

INDEX OF SUBJECTS.

- A. T. 10. See Dihydratachysterol.
- Absorptiometer, thermo-electric, 462.
- Absorption in solids, 98.
- Acetaldehyde, photolysis of, 83, 88, 272.
thermal decomposition of, 272, 273.
- Acetamide, crystal structure of, 191.
- Acetanilide, nitroso-, decomposition of, in aromatic solvents, 281.
reaction of, with *cyclohexene*, 280.
reaction of, with *quinoline*, 284.
- Acetic acid, amyl ester, emulsions, hydrolysis of, 111.
- Acetic acid, chloro-, photolysis of, 92.
- Acetic acids, *trisubstituted*, synthesis of, 225.
- Acetone, photolysis of, 87, 273.
- Acetophenone, photolysis of, 273.
- Acetophenone, *p*-amino-, diazotised, as reagent for thiazole grouping, 464.
- Acetyl bromide, photolysis of, 85.
- Acetylcholine, formation of, from *pyruvate*, 386.
- Acetylene, photobromination of, 95.
- Acetylene, *diiodo*-, photochemistry of, 96.
- Acetylene *tetrachloride*, molecular structure of, 65.
- 2-Acetylrhodin *g*₇, 323.
- Acids, aliphatic, esterification of, 233.
long-chain, structure of, 211.
separation of, by distillation, 461.
growth-promoting action of, 431.
- Acrodynia, cure of, 392.
- Acrylic acid, methyl ester, photopolymerisation of, 97.
- Addison's disease, treatment of, 337.
- Adenine, fission of, by bacteria, 450.
- Adenosine, fission of, by bacteria, 450.
- Adenylic acid, fission of, by *Bacillus coli*, 450.
- Adermin, requirement of, for *Streptococcus*, 439, 440.
- Adrenals, ox, arachidonic acid from, 215.
- Adrenal substance J, 337.
- Adrenal substance K, preparation of, 336.
- Adrenal substance O, 337.
- Agmatine, formation of, from *l*(+)-arginine by bacteria, 449, 450.
- β -Alanine, formation of, from aspartic acid by bacteria, 448.
requirement of, for bacteria, 437.
- Albumin, egg-, homogeneity of, 405.
viscosity of, on denaturation, 411.
serum, homogeneity of, 405, 408.
- Aldehydes, aliphatic, photolysis of, 276.
photolysis of, 81, 272.
- Aletris farinosa*, diosgenin from, 353.
- Aliphatic compounds, 200.
higher, 211.
substitution in, 236.
- Alkali hydroselenides, 135.
polyiodides, 136.
- Alkaloids, 375.
- Alkanation, 204.
- Alkyl groups, tautomeric effects of, 247.
halides, reactions of, with sodium vapour, 274.
radicals, free, reactions of, in solution, 276.
- tert.*-Alkylarsines, complexes of, with cadmium and mercuric halides, 131.
- Alkylbenzenes, dipole moments of, 248.
- Alkylbenzhydryl halides, hydrolysis of, 240.
- p*-Alkylbenzhydryl chlorides, hydrolysis of, 248.
- tert.*-Alkylphosphines, complexes of, with cadmium and mercuric halides, 131.
- Allyl chloride, preparation of, 205.
- Aluminium, crystals, X-ray reflection by, 167.
detection and determination of, 468.
- Aluminium alloys, determination in, of tin, 477.
bromide, dielectric constant of, 126.
perchlorate, 126.

- Amines, formation of, by bacteria, 448.
 photolysis of, 273.
n-primary, preparation of, 205.
- Amino-acids, decarboxylation of, by bacteria, 449.
 fission of, by bacteria, 445.
- Amino-radical, mean life-time of, 97.
- Ammonia, dipole moment of, 48.
 photolysis of, 88, 97, 274.
- Ammoniates of boron compounds, 142.
- Ammonium hydrogen fluoride, structure of, 185.
 sulphamate, 137.
- Amphipathic substances, 102.
- Amyl chloride, chlorination of, 288.
 reaction of, with sodium, 286.
- Amyloamylose, 422.
- Amylopectin, 422.
- tert.*-Amylcyclopentane, preparation of, 202.
- Analysis, colorimetric, 462.
 distillation, 451.
 electrolytic, 469.
 fluorescence, 466.
- $\Delta^{5:7}$ -Androstadiene, 3:17-*dihydroxy*-, 333.
- Androstane derivatives, 332.
- Androstan-17-one, (β): 6-*dihydroxy*-, 333.
- Androstenedione, reduction of, 332.
- Δ^1 -Androstenedione, 333.
- Aneurin, determination of, colorimetrically, 464.
 by oxidation, 467.
 requirement of, for *Staphylococcus*, 439.
 See also Vitamin-*B*₁.
- Anhydrosarsapogenoic acid, 348.
- Anona reticulata*, anonaine from, 377.
- Anonaine, structure of, 377.
- Antibodies, 398.
 reaction of, with antigens, 400.
- Antigens, bacterial, 394.
 protein, 395.
 reaction of, with antibodies, 400.
 synthetic, 396.
- Antihormones, 404.
- Antimonials, aromatic, preparation of, 279.
- Antimony, electrodeposition of, 473.
- Antimony trifluoride, as fluorinating agent, 150.
- Antimony ores, analysis of, 474.
- Arabogalactan, larch, 427.
- Arachidonic acid, structure of, 215.
- Arginine, fission of, by bacteria, 445.
- Arginine dihydrolase, 445.
- Argon atoms, dipole-dipole energy of, 27.
- Arsenic, determination of, electrolytically, 474, 475.
- Arsenic trioxide, molecular structure of, 72.
- Arsenicals, aromatic, preparation of, 279.
- Arsines, tertiary, complexes of, with cadmium and mercury halides, 186.
- Arylpyridines, formation of, 282.
- Aryl radicals, free, formation of, 278.
- Asclepain m and s, 429.
- Asclepias*. See Milkweed.
- Ascorbic acid. See Vitamin-*C*.
- Ash wood, constituents of, 426.
- Aspartase, 447.
- Aspartic acid, deamination of, by bacteria, 447.
 excretion of, by nitrogen-fixing bacteria, 444.
- l(-)-Aspartic acid, fission of, by bacteria, 446.
- Aspirylproteins, 397.
- Atoms, interacting, quantum-mechanical energy of, 25.
 polarisation of, 57.
- Atomic reactions, 274.
- Auxins, growth promotion by, 430.
- Avena* coleoptiles, growth of, in auxin solutions, 431.
- Avitaminosis-*A*, experimental, 384.
- Azafrin, methyl ester, oxidation of, 296.
- apo*-1-Azafrinal, 296.
- Azeotropes, distillation of, 459.
- cis*-Azobenzene, 71.
 molecular structure of, 178.
- trans*-Azobenzene, molecular structure of, 178.
 solubility of, in cetylpyridinium salts, 106.
- Azomethane, photolysis of, 273.
 thermal decomposition of, 271.
- Azotobacter*, nitrogen fixation by, 444.
- Bacilli, dysentery, nutritional requirements of, 439.
 intestinal, histamine formation by, 449.
- Bacillus coli*, deamination of aspartic acid by, 447.
 fission of cysteine and cystine by, 446.
 tryptophan conversion into indole by, 448.
- Bacillus fluorescens liquefaciens*, deamination of aspartic acid by, 447.
- Bacillus lepræ* and *tuberculosis*, bactericidal activity against, 225.
- Bacillus tuberculosis*, lipides, acids of, 223.

