophorine**, a simple route to: an improved phenanthrene synthesis, 826
- Tyrosine.** Stereochemistry of the conversion of serine and tyrosine into pyruvate by tyrosine phenol-lyase, 85
- Tyrosyl** unit, photo-CIDNP in the: a new tool in high resolution nuclear magnetic resonance studies of peptides, 872
- Ultrasonic** fields as a factor affecting the ion-exchange rate in molecular sieves, 34
- 3,6,9,12,15,18,21,24,26,29,32-Undeca-oxabicyclo[12.10.9]tritriacontane**, in, out-(–)-, chiral cryptand, and in, out-3,6,9,12-16,19,22,25,27,30,36-dodeca-oxabicyclo[12.12.10]hexatriacontane, synthesis. Out, in–in, out isomerism, 918
- Unsaturated** groups, 1,5-shift of; migratory aptitudes of substituted vinyl groups and evidence for *exo*-selectivity, 688
- Uracils**, 5-nitro-6-(*N*-substituted-anilino)-; one-step synthesis of 8-chloroflavins by the cyclization of, with the Vilsmeier reagent. Vilsmeier reagent as a reducing agent, 681
- Uranium.** Complexes of uranium(III) with bidentate amides, 507
- Urea**, tetramethyl- and tetraethyl-; *NN*-diethylacetamide, *NN*-dipropylacetamide, and *NN*-dimethylpropanamide: solvents for alkali metals, 188
- 5'-Uridine** monophosphate (UMP); *X*-ray crystal structure of a stable metal-5'-UMP complex, [Cu(5'-UMP)(2,2'-dipyridylamine)(H<sub>2</sub>O)]<sub>2</sub>, 272
- Uro'gen-III**, mechanistic study of the enzymic incorporation of unrearranged AP.AP pyrromethane into, 117
- Uroporphyrinogen-I** and coproporphyrinogen-I, intermediates between, 696
- Verdins**, electrophilic substitution in: deuteration and nitration of 2,3,7,8,12,13,17,18-octaethylbilin-1,19(21*H*,24*H*)-dione (octaethylbilatriene-*abc*): *X*-ray crystal structure of the 5-nitro derivative, 829
- Vilsmeier** reagent, as a reducing agent. One-step synthesis of 8-chloroflavins by the cyclization of 5-nitro-6-(*N*-substituted-anilino)uracils with the Vilsmeier reagent, 681
- Vinyl** ethers, solvent effects in 1,3-photocycloaddition of, to mono substituted benzenes, 242
- groups, migratory aptitudes of substituted, and evidence for *exo*-selectivity; 1,5-shift of unsaturated groups, 688
- Viomycin** sulphate, assignments in. High field <sup>15</sup>N nuclear magnetic resonance spectroscopy of peptides, 546
- Vitamin D<sub>3</sub>**, equilibria in. Preparation and properties of 6-methylvitamin D<sub>3</sub> and its isomers, 21
- 1 $\beta$ -hydroxy- and 1 $\beta$ ,25-dihydroxy-, synthesis of, 890
- Vycor** glass, photoemission of porous, and its photodesorption activity, 665
- Wacker** process, stereochemistry of the hydroxypalladation in the, 264
- Water**, cleavage of, over zeolites, 128
- Water exchange**, relatively slow, in a pentaco-ordinate macrocyclic cobalt(II) complex, 36
- Xenon.** Preparation and Raman spectra of XeOF<sub>2</sub>, XeOF<sub>3</sub><sup>–</sup>, and XeO<sub>2</sub>F<sub>3</sub><sup>–</sup>, 595
- p*-**Xylonitrile** derivatives; iminophthalans (imino-1,3-dihydroisobenzofurans) from the nitration of some, 341
- o-Xylylenes**, absorption spectra and decay kinetics of. Transients in the flash photolysis of indan-2-ones, 721
- Yeast**, enantioselective reduction of racemic ketones by, 315
- Ylide** or carbene complex, iridium, unusual, synthesis and *X*-ray structure, 589
- S-Ylides**, preparation of isoxazoline *N*-oxide derivatives from a nitro-sugar and, 7
- Zeaxanthin** biosynthesis in a *Flavobacterium*; use of deuterium labelling to elucidate the stereochemistry of the initial step of the cyclization reaction in, 655



- Zeolite**, X type; activating effect of metallic palladium on the reduction rate of  $\text{Ni}^{2+}$  ions in an, 102
- Zeolites**, cleavage of water over, 128  
description of a characteristic infrared frequency for acidic hydroxy-groups in, 743
- Zinc**. Calorimetric determination of macrocyclic enthalpy. Copper(II) and zinc(II) complexes with 1,4,8,11-tetra-azacyclotetradecane, 244  
mica, novel,  $\text{K}_2\text{H}_3\text{Zn}_5[\text{ZnSi}_7\text{O}_{20}](\text{OH})_4$ , synthesis: evidence for the replacement of silicon by a divalent cation, 905