- Bacteria, action of, on sucrose, 425.
 antigens from, 394.
 butyl-fermenting, nutritional requirements of, 441.
 growth substances for, 435.
 lactic, nutritional requirements of, 437.
 nitrogen fixation by, 443.
 pathogenic, amino-acid metabolism of, 443.
 propionic, carbon dioxide absorption by, 385.
 purine metabolism of, 450.
- Bactericides, synthetic, 225.
- Bacteriochlorin, oxidation of, 322.
- Bacteriochlorophyll, 322.
- Bacterium delbrückii*, pyruvate fission by, 417.
- Bacterium dysenteriae*, antigen from, 394.
- Bacterium typhi-murium* and *typhosus*, antigens from, 394.
- Bananas, starch in, 423.
- Barium, isotopes of, from fission, 9.
- Barium azide, photolysis of, ultraviolet, 99.
- Bean plants, plant growth inhibitor in, 433.
- Bean pods, wound-hormone from, 222.
- Bebeerine, structure of, 377.
- Beechwood, cellulose and xylan from, 427.
- Beech-wood tar, acids from, 217.
- Beeswax, 220.
- Bentonite sols, loss of birefringence in, 118.
 viscosity of, 121.
- Benzaldehyde, thermal decomposition of, 272.
- Benzene, distillation of azeotropic mixtures of, with ethyl alcohol, 461.
 separation of, from ethylene dichloride, 456.
 from methyl alcohol, 455.
- Benzene, bromo-, photochemical reaction of, with bromine, 96.
 bromo-, and chloro-, reactions of, with sodium, 287.
p-dicyano-, molecular polarisation of, 62.
 fluoro-, bond length in, 76.
p-nitro-, non-polar nature of, 71.
- Benzeneazotriphenylmethane, addition of, to styrene, 289.
 decomposition of, 287.
- Benzenediazonium chloride, reactions of, in organic solvents, 278.
 with esters and nitriles, 280.
 with cyclohexene, 280.
- iso*Benzofurans, 367.
- Benzhydryl chloride, reaction of, with ethyl alcohol, 239.
 and *m*-chloro-, substitution in, in liquid sulphur dioxide, 246.
m-chloro-, reaction of, with tetramethylammonium fluoride, 246.
 halides, hydrolysis of, 243.
- Benzil, molecular structure of, 66.
- Benzoic acid, ethyl ester, hydrolysis of, 235.
 Kolbe reaction with, 284.
- Benzoic acid, 3:5-dinitro-, as reagent in colorimetry, 466.
- Benzophenone, photolysis of, 273.
- p*-Benzoquinone, molecular polarisation of, 62.
- Benzoyl peroxide, polymerisation acceleration by, 289.
- Benzyl chloride, hydrolysis of, 242.
 radical, 284.
- Benzylisoquinoline alkaloids, 376.
- Beryllium acetylacetonate, non-polar nature of, 71.
- Bilan, 326.
- Bilichrysenes, 329.
- Bilichrysin, 330.
- Bilidiene, 327.
- Bilience, 327.
- Bilifuscin, 330.
- neo*Bilirubic acid, 328.
*isoneo*Bilirubic acid, 327.
- Bilirubin, structure of, 328.
- Bilirubinoids, formation of, from porphyrins, 325.
 nomenclature of, 326.
 synthesis of, 327.
- Bilitriene, 327.
 synthesis of, 327.
- Biliverdin, 330.
- Biochemistry, 382.
 plant, 419.
- Biotin, 393.
 determination of, by growth response, 433.
 requirement of, for bacteria, and its detection, 441.
- Birch wood, hemicelluloses of, 428.
- 10:10'-Bis-5:10-dihydrophenarsazine, magnetic susceptibility of, 267.
- Bismuth, bombardment of, with α -rays, 14.
 determination of, in lead bullion and ores, 476.
 electrodeposition of, 474.
 separation of, from lead, 473.
- Bisnorcholenic acid, 3-hydroxy-, conversion of, into progesterone, 340.
- Bixin, isomerisation of, 293.
 methyl ester, oxidation of, 295.
- Bixindialdehyde, 295.
apo-1-Bixindialdehyde, 295.

- Blood, suspended fat in, and protein adsorption, 414.
- Blood-corpuscles, red, human, factor V synthesis by, 388.
- Bonds, between oxygen and other elements, 73.
 formation and length of, 73.
 halogen, 76.
 lengths of, table of, 46, 75.
- Bonellia viridis*, pigment of, 323.
- Bonelline, 323.
- Borine carbonyl, 141, 150.
- Borine radical, existence of, 141.
- Borine trimethylamine, structure of, 150.
- Boron compounds, ammonia compounds with, 142.
 cyanate, 127.
 trifluorides, addition products of, 127.
 hydrides, 138.
 structure of, 148.
 oxyfluoride, 127.
- Brain, adenylic acid in, in phosphorylation, 386.
 cerebrosides of, 217.
 pyruvate oxidation in, in polyneuritis, 386.
- Brass, analysis of, 475.
 determination in, of mercury, 476.
- Brassicasterol, structure of, 361.
- Bread, brown versus white, 394.
- Bromelin from pineapples, 429.
- Bromination, atomic, 288.
- Bromine, isomerism of, 19.
 photochemical oxidation by, 96.
 thermal diffusion of mixtures of helium and, 156.
- Brownian motion, 100.
- Bruccella melitensis*, antigen from, 395.
- ψ -Brucine, degradation of, 380.
- Brucinonic acid, oxidation of, 381.
- Budde effect, 94.
- n*-Butane, photolysis of, mercury-sensitised, 92.
 thermal decomposition of, 270.
- Butane, nitro-, determination of, colorimetrically, 464.
- Butanes, separation of, from butenes by distillation, 461.
- iso*Butene from petroleum cracking, 204.
- cis*- and *trans*-Butene-2, separation of, 456.
- Butenes, separation of, from butanes by distillation, 461.
- Butyl bromides, exchange reactions of, with radioactive bromide ions, 247.
- n*-Butyl bromide, hydrolysis of, 238.
- tert*-Butyl bromide, hydrolysis of, 242, 245.
 chloride, alcoholysis and hydrolysis of, 237.
 halides, hydrolysis of, 240.
- p*-*tert*-Butylbenzhydryl chloride, hydrolysis of, in presence of azide, 245.
- tert*-Butylcyclopentane, preparation of, 202.
- tert*-Butylcyclopentanol, preparation of, 202.
- p* - *tert* - Butylphenyldiphenylmethyl radical, 256.
- n*-Butyric acid, chlorination of, 210.
- Cadaverine, formation of, from μ (+)-lysine by bacteria, 449.
- Cadmium, determination of, in spelter and zinc ores, 476.
 in zinc alloys, 477.
 isotope, electron spectrum of, 17.
 isotopes, from fission, 10.
 separation of, from zinc, 476.
- Cadmium halides, complexes of, with tertiary arsines and phosphine, 133, 186.
- Cadmium lamp for photochemistry, 92.
- Cæsium isotopes from fission, 9.
- Cæsium hexachlorogermanate, 130, 186.
sesquioxide, crystal structure of, 184.
- Calcium, isotope of, radioactive, 14.
- Calcium carbonate, neutron scattering by, 21.
 fluoride as fluorinating agent, 152.
- Callus, formation of, in vitamin-C deficiency, 391.
- Cannabidiol, structure of, 374.
- Cannabinol, structure of, 374.
 synthesis of, 375.
- Carbonyloxyproteins, 397.
- Carbon, isotope of, heavy, separation of, by thermal diffusion, 159.
 radioactive, 13.
 isotopes, thermal diffusion of, 35.
- Carbon suboxide, molecular polarisation of, 62.
monoxide, oxidation of, chlorine-sensitised, 95.
dioxide, liquid, structure of, 169.
 thermal diffusion of mixtures of hydrogen and, 154, 156.
- Carbon-carbon linking, fission of, in biology, 416.
- Carbonic anhydrase, zinc in, 419.
- Carbonyls, 129.
- Carbonyl chloride, photochemical formation of, 94.

- Carboxylase, containing magnesium and thiamine diphosphate, 417.
 pyruvate degradation by, 417.
 β -*apo*-Carotenals, 294.
 Carotene, chemistry and physiology of, 385.
 determination of, in foods, colorimetrically, 463.
 β -Carotene, oxidation of, 294.
 α - and β -Carotenes, isomerisation of, 291.
*neo*Carotenes, 291.
 ψ -Carotenes, 291.
 Carotenoids, 290.
 degradation of, 294.
 isomerisation of, 290.
 Carrageen moss, mucilage of, 425.
 Carrots, nutritive value of, 393.
 Casein, light-white, vitamin-A in, 385.
 Caseinogen, sedimentation constant of, 406.
 Cassaine, 380.
 Castor oil, fatty acids from, 213.
 Catalase, antiserum to, 395.
 Catalysis, biological, 415.
 Cataract from riboflavin deficiency, 389.
 Cellulose nitrate sols, viscosity of, 121.
 Cereals, distribution of nicotinic acid in, 388.
 Cerebronic acid, structure of, 217.
 Ceric phosphate, 128.
 Cerium, detection of, by fluorescence, 466.
 electrolytic separation of, 128.
 Cevadine, structure of, 379.
 Cevine, degradation of, 379.
 Cheese, lactic bacteria from, 437.
 vitamin-A in, 385.
 Cheilanthifoline, structure of, 376.
 Chick-pellagra factor. See Pantothenic acid.
 Chloral, reaction of, with chlorine, 95.
 Chloral hydrate, conversion of, into β -trichloroethylgentiobioside, in plants, 435.
 Chlorazol sky blue, photolysis of, on titanium dioxide, 98.
 ψ -Chlorin p_8 , 321.
 Chlorination, atomic, 288.
 Chlorine, isotope, radioactive, 14.
 isotopes, separation of, 156.
 photochemical reaction of, with hydrogen, 94.
 photosensitisation by, 95.
 Chlorine heptoxide, molecular structure of, 74.
 Chloroform, valency angles in, 55.
Chlorogalum pomeridianum, chlorogenin from, 353.
neotigogenin from, 350.
 Chlorogenin, 353.
 Chlorogenone, 354.
 Chlorogeranic acid, and its salts, 130.
 Δ^5 : 7 -Cholestadiene, 3(α)-hydroxy-, 360.
 Δ^4 : 6 -Cholestadienol, 361.
 Δ^6 : 8 -Cholestadienol, irradiation of, 360.
 Cholestane, 3(β):5:6-*tri*hydroxy-, 356.
 Cholestanone, sulphonation of, 358.
 Δ^4 -Cholestene, 3:6-*di*hydroxy-, 356.
cis- Δ^5 -Cholestene, 3:4-*di*hydroxy-, 355.
 Cholesterol, oxidation of, 354.
 Cholesterol, 6-iodo-, 363.
 Cholesteryl iodide, 363.
*iso*Chondrodendrine, 377.
Chondrodendron, alkaloids from, 377.
 Chondrofoline, 377.
Chondrus crispus. See Carrageen moss.
 Chroman, preparation of, 210.
 Chylomicrons, 414.
 α -Citaurin, 296.
 β -Citaurin, 294.
 Citric acid, formation of, in pyruvic oxidation, 385.
Clostridium, amino-acid decarboxylation by, 449.
 amino-acid metabolism of, 448.
 nutritional requirements of, 440.
Clostridium acetobutylicum, nutritional requirements of, 441.
Clostridium botulinum, fission of serine by, 446.
Clostridium butylicum, nutritional requirements of, 441.
 Cobalt, determination of, in ores, 475.
 overvoltage of, 470.
 separation of, from nickel, 475.
 Cobalt carbonyls, 129.
 Cocarboxylase, activation of, by vitamin-B₁, 387.
 Cochineal wax, 220.
*d-iso*Coclaurine, structure of, 378.
 Coenzyme R, 393.
 Colloids, 99.
 micellar, 102.
 viscosity of, 111.
 Colloidal particles, degradation of, by shear, 121.
 rod-shaped, viscosity of, 115.
 size of, 100, 120.
 sols, hydrophobic, 100.
 Colloidoscope, 111.
 Colorimeter, Donaldson, 467.
 Colorimetric analysis, 462.
 Conjunctivitis from riboflavin deficiency, 389.
 Co-ordinate links, 74.
 Coproglucobilin, 325.

- Coproporphyrin-III, determination of, by fluorescence, 466.
- Copper, detection of, in traces on shears, 473.
determination of, electrolytically, 473.
in lead bullion, spelter, and zinc ores, 476.
in ores, 477.
in presence of cadmium and iron, 477.
in zinc alloys, 477.
electrodeposition of, in presence of iron salts, 471.
- Corticosterone, and 17-hydroxy-, 337.
- Corydalis*, alkaloids from, 376.
- Corynebacterium diphtheriae*, nutritional requirements of, 437.
- Coumaranones, 370.
- Creatine, determination of, in meat extracts, etc., 465.
- Creatinine, determination of, in meat extracts, etc., 465.
- Critical concentration and viscosity, 122.
- Crocein, isomerisation of, 293.
- Crotalaria retusa* and *spectabilis*, alkaloids from, 376.
- Crotonaldehyde, condensations of, 221.
- Cryptocavine, structure of, 376.
- Crystals, model of, 173.
nuclei, formation of, in liquids, 170.
physics of, 167.
X-ray reflection by, 167.
structure of, and melting, 171.
thermodynamics of, 33.
- Crystal state, transitions of, 175.
- Crystal-albumin, 408.
- Crystallisation, rules for, 170.
- Cyanimino-group, linearity of, 193.
- Cyanines, preparation of, 366.
- Cyanine dyes, colour of, 365.
- Cyanogen, molecular polarisation of, 62.
- Cyclotron, 12.
- Cysteine, fission of, by bacteria, 446.
- Cystine, fission of, by bacteria, 446.
- Cytochromes, succinate oxidation by, 416.
- Cytochrome a_3 , 416.
- Cytochrome c, hydrolysis of, 324.
- Dark-adaptation test for vitamin-A deficiency, 383.
- cis*- and *trans*-Decalins, separation of, 456.
- Decane-1 : 10-dicarboxylic acid, growth-promotion by, 223.
- Decarbousnol, 373.
- Decevinic acid, 380.
- Dehydroandrosterone, progesterone, synthesis from, 340.
- Dehydrobilirubin, 325.
- 7-Dehydrocholesterol, 361.
- 7-Dehydroepicholesterol. See 4^{5:7}-Cholestadiene, 3(α)-hydroxy-.
- Dehydrocorticosterone, and 17-hydroxy-, "cortin activity" of, 337.
- Dental structure in avitaminosis-A, 384.
- Deoxycorticosterone, synthesis of, 342.
- Detergents, 102.
- Deuterium, enrichment of, 456.
- Deuterium oxide, separation of, from water, 163.
peroxide, preparation of, 125.
- Diacetyl, formation of, from acet-aldehyde, 84.
molecular structure of, 66.
thermal decomposition of, 272.
- Diacyl peroxides, reactions of, 283.
- m*-Diamines, detection of, by fluorescence, 466.
- Diazobenzene hydroxide, decomposition of, 279.
- syn*-Diazo-cyanides, reactions of, 281.
- Diazohydroxides, reactions of, 279.
- Dibenzoyl *peroxide*, reaction of, with triphenylmethyl, 283.
- 4 : 4'-Dibenzoyltriphenylmethyl, 258.
- Diisobutene, reduction of, 204.
- Diborane, 138.
reaction of, with aluminium alkyls, 148.
with phosphine, 145.
- Dicyanodiamide, structure of, 192.
- Didymocarpus pedicellata*, penta-hydroxybenzene derivatives from, 370.
- Diels-Alder reaction, *isobenzfuran* synthesis by, 369.
- Diethoxyborine, 147.
- Diethyl ketone, photolysis of, 85.
- Diethylmercury, photolysis of, 86.
- Diethyl sulphide, $\beta\beta'$ -dihydroxy-, formation of, 203.
- Diethylzinc, photolysis of, 86.
- Diffraction, observation of, 41.
- Diffusion, thermal, in liquids, 162.
isotope separation by, 153.
of gases, 34.
parallel-plate cell for, 155.
- Diffusion apparatus, 163.
- Diffusion constants of proteins, 410.
- Di - *p* - *cyclohexylphenyltetraphenyl* - ethane, 259.
dissociation of, 258.
- Dihydrotachysterol, 360.
- Dihydrovitamin- D_2 I, 360.
- Diketen, 208.
- Dilsea edulis*, mucilage from, 425.

- Dimesitylchloromethane, dissociation of, 260.
- Dimethoxyborine, 140.
- Dimethoxytriphenylmethyls, stability of, 253.
- 3:4-Dimethoxytriphenylmethyl, stability of, 254.
- Dimethylbenzhydryl chloride, hydrolysis of, in presence of azide, 245.
- Dimethylborine, amino-, 143.
- Dimethylboron fluoride, 147.
- 2:2-Dimethylbutane, preparation of, 202.
- 3:3-Dimethyl- Δ^1 -butene, 202.
- Dimethyldiborane, 141.
- 2:2'-Dimethyldiphenyl-4:4'-bisdiphenylmethyl, 265.
- Dimethylmercury, photolysis of, 86.
- 2:3-Dimethyl methylgalacturonoside, methyl ester, 424.
- Dimethyl disulphide, molecular structure of, 66.
- 2:5-Dimethyltriphenylmethyl radical, stability of, 257.
- Di- β -naphthaspiropyran, effect of heat on, 366.
- Diosgenin, 353.
- Diphenoxytetraphenylethane, thermal behaviour of, 253.
- Diphenyl, *oo'*-dichloro-, molecular structure of, 66.
- Diphenyl ether, valency angle of, 72.
- Diphenyl ether, *pp'*-diiodo-, structure of, 47.
- valency angle of, 72.
- Diphenyl-3-acenaphthylmethyl, stability of, 259.
- o*-Diphenylbenzene, molecular structure of, 178.
- Diphenyl-3:3'-bisdiphenylmethyl, 266.
- radical nature of, 264.
- Diphenyl-4:4'-bisdiphenylmethyl, quinonoid form of, 264, 266.
- Diphenyl-4:4'-bisdiphenylmethyl, 2:6:2':6'-*tetrachloro*-, 264.
- Diphenyl-4:4'-bis-4''-diphenylphenylmethyl, 2:6:2':6'-*tetrachloro*-, 265.
- Diphenyleyanomethyl radical, 289.
- Diphenyl-4-diphenylmethyl, stability of, 254.
- Diphenylmercury, decomposition of, 285.
- 1:4-Diphenylnaphthalene, derivatives, from *isobenzfurans*, 369.
- Diphenyl-*a*-naphthylmethyl, stability of, 259.
- Diphenyl-*a*-naphthylmethyl formate, thermal decomposition of, 259.
- Diphenylnitrogen radical, 268.
- $\alpha\beta$ -Diphenyloctatetraene, degradation of, 296.
- s*-Diphenyltetra-($\beta\beta$ -diphenylvinyl)-ethane, stability of, 261.
- Diphenyl-*o*-tolylmethyl radical, 256.
- Diphenyl-*m*-tolylmethyl radical, stability of, 257.
- Diphenyl-*p*-tolylmethyl radical, 256.
- 1-Diphenyltetraphenylethane, distillation of, 262.
- Diphosphopyridinenucleotide, requirement of, for *Hæmophilus*, 442.
- Diphtheria antitoxin, enzymic digestion of, 399.
- mol. wt. of, in horse sera, 399.
- Dipole moments, and molecular structure, 67.
- electric, 36, 47.
- Diisopropoxyborine, 147.
- Diisopropyl ether, octane number of, 204.
- Di-*n*-propyldiborane, 141.
- Dipyrrylmethene, bromo-, reduction of, 330.
- Dipyrrylmethenes, synthesis of, 331.
- Disease, serum proteins in, 409.
- Distillation, 451.
- fractional, 452.
- of aliphatic compounds, 201.
- micro-, 457.
- molecular, 457.
- under reduced pressure, 461.
- Distillation apparatus, columns, 452.
- molecular, 458.
- Disulphur monoxide, 134.
- Docosahænaic acid, structure of, 216.
- Dunnione, structure of, 372.
- Earths, rare, chemistry of, 128.
- Eggs, viscosity of proteins from, 412.
- Egg albumin. See under Albumin.
- Egg-white, injury from, in rats, protection against, 392.
- Elæostearic acid, structure of, 214.
- ψ -Elæostearic acid, structure of, 212.
- Elaidic acid, structure of, 212.
- Electric moments, induced by polar groups, 53.
- Electrode, calomel standard, 470.
- hydrogen, potential of, 469.
- Electrodeposition, 469.
- Electrolysis, internal, 476.
- stirring in, 471.
- Electrolytic analysis, 469.
- Electrons, diffraction of, and molecular structure, 67.
- by gases or vapours, 36.
- Electron microscope in determination of molecular shape, 413.
- Element 85, 14.

- Element 93, isotope of, 11, 16.
 Elm wood, constituents of, 426.
 Embryos, viscosity of proteins from, 412.
 Emulsifiers, 109.
 Emulsions, 109.
 oil-in-water and water-in-oil, 110.
 Encephalopathic syndrome, treatment of, with nicotinic acid, 389.
 Energy, dipole-dipole, calculation of, 27.
 intermolecular, 24.
 quantum-mechanical, of interacting atoms, 25.
 Entropy of fusion, 172.
 Enzymes, activity of, in presence of buffer solutions, 423.
 as catalysts, 415.
 crystalline, 419.
 Equation of state for gases, 29.
 Ergosterol, photoisomers of, 359.
Erythrophleum guineense, alkaloid from, 380.
 Esterification, mechanism of, 229.
 Ethane, mercury-photosensitised reactions of, 272.
 photolysis of cadmium- and mercury-sensitised, 92.
 Ethane, *s*-dibromo-, molecular rotation of, 177.
 s-dichloro-, molecular rotation of, 176.
 tetraiodo-, photochemistry of, 96.
 nitro-, determination of, colorimetrically, 464.
 17 - Ethinyltestosterone, progestational activity of, 342.
 Ethyl alcohol, distillation of azeotropic mixtures of, with benzene, 461.
 with water, 461.
 iodide, reaction of, with sodium, 286.
 radicals, formation of, 273.
 reactions of, with liquid hydrocarbons, 277.
 Ethylboranes, 141.
 Ethylcyclobutane, preparation of, 202.
 Ethylene, hydrogenation of, mercury-photosensitised, 273.
 polymerisation of, 87.
 Ethylene, dichloro-, photobromination of, 95.
 Ethylene dichloride, polarisation of, 58.
 potential curves for, 64.
 separation of, from benzene, 456.
 chlorohydrin, conversion of, into β -2-chloroethyl-*d*-glucoside in plants, 435.
 dihalides, structure of, and Raman spectra, 179.
 Ethylene diiodide, photolysis of, 96.
 oxide, use of, as insecticide and in synthesis, 203.
 Europium, detection of, by fluorescence, 466.
 Eye diseases caused by riboflavin deficiency, 389.
 Factor V, 388.
 Factor W, 390.
 Faeces, of myopathic patients, pigment in, 330.
 stercobilin from, 329.
 Fangchinoline, structure of, 378.
 Fibrinogen, 407.
 molecular shape of, 412.
 Filtrate factor. See Pantothenic acid.
 Fish, putrid, trimethylamine in, 450.
 Fish oils, molecular distillation of, 459.
 unsaturated acids of, 216.
 Fittig reaction, 286.
 Flavins, synthetic, effectiveness of, for bacterial growth, 438.
 Flavones, 370.
 Flour, xanthophyll from, 463.
 Flow of colloids, 112.
 Fluorescence, apparatus used for, 467.
 relation of, to photolysis in gases, 81.
 Fluorescence analysis, 466.
 Fluorination of inorganic compounds, 150.
 Foods, determination in, of carotene, 463.
 Formaldehyde, photolysis of, 81, 99.
 Formic acid, sodium salt, structure of, 185.
 Formyl radical, stability of, 82.
 Formylneobilirubic acid, 327.
 Formylneoxanthobilirubic acid, 327.
 Fractionating columns, 452.
 efficiency, 453.
 Frictional constant of proteins, 410.
 Fruit, cooked and raw, vitamin-*C* in, 391.
 Fumaronitrile, molecular polarisation of, 62.
 Furan, bond distances in, 364.
 Furano-compounds, 372.
 Fusel oil, analysis of, by distillation, 461.
 Gadolinium, purification of, 128.
 Gallium chlorides, 128.
 Gases, electron diffraction by, 36.
 molecular distribution law for, 33.
 thermal diffusion of, 34, 153.
 thermodynamic data of, 28.
 viscosity of, 34.

- Gelation and thixotropy, 116.
 Germanium, determination of, in presence of arsenic, 476.
 Germanium tetrachloride, fluorination of, 151.
 Ginkgetin, structure of, 371.
 Gitogenin, 353.
*neo*Gitogenin, 354.
 Glucobilin, 325.
 Globoglycoid, 408.
 β -Globulin, sedimentation of, 407.
 Glucose, phosphorylation of, 418.
 Glucose 1-phosphate, formation of, from starch, 420.
 Glutamic acid, deamination of, by bacteria, 447.
l(-)-Glutamic acid, fission of, by bacteria, 446.
 Glutamic acid dehydrogenase, extraction of, from bacteria, 446.
 Glycerol, preparation of, from allyl chloride, 205.
 Glycine, fission of, by bacteria, 446.
 Glycosides, formation of, in plants, 434.
 Gold, determination of, by electro-deposition, 473.
 valency of, in complexes, 73.
 Gold halides, complexes of, with triethyl-arsine and -phosphine, 133.
 Gossypitrin, structure of, 371.
 Grignard reaction with hydrocarbons, 285.
 Growth substances, 430.
 bacterial, 435.
 chick anti-dermatitis, 226.
 vapours, 432.
 Guanidine group, planarity of, 193.

 Hæmatin, requirement of, for *Hæmophilus*, 442.
 Hæmin, complexity of, 324.
 Hæmocyansins, molecular shape of, 412, 413.
Hæmophilus, nutritional requirements of, 441.
Hæmophilus parainfluenzæ, cultivation of, with factor V, 388.
 growth of, in diphosphopyridine-nucleotide, 442.
 oxidation of aspartic and glutamic acids by, 447.
 Halogens, photolysis of, 93.
 Halogen compounds, bonds in, 76.
 Han-fang-chi, alkaloids of, 378.
 Hashish, constituents of, 374.
 Heat of fusion, 172.
 of crystals, 171.
 Heliotric acid, structure of, 376.
 Heliotrine, 376.

 Helium, atoms, quantum-mechanical energy of, 25, 28.
 purification of, 162.
 thermal diffusion of mixtures of bromine and, 156.
 virial coefficients of, 31.
 viscosity of, 35.
 wave function of, 24.
 Hemicelluloses, 426, 427.
 preparation of, pretreatment of materials for, 428.
 Heptaldehyde from castor oil, 213.
n-Heptane, separation of, from toluene, 456.
 Heterocyclic compounds, 364.
 Hexa-arylethanes, dissociation of, 250.
 Hexachlorodisilane, fluorination of, 151.
 Hexa- ($\beta\beta$ - diphenylvinyl) ethane, stability of, 261.
 Hexa- 3 - diphenyllethane, dissociation of, 252.
 Hexafluogermanates, 186.
 Hexa-*p*-cyclohexylphenylethane, dissociation of, 258.
 Hexacyclohexylphenylethanes, 258.
 Hexamethylenetetramine, molecular structure of, 72.
*cyclo*Hexane, molecular structure of, 65.
 preparation of, 202.
 Hexaphenylethane, *p*-alkyl derivatives, dissociation of, 254.
 dissociation of, 267.
*cyclo*Hexene, reactions of, with benzenediazonium chloride and with nitrosoacetanilide, 280.
 Hexyl alcohols, physical properties of, 206.
*p-cyclo*Hexyltriphenylmethyl radical, 259.
 Histamine, determination of, and its production by bacteria, 448, 449.
 Holmium, crystal structure of, 128, 184.
 Holmium compounds, 128.
D-Homoandrostande derivatives, 344.
 Homopterocarpin, 371.
 Hormones, 400.
 animal, from plant products, 347.
 pituitary anterior, gonadotrophic, 401.
 growth, 403.
 lactogenic, 403.
 thyrotrophic, 402.
 wound, 222.
 Horse-nettle. See *Solanum elæagnifolium*.
 Hydrazine, molecular structure of, 66.
 photolysis of, 86, 274.
 Hydrazine salts as anodic depolarisers, 470.

- Hydrocarbons, carotenoid, isomerisation of, 290.
 pure, preparation of, 200.
 thermal decomposition of, 270.
- Hydrogen, isotope, β -active, 13.
 isotopes, separation of, 159.
 para-, conversion of, mercury-sensitised, 89.
 photochemical reaction of, with chlorine, 94.
 thermal diffusion of mixtures of carbon dioxide and, 154, 156.
- Hydrogen chloride, dipole moment of, 49.
 electrode, potential of, 469.
 iodide, addition of, peroxide effect in, 209.
 photolysis of, 99.
 peroxide, molecular structure of, 66.
 photochemical reaction of, with bromine, 96.
 disulphide, molecular structure of, 66.
- Hydrolysis, mechanism of, 229.
- Hydropolymerisation, 205.
- Hydroxlenides, 135.
- Hydroxamic acids, preparation of, 208.
- α -Hydroxy-acids, determination of, 227.
- Hydroxyl radical, formation of, 279.
- Hydroxylamine as anodic depolariser, 470.
- Hyodeoxycholic acid, conversion of, into progesterone, 340.
- Iminophthalimidine, *isoindole* syntheses from, 368.
- Immunochemistry, 394.
- Indicators, fluorescent, 468.
- Indium, isomerism of, 19.
 isotopes, from fission, 10.
- isoIndoles*, 367.
 syntheses of, 367.
- Indolylacetic acid, plant-growth promotion by, 430, 432.
- Indolylbutyric acid, root-growth stimulation by, 431.
- Infection, resistance to, vitamin-C in, 391.
- Insect waxes, 219.
- Insulation, thermal, of fractionating columns, 454.
- Insulators, dielectric losses in, 57.
- polyIodides*, 136.
- Iodine, spectrum of, absorption, 80.
- Iodine pentafluoride, crystal structure of, 183.
- Ionisation, energy of, 237.
- Iridium caesium chloride, 135.
 subphosphide, crystal structure of, 184.
- Iridium phosphides, 131.
- Iron, overvoltage of, 470.
- Iron arc as source of ultra-violet light, 467.
- Iron phosphide, 131.
- Isomerides, nuclear, table of, 19.
- Isomerism, nuclear, 16.
- Isotopes, mixed, thermal diffusion of, 35.
 separation of, by thermal diffusion, 153.
- Joule-Thomson coefficients of gases, 30.
- Juniperic acid, structure of, 220.
- Kerasin, 217.
- Keratins, feather and wool, specificity of, 396.
- Keratins from riboflavin deficiency, 389.
- Keten, polymerisation of, 208.
- 6-Ketocholestanol, 356.
- 3-Keto- Δ^4 -cholestene, sulphonation of, 358.
- Ketones, aliphatic, photolysis of, 276.
 photolysis of, 81, 272.
- Kidney extracts, glucose phosphorylation by, 418.
- Kinetics, 79.
- Körper II, 330.
- Krypton isotopes, from fission, 9.
 separation of, 161.
- Lacquers, ester solvents for, 205.
- Lactobacillus*, nutritional requirements of, 438.
- Larch wood, arabogalactan from, 427.
- Lauric acid, sodium salt, solution equilibria of, 105.
- Lead, determination of, as electrolytically deposited oxide, 473.
 separation of, from bismuth, 473.
- Lead complexes, configuration of, 182.
 suboxide, 125.
 tetraethyl, thermal decomposition of, 277.
- dl*-Lelobanidine, 375.
- Lemon wood, hemicelluloses of, 428.
- Leprosy, bactericides for treatment of, 225.
- Lespedin, 371.
- Lespeza cryptobotrya*, lespedin from, 371.
- Leuconostoc*, nutritional requirements of, 438.
- Licanic acid, structure of, 215.

- Light, sources of, 467.
 ultra-violet, for fluorescence excitation, 467.
- Lignoceric acid, structure of, 217.
- Linoleic acid, structure of, 212.
- Linolenic acid, structure of, 212.
- Liquids, dipole absorption by, 55.
 quasi-crystalline, 168.
 statistical theory of, 31.
 thermal diffusion in, 162.
 transition of, to solids, 168.
- Lithocholic acid, conversion of, into progesterone, 340.
- Liver, pantothenic acid from, 226.
- Liver diseases, vitamin-*A* deficiency in, 384.
- Liver extracts, growth substances from, 437.
 yeast growth stimulants in, 434.
- LOBELIA inflata*, alkaloids of, 375.
- Locust wood, black, hemicelluloses of, 428.
- Lonicera tartarica*, rooting of cuttings of, 431.
- Lucerne hay, hemicelluloses of, 428.
- Lumisterol, 359.
- r*-Lupinine, synthesis of, 376.
- Lutein, isomerisation of, 292.
- Lutein diacetate, oxidation of, 296.
- Lycopenal, 295.
- apo*-3-Lycopenal, 295.
- Lycopene, degradation of, 295.
*neo*Lycopene, 292.
- Magnetic susceptibility and free radical formation, 263.
- Maize meal, plant growth inhibitor in, 433.
- Mannan, spruce, 427.
- Marihuana, constituents of, 374.
- Marsh test, electrolytic, 475.
- Meat extracts, determination in, of creatine and creatinine, 465.
- Melting and crystal structure, 171.
- Mercuric halides, complexes of, with *tert.*-alkyl-arsines and -phosphines, 131.
- Mercury, determination of, in brass, 476.
 isotopes, separation of, 458.
 sensitisation by, of photolysis, 89.
 specific heat of, in neighbourhood of *m. p.*, 169.
- Mercury arc as source of ultra-violet light, 467.
 diethyl, photolysis of, 273.
 halides, complexes of, with tertiary arsines and phosphines, 186.
 salts, thiobasic, 126.
- Mesobilichrysin, 329.
- Mesobilifuscin, 330.
- Mesobilirhodin, synthesis of, 329.
- Mesobilirubin, synthesis of, 328.
- Mesobiliviolin, synthesis of, 329.
- Mesohæmin, preparation of, 325.
- Metabolism, carbohydrate, effect of anterior pituitary hormones on, 404.
- Metalloporphyrins, 413.
- Metals, determination of, by internal electrolysis, 476.
 electrodeposition of, 469.
 liquid, viscosity of, 169.
- Metallic carbonyls, 129.
- Methane, isotopes, thermal diffusion of, 35.
 photolysis of, mercury-sensitised, 91.
- Methane, tetranitro-, molecular structure of, 71, 72.
- p*-Methoxybenzhydriyl chloride, alcoholysis of, 242.
- p*-Methoxydiphenyl-4-diphenylmethyl, stability of, 254.
- Methyl, free, reactions of, 87.
- Methyl alcohol, photolysis of, 99.
 separation of, from benzene, 455.
- Methylacrylic acid, methyl ester, polymerisation of, with styrene, 290.
- β -Methylallyl chloride from isobutylene, 205.
- Methyl- Δ^4 -androstene-3-one, 17-hydroxy-, 333.
- p*-Methylbenzhydriyl chloride, hydrolysis of, 248.
- Methylboranes, structure of, 141.
- Methylboric acid, and its anhydride, 146.
- Methylboron fluoride, 147.
- Methyldiborane, 141.
- Methyldioctylacetic acid, 225.
- Methylene dichloride, valency angles in, 55.
- 3:4-Methylenedioxytriphenylmethyl, stability of, 254.
- Methyl ethyl ketone, photolysis of, 85, 86, 88, 273.
- Methylcyclohexane, preparation of, 202.
- Methyl iodide, photolysis of, 86.
- 2-Methyl-1:4-naphthaquinone, determination of, colorimetrically, 464.
- 3-Methyl-3-*n*-octyl-*n*-undecic acid, 226.
- Methylcyclopentane, preparation of, 202.
- Methyl radical, reactions of, 271.
- 10-Methylstearic acid, synthesis of, 223.
- 17-Methyltestosterone, activity of, 332.
- 17(*epi*)-Methyltestosterone, 333.

- N*-Methyltriborinetriamines, synthesis of, 143.
- Milk, determination in, of riboflavin, 467.
lactic bacteria from, 437.
nutritive value of, 393.
- Milkweed, proteases from, 429.
- Molecular structure, from dipole moments and electron diffraction, 67.
- Molecules, hindered rotation of, 176.
non-polar, effect of vibration in, 52.
- Molybdenum, isotopes, from fission, 9.
- Molybdenum carbonyl, 130.
phosphide, 131.
- Monocrotalic acid, 376.
- Monocrotaline, 376.
- Monocrotic acid, 376.
- Montmorillonite, viscosity of suspensions of, 121.
- Mucilages, plant, 425.
- Myelomatosis, serum proteins in, 409.
- Myosin, molecular shape of, 412.
- α -Naphthaflavone as fluorescent indicator, 468.
- Naphthapyrans, colour of, 366.
- Naphthoxyacetic acid, and its salts, growth stimulation by, 433.
- Neon, atoms, quantum-mechanical energy of, 26.
isotopes, separation of, 156, 456.
thermal diffusion of, 35.
- Nephrosis, serum proteins in, 409.
- Neutrons, magnetic moment of, 21.
scattering of, 21.
- Nickel, determination of, in zinc, 476.
overtoltage of, 470.
separation of, from cobalt, 475.
valency of, in glyoximes, 72.
- Nickel bronze, analysis of, 475.
- iso*Nicotine, structure of, 376.
- Nicotinic acid, determination of, 388, 465.
requirement of, for bacteria, 436, 437, 438.
- Niobium halides, crystal structure of, 182.
pentoxide, m. p. of, 133.
oxides, 133.
- Nitrogen, fixation of, by bacteria, 443.
heavy, separation of, by thermal diffusion, 160.
- Nitrogen tribromide, 130.
- Nitrosoacetylarylamines, reactions of, 281.
- Nitrosoamines, photolysis of, 273.
- Nitrosyl chloride, photolysis of, 93.
- Nodakenetin, structure of, 372.
- Nodakenin, 372.
- apo*-3-Norbixinol methyl ester, 296.
- Nuclei, fission of, 8.
- Nutrition and vitamins, 383.
in wartime, 393.
level of, 387.
- Oak wood, hemicelluloses of, 427.
- Oat hulls, hemicelluloses of, 428.
- Oatmeal, nutritive value of, 393.
- Octadecenoic acids, isolation and purification of, 213.
- n*-Octadecylcyclohexane, preparation of, 202.
- Octane, thermal decomposition of, 271.
- iso*Octane, anti-knock properties of, 204.
- n*-Octylcyclohexane, preparation of, 202.
- Œstriol, 333.
- Oiticica oil, licanic acid from, 215.
- Olefins, addition of hydrogen bromide of, 289.
addition of hydrogen iodide to, 209.
dehydrogenation of, 203.
halogenation of, 205.
- Olefinic acids, purification of, 211.
- Oleic acid, structure of, 211.
- Organic compounds, colorimetry of, 463.
- Ornithine, formation of, from *l*(+)-arginine by bacteria, 450.
- Overtoltage, 470.
- Ovoglobulin, molecular shape of, 412.
- Oxalic acid, lead salt, structure of, 182.
uranyl salt, photolysis of, 93.
- Oxidation, biological, 415.
- Oxygen, heavy, separation of, by thermal diffusion, 160.
use of, in esterification and hydrolysis, 231.
isotopes, separation of, 456.
rings, natural products containing, 370.
- Packing materials for fractionating columns, 454.
- Palladium, valency of, in complexes, 73.
- Palladium cæsium chloride, 135.
- Pantothenic acid, deficiency symptoms of, 390.
determination of, in blood, 390.
by growth response, 433.
in extracts, 442.

- Pantothenic acid, requirement of, for bacteria, 436, 437, 438.
 structure and properties of, 389.
 structure and synthesis of, 226, 433.
- Pantothenic acid, hydroxy-, 229.
- Papain from papaya latex, 429.
- Papaya latex, papain from, 429.
- Paprika, pigments of, determination of, 463.
- Paraffins, chlorination of, 205.
 nitration of, 207.
 vapour-phase, 275.
- Paraffins, nitro-, manufacture of, 207.
- Paraffin wax, fractionation of, 458.
- Parinaric acid, structure of, 214.
- Parinarium laurinum*, parinaric acid from, 214.
- Pasteurella*, nutritional requirements of, 439.
- Pastes, flow of, 112.
- Pea plants, leaves, plant growth inhibitor in, 433.
- Peanut oil, acids from, 217.
- Pectic acids, 423.
- Pectin, jelly formation by, 424.
 structure of, 424.
- Pedicellin, 370.
- Pedicin, 370.
- iso*Pedicin, 370.
- ψ -*iso*Pedicin, 370.
- Pedicinin, 370.
- Pellagra-preventive factor. See Nicotinic acid.
- Penta-arylethanes, 261.
- Pentaborane, 149.
- neo*Pentane, thermal decomposition of, 271.
- cyclo*Pentane, preparation of, 202.
- Pentaphenylethane, dissociation of, 260, 263.
- Pentaphenylcyclopentadienyl, magnetic measurements with, 267.
- Pentdyopent reaction, 331.
- cis*-Pentene-2, purification of, 457.
- neo*Pentyl group, rearrangement of, 231.
- Peptisation, 107.
- Peroxide effect, 209.
- Petroleum, fractionation of, 458.
 hydrocarbons, thermal decomposition of, 270.
 industry, 200.
- Peucedanum decursivum*, nodakenin from, 372.
- Phenanthryldiphenylmethyls, stability of, 259.
- Phenol, *o*-chloro-, conversion of, into β -(*o*-chlorophenyl)gentiobioside in plants, 435.
o-nitro-, determination of, in *p*-nitrophenol, 468.
- Phenolphthalins, *isobenzfuran* syntheses from, 369.
- Phenoxy radical, 284.
- Phenyl benzyl ether, Claisen rearrangement of, 284.
- Phenyldiazocyanides, stereoisomerism of, 71.
- $\omega\omega'$ -Phenylpolyenes, paramagnetism of, 267.
- Phenyl radical, formation of, 279, 285.
 stability of, 273.
- Phenylureidoproteins, 397.
- Phosphides, 131.
- Phosphine. See Phosphorus trihydride.
- Phosphines, tertiary, complexes of, with cadmium and mercury halides, 186.
- Phosphonitrile chlorides, fluorination of, 153.
- Phosphorus, *pentabromide*, crystal structure of, 185.
pentachloride, crystal structure of, 185.
 cyanate, 127.
pentafluoride, crystal structure of, 182.
 halides, fluorination of, 151.
 trihydride, photolysis of, 91.
 reaction of diborane with, 145.
 oxides, molecular structure of, 72.
- Phosphorylase, 420.
- Phosphorylation, vitamin- B_1 and, 386.
- Photochemical decomposition, 272.
 primary quantum efficiency, 87.
 processes, primary, 79.
 reactions, kinetics of, 93.
- Photochemistry, ultra-violet, 96.
- Photolysis of aldehydes and ketones, 81.
 relation of, to fluorescence in gases, 81.
- Photometer, photo-electric, 462.
- Photopyrocalciferols, 360.
- Photosensitisation by metallic vapours, 92.
- Phrenosin, 217.
- Phthalocyanine, and its metallic derivatives, structure of, 188.
- Phthalonitrile, *isoindole* syntheses from, 367.
- Phthioic acid, structure of, 223.
- neo*Physaliden, 292.
- Picryl iodide, molecular structure of, 178.
- Pigments, linear, 325.
- dl-n*- and *iso*-Pilocarpines, synthesis of, 381.
- Pilosinine, 381.
- Pilosinic acid, synthesis of, 381.

- Pimelic acid, requirement of, for bacteria, 437.
- Pine wood, constituents of, 426.
- Pineapples, bromelin from, 429.
- Piperidine bases, 375.
- Pituitary, anterior, hormones of, 401.
- Plants, biochemistry of, 419.
glycoside formation in, 434.
growth of, inhibitor for, 433.
substances promoting, 430.
proteases of, 429.
wound hormone of, 433.
- Plant roots, formation of, induced by growth substances, 431.
- Plant waxes, 219.
- Plasticity, 124.
- Platinum, valency of, in complexes, 73.
- Platinum caesium chloride, 135.
- Pneumococci, immunity to, conferred by synthetic antigens, 396.
- Polarisation, atom, electron, and orientation, 57.
atom, expression for, 60.
electric, effect of intramolecular vibrations on, 51.
molecular, expression for, 61.
orientation, expression for, 60.
vibration, 63.
- Polymerides, viscosity of, 123.
- Polymerisation, acceleration of, 289.
- Polynneuritis, pyruvate oxidation in brain in, 386.
- Polysaccharides, bacterial, 426.
- Pomegranate seed, punicic acid from, 214.
- Porphyryns, conversion of, into bilirubinoids, 325.
determination of, by fluorescence, 466.
properties of, 325.
- Porphyrin c, 324.
- Potassamide, reactions of, with potassium nitrate and nitrite, 137.
- Potassium fluoriodate, crystal structure of, 181.
polyiodides, 136.
sulphamate, structure of, 185.
- Potatoes, nutritive value of, 393.
phosphorylase from, 421.
wound formation in, effect of traumatic acid on, 433.
- Potential, difference of, between metals and solutions of their ions, 469.
- ϵ -Potential, 101.
- ζ -Potential, 101.
- $\Delta^{5:17}$ -Pregnadien - 21 - al, 3(β) - hydroxy-, 339.
- $\Delta^{5:17}$ -Pregnadiene, 3(β) - 21 - dihydroxy-, 338.
- $\Delta^{4:17}$ -Pregnadien - 3 - one, 21 - hydroxy-, 338.
- Pregnane, derivatives of, from saponinins, 351.
synthesis of, from androstane derivatives, 334.
- Pregnane, 3 : 16 : 20-*trihydroxy*-, 352.
alloPregnane, 3(β) : 17(β)-*dihydroxy*-, 335.
- Pregnane ketones, oxidation of, with lead tetra-acetate, 343.
- Δ^{20} -*alloPregnene*, 3(β) : 17(a)-*dihydroxy*-, isomerisation of, 336.
- Pregnene aldehydes, 337.
- Δ^4 -Pregnene-3 : 20 - dion - 21 - al, synthesis of, 337.
- Δ^1 -*alloPregnedione*, 340.
- Δ^5 -Pregnenolone, 344.
isoPregnenolone, 344.
- Δ^5 - *isoPregnenolone*, 17 - hydroxy -, 346.
- neoPregnenolone*, 344.
- Premelting, 174.
- Primetin, structure of, 370.
- Progesterone, 340.
hydroxy-derivatives, progestational activity of, 342.
synthesis of, 340.
- neoProgesterone*, 345.
- Prolactin, 403.
- Prolan, 401.
- Propane, mercury - photosensitised reactions of, 272.
purification of, 456.
- Propane, nitro-, determination of, colorimetrically, 464.
- Propionibacterium pentosaceum*, fission of cysteine by, 446.
- n*-Propyl alcohol, distillation of azeotropic mixtures of, with water, 460.
- Propyl bromides, exchange reactions of, with radioactive bromide ions, 247.
- n*-Propyldiborane, 141.
- Propylene, polymerisation of, 203.
- isoPropylcyclohexane*, preparation of, 202.
- p* - *isoPropylphenyldiphenylmethyl* radical, 256.
- Proteases, plant, 429.
- Proteins, 404.
adsorption of, 414.
Bence-Jones, 396.
dipole moments of, 56.
electrophoresis and sedimentation of, 406.
homogeneity and molecular size of, 405.
immunological properties of, effect of substitution on, 396.
molecular shape of, 409.
serum, 407.

- Proteus*, nutritional requirements of, 436.
- Proteus morgani*, pantothenic acid requirement of, 436.
- Protochlorophyll, 321.
- Protocuridine, 377.
- neo*Protocuridine, 377.
- Pterocarpin, 371.
- Punica granatum*. See Pomegranate.
- Punic acid, structure of, 214.
- Putrescine, formation of, from *l*(+)-ornithine by bacteria, 449.
- Pyrano-compounds, 372.
- Pyrazine, bond distances in, 364.
- Pyridine, bond distances in, 364.
reactions of, with diazonium chlorides and with nitrosoacylaryl-amines, 282.
- n*- and *iso*-Pyrocalciferols, 359.
- n*- and *iso*-Pyrovitamin-*D*₃, 359.
- Pyrochlorin, γ -cyano-, 323.
- Pyrrrole, bond distances in, 364.
- Pyrolidine bases, 375.
- Pyrroporphyrin, γ -derivatives, 323.
- Pyruvic acid, fission of, 417.
oxidation of, vitamin-*B*₁ and, 385.
- Quinoline, reaction of, with nitrosoacetanilides, 284.
- Radial distribution, curve of, 67.
expression for, 44.
- Radicals, free, 250.
formation of, in photolysis, 83.
identification of, 86.
magnetic susceptibility in relation to, 263.
short-life, 268.
in liquid phase, 275.
- Radioactivity, artificial, 12.
- Radish plants, plant growth inhibitor in, 433.
- Radix pareiræ bravæ*, constituents of, 377.
- Rape-seed oil from brassicasterol, 361.
- Rays, molecular, intermolecular potentials from, 36.
ultra-violet. See under Light.
- X-Rays, reflection of, by crystals, 167.
- Reactions, elimination, 248.
gaseous, free radicals in, 269.
- Reaction mechanisms, 229.
- Retronecanol, 376.
- Retronecine, 376.
- Rhenium carbonyls, 129.
- Rheology, 112.
- Rheopexy, 119.
- Rhinitis from vitamin-*C* deficiency, 391.
- Rhizobium*, β -alanine formation by, from aspartic acid, 448.
nitrogen fixation by, 443.
- Rhizocaline, activation of, in plants, 430.
- Rhodins, synthetic, 323.
- Rhodium cæsium chloride, 135.
halides, 136.
subphosphide, 184.
- Rhodoporphyrin, synthesis of, 323.
- Rhodoporphyrin- γ -carboxylic acid, 321.
- Rhodymenia palmata*, polysaccharide from, 425.
- Riboflavin, deficiency symptoms of, and their cure, 389.
determination of, in milk, by fluorescence, 467.
in yeast and yeast products, 464.
requirement of, for lactic bacteria, 438.
- Richard's rule for solids, 171.
- Ricinelaic acid, structure of, 213.
- Ricinoleic acid, structure of, 213.
- Rigidity modulus, 174.
- Rings, closure of, and valency angles, 366.
- Rœmeria refracta*, rœmerine from, 377.
- Rœmerine, structure of, 377.
- Rotation, hindered, about single bonds, 176.
- Rubber, viscosity and mol. wt. of, 123.
- Rubber state, transition from crystalline to, 175.
- Rubidium sesquioxide, crystal structure of, 184.
- Sabinic acid, preparation of, from farnesol, 221.
structure of, 220.
- Salts, molten, structure of, 169.
- Samarium, detection of, by fluorescence, 466.
- Sapogenins, 347.
conversion of, into pregnane derivatives, 351.
- ψ -Sapogenins, 351.
- Sarsasapogenin, structure of, 347.
- Sarsasapogenoic acid, 348.
- Sarsasapogenone, 349.
- Scattering function for atoms, 40.
- Scurvy, from vitamin-*C* deficiency, 391.
- Sedimentation constants of antibodies, 398.
- Selenium, isomerism of, 19.
- Selenium iodide, 135.
oxychloride, additive compounds of, with pyridine and quinolines, 138.

- Senecio*, alkaloids from, 376.
 Serine, fission of, by bacteria, 446.
 Serine deaminase, activity of, 447.
 Seroglycoid, 408.
 Seromucoid, 408.
 Serum, albumin of. See under Albumin.
 proteins, 406.
 in disease, 409.
 Seselin, 372.
 Sewage sludge, nitrogen cycle in, 445.
 Silicon carbide, packing with, in fractionating columns, 455.
 tetrachloride, fluorination of, 151.
 cyanate, 126.
 fluorides and fluorochlorobromides, 151.
 hydrides, fluorination of, 151.
 Silver, determination of, in galena and pyrites, 476.
 electrodeposition of, 472.
 isotopes from fission, 10.
 Sinactine, 376.
 Sitosteryl iodide, 363.
 Smilagenin, 347.
 Soaps, 102.
 internal solubility in micelles of, 106.
 pure, preparation of, 104.
 Soap solutions, peptisation of, 107.
 surface tension of, 103.
 Sodium, reaction of, with amyl chloride, 286.
 with bromo- and chloro-benzenes, 287.
 with ethyl iodide, 286.
 vapour, reactions of, with organic halides, 274.
 Sodium azide, hydrolysis in presence of, 245.
 sulphate, structure of, 185.
 Solanain from horse-nettles, 429.
 Solanacarpidine, 378.
Solanum elaeagnifolium, solanain from, 429.
 Solasodine, structure of, 378.
 Solasonine, 378.
 Solatubine, structure of, 378.
 Solatunine, 378.
 Solids, photochemical reactions in, 98.
 transition of liquids to, 168.
 Solvents, polar, solutions in, 51.
 Solvolysis, mechanism of, 237.
 Spectrograph, β -ray, 12.
 α -Spinastenol, 361.
 α -Spinasterol, structure of, 361.
 Spruce wood, mannan from, 427.
Staphylococcus, nutritional requirements of, 439.
Staphylococcus aureus, growth of, in aneurin, 443.
 metabolism of, 440.
 Starch, banana, structure of, 423.
 fission and synthesis of, in plants, 419.
 methylated, assay of, 423.
 natural and synthetic, X-ray structure of, 422.
 phosphorylation of, 418.
 synthetic, 421.
 Stearic acid, thallos salt, solution equilibria of, 105.
 Stercobilin, 329.
 Stereochemistry, 69.
 and valency of multivalent atoms, 180.
 Steroids, 332.
 adrenal, structure of, 336.
 Δ^5 -Steroids, conversion of, into Δ^4 -3-ketones, 334.
 Steroid ketones, reduction of, 362.
 sulphonation of, 358.
 Sterols, 354.
 Stigmasteryl iodide, 363.
 Stilbene, molecular structure of, 178.
*meso*Stilbene dibromide, molecular structure of, 178.
 Stills, molecular, 459.
Streptococcus haemolyticus, nutritional requirements of, 439, 440.
Streptococcus lactis, nutritional requirements of, 438.
 Strontium azide, photolysis of, ultra-violet, 99.
 isotopes, from fission, 9.
 Strychnine, structure of, 380.
 ψ -Strychnine, degradation of, 380.
 Strychnos alkaloids, 380.
 Styrene, polymerisation of, acceleration of, 289.
 Substitution, abnormal, 288.
 aliphatic, 236.
 Succinic dehydrogenase, oxidation with, 416.
 Sucrose, action of bacteria on, 425.
 Sulphamic acid, formation of, 137.
 Sulphanilamide, poisoning by, treated with nicotinic acid, 389.
 β -Sulphopropionic acid, preparation of, 210.
 Sulphur, ring compounds containing, 364.
 spectrum of, absorption, 80.
 Sulphur monochloride, molecular structure of, 66.
 chlorides, hydrolysis of, 134.
 fluorochloride, 152.
 halides, fluorination of, 152.
 monoiodide, 134.
 dioxide, liquid, substitution reactions in, 246.
 Sulphuryl chloride, chlorination by, 210, 288, 289.
 fluorination of, 152.
 fluoride, 152.

- Tachysterol, reduction of, 360.
- Taka-diastrase, activity of, in presence of buffer solutions, 423.
- Talc dusting powder, root-formation induced by, 432.
- Tan-shin, tanshinone I from, 373.
- Tanshinone I, 373.
- Tantalum halides, crystal structure of, 182.
- Tellurium, isomerism of, 19.
- Tellurium tetrachloride, structure of, 69, 181.
- Terbium, detection of, by fluorescence, 466.
- p*-Terphenyls, halogeno-, formation of, 282.
- p*-Terphenyl-4:4''-bisdiphenylmethyl, 264.
- Testosterone, formation of, from androstenedione, 332.
- from sarsasapogenin, 352.
- Testosterone, 16-hydroxy-, 333.
- Tetra-arylethanes, 260.
- Tetra-arylhydrazines, 267.
- Tetrabenzmonazaporphin, structure of, 188.
- Tetrabenzporphin, structure of, 188.
- Tetrabenztriazaporphin, structure of, 188.
- Tetraborane, 149.
- s*-Tetra-($\beta\beta$ -diphenylvinyl)ethane, dissociation of, 261.
- s*-Tetradiphenylethane, stability of, 261.
- Tetra-*p*-cyclohexylphenyldiphenylethane, dissociation of, 258.
- Tetrahydroanhydrosarsapogenonic acid, 348.
- Tetrahydrobrassicasterol, 361.
- Tetrahydrocannabinols, 374.
- Tetramethylammonium fluoride, reaction of, with *m*-chlorobenzhydridyl chloride, 246.
- Tetramethylcyclobutanedione, molecular polarisation of, 62.
- Tetrandrine, structure of, 378.
- 3:3:4:4-Tetraphenylcyclobutane-1:2-dione, 266.
- $\alpha\alpha\beta\beta$ -Tetraphenyl-di-2-chryselethane, dissociation of, 259.
- Tetraphenyldidiphenylethanes, dissociation of, 252.
- s*-Tetraphenyldi- β -naphthylethane, heat of dissociation of, 252.
- s*-Tetraphenylethane, fission of, with potassium, 260.
- Tetraphenylhydrazine, dissociation of, 268.
- Tetraphenyl-lead, decomposition of, 285.
- Tetraphenylmethane, formation of, 283.
- 1:1:5:5-Tetraphenyl-*n*-pentane, 261.
- Tetraphenylsuccinodinitrile, addition of, to styrene, 289.
- Tetraphenyltin, decomposition of, 285.
- Tetraphosphonitrile chloride, crystal structure of, 185.
- Thallium complexes, configuration of, 182.
- Thermal decomposition, 270.
- Thermodynamics of crystals, 167.
- Thiobenzophenone, magnetic susceptibility of, 267.
- Thiodiglycol. See Diethyl sulphide, $\beta\beta$ -dihydroxy-.
- Thionyl chloride, fluorination of, 152.
- fluoride, 153.
- iodide, 134.
- Thiophen, bond distances in, 364.
- Thixotrometer, 124.
- Thixotropy, and gelation, 116.
- Thorium nuclei, fission of, 8.
- Thulium, detection of, by fluorescence, 466.
- Thyreoglobulin, hog, molecular shape of, 412.
- Tigogenin, structure of, 347.
- neo*Tigogenin, 350.
- ψ -Tigogenin, 351.
- Tigogenioic acid, 348.
- 4⁴-Tigogenone, 353.
- Tin, determination of, in aluminium alloys, 477.
- electrodeposition of, 474.
- Tobacco leaf wax, 219.
- mosaic virus protein, molecular shape of, 412, 413.
- sols, viscosity of, 114.
- Toluene, separation of, from *n*-heptane, 456.
- Tomato plants, root formation in, induced by naphthoxyacetic acid, 433.
- Tomato seeds, germination of, inhibited by traumatic acid, 433.
- Tomatoes, pigments of, 463.
- Transuranic elements, 8.
- Traumatic acid, structure of, 222, 433.
- Trench mouth. See Vincent's disease.
- Triarylmethyl radicals, configuration of, 251.
- Triborinetriamine, 149.
- Trichlorosilane, fluorination of, 150.
- Trichosanic acid, structure of, 214.
- Trichosanthes curcumeroides*, seed, trichosanic acid from, 214.
- Trideuteroammonia, photolysis of, 91, 93.
- Tri-4-diphenylmethyl, magnetic susceptibility of, 263.
- Trillium erectum*, diosgenin from, 353.

- Trimethylamine in putrid fish, 450.
 Trimethylamine oxide, molecular structure of, 74.
 2:3:5-Trimethyl β -methylgalacturonoside, methyl ester, 424.
 Trimethylnitromethane, trihydroxy-, explosive properties of, 208.
 2:2:3-Trimethylpentane, preparation of, 202.
 Triols-I and -II, 356.
 Triphenylmethyl, reaction of, with dibenzoyl peroxide, 283.
 Triphenylmethyl, *p*-fluoro-, reactivity of fluorine in, 257.
 Triphenylmethyl fluoride, fluorine reactivity in, 257.
 Tripyrenes, formation of, 330.
 Tri-*m*-tolylmethyl radical, 256.
 Tri-*p*-tolylmethyl radical, 255.
 Trouton's rule for liquids, 171.
 Tryptophan, formation of indole from, by bacteria, 448.
 Tryptophanase, 448.
 Tubers, dormancy of, substances breaking, 435.
 Tuberculosis, bactericides for treatment of, 225.
 Tuberculostearic acid, structure of, 223.
 Tung oil, acids of, 214.
 Tungsten carbonyl, 130.
 Tyramine, formation of, from tyrosine by bacteria, 449.
- Δ^{10} -Undecenoic acid from castor oil, 213.
 Uranium isotopes, separation of, 161. nuclei, fission of, 8.
 Uranium pentoxide, 135.
 *sub*sulphide, crystal structure of, 184.
 sulphides, 135.
 Urine, stercobilin from, 329.
 Uronic acids, rôle of, in pneumococcal immunity, 396.
 Usnic acid, structure of, 373.
 Usnolic acid, 373.
- Valency, angles of, and ring closure, 366.
 directed, 179.
 Vapours, electron diffraction by, 36.
 Vegetables, cooked and raw, vitamin-*C* in, 391.
Veratrum sabadilla, alkaloids from, 379.
 Verdins, 323.
 Vibration, thermal, effect of, on diffraction, 43.
 Vincent's disease, treatment of, with nicotinic acid, 389.
- Vinylchloroporphyrin e_6 , 321.
 Vinylisochloroporphyrin e_4 , 322.
 2-Vinyl-2-desethylphæoporphyrin a_5 , 321.
 2-Vinyl- γ -formylpyrroporphyrin, 322.
 Vinylphæoporphyrin a_5 , 321.
 Vinylphyloerythrin, 322.
 Vinylphyloporphyrin, 322.
 Vinylporphyrins, 321.
 2-Vinylpyrroporphin, 322.
 Virial coefficients of gases, 29.
 Viscometers, 124.
 Viscosity, anomalous, and gelation, 116.
 of colloids, 111.
 of gases, 34.
 of proteins, 411.
 Vitamins, bacterial, 435.
 functions of, 442.
 concentration and separation of, by distillation, 459.
 new, 393.
 nutrition and, 383.
 requirements of, by bacteria, tissues, and yeasts, 443.
 Vitamin-*A*, deficiency of, 384.
 requirements for, in mammals and man, 383.
 Vitamin-*B*₁, 385.
 activation of cocarboxylase by, 387.
 determination of, in blood and in urine, 387.
 phosphorylation and, 386.
 pyruvate oxidation and, 385.
 root-formation activation by, 432.
 Vitamin-*B*₂ complex, 388.
 Vitamin-*B*₆, root-formation activation by, 432.
 See also Adermin.
 Vitamin-*C*, deficiency of, and its distribution, 390.
 Vitamin-*D*₄, 359.
 Vitamin-*F*, 392.
 Vitamin-*H*, 392.
 Vitamin-*K*, 391.
 Vitamin-*K*₂, structure of, 391.
 Vitamin-*P*, 392.
 Vomocine, 381.
 Vomipyrine, 381.
- Wartime, nutrition in, 393.
 Wave function, calculation of, 24.
 Waxes, films, *X*-ray analysis of, 219.
 insect and plant, 219.
 metabolism of, 220.
 Wetting agents, 102.
 Wheat straw, hemicelluloses of, 428.
 xylan from, 427.
 White metal, analysis of, 475.
 Wood, constituents of, 426.

- Wounds, healing of, in vitamin-C deficiency, 391.
Wurtz reaction, 286.
- neo*Xanthobilirubic acid, 328.
*isoneo*Xanthobilirubic acid, 327.
Xanthophylls, isomerisation of, 292.
Xanthyltin, structure of, 372.
Xenon isotopes, from fission, 9.
 separation of, 161.
 purification of, 162.
Xylans, beechwood and wheat straw, 427.
m- and *p*-Xylenes, separation of, 457.
- Yeast, growth substances for, 433.
 requirements of, for bios substances, 434.
- Ytterbium, detection of, by fluorescence, 466.
- Zeaxanthin, isomerisation of, 292.
 oxidation of, 296.
*neo*Zeaxanthins, 292.
apo-4-Zeaxanthinal, 296.
Zinc, determination in, of nickel, 476.
 separation of, from cadmium, 476.
Zinc alloys, determination in, of cadmium and copper, 477.
 diethyl, photolysis of, 273.
 fluoride as fluorinating agent, 152.
 sulphide, metastability of, 170.
Zirconium isotopes from fission, 9.
Zymohease, preparation of, 417.
Zymosterol from yeast, 361.