

BIBLIOTECA DEL CONSIGLIO SUPERIORE DELLA MAGISTRATURA

C.N.R.
I.C.F.A.M.
BIBLIOTECA
INVENTARIO

ORGANIC NAME REACTIONS

268L

R1

ORGANIC NAME REACTIONS

A Contribution to the Terminology of Organic
Chemistry, Biochemistry and Theoretical
Organic Chemistry

by

HELMUT KRAUCH AND WERNER KUNZ

with a Foreword by

FRIEDRICH RICHTER
Director of the Beilstein Institute

Translated from the Second Revised German Edition
(with Addendum) by

JOHN M. HARKIN

1964

JOHN WILEY & SONS, INC.

NEW YORK • LONDON • SYDNEY

First published under: Krauch and Kunz, *Namenreaktionen der organischen Chemie*, 2. verbesserte Auflage, by Dr. Alfred Hüthig Verlag G.m.b.H., Heidelberg, 1962

Library of Congress Catalog Card No. 63-21807

© 1962 by Dr. Alfred Hüthig Verlag GmbH., Heidelberg

*Made and printed in Great Britain
by Page Bros. (Norwich) Limited*

W. 268L

Foreword

The term "name reactions" is the designation generally applied to reactions which either for historical reasons, or because of their unfailing practical value, or, finally, because of the associated mnemonic convenience bear the names of their discoverers. The need for keeping terminology short has led to a continuous extension of this principle in recent times. Hence it is of value, not only for the beginner, but often even for the expert, to have an ordered collection of all the more important name reactions at his disposal. The basic requirements for identification purposes have been catered for by less comprehensive surveys which have appeared previously.

Naturally, it is only partially a historical tendency inherent in the nature of any particular branch of science that causes a reaction to become a name reaction. It also illustrates the compromise made in order to be able to include in subject indices novel types of reactions which have not as yet been described by general terminological expressions. The precedence given all too frequently to author indices over subject indices is due in no small part to this trend. This presentation, which considerably improves upon its predecessors with regard to both coverage and detail, should prove more than a convenience to all chemists, experimenter, teacher, and publisher alike. The "device" of using authors' names here affords the possibility of combining convenience with usefulness. Thus, this encyclopaedic collection has become practically a textbook of the most important organic reactions and their mechanisms as they are accepted today. Not all of the important reactions of organic chemistry are name reactions; however, this is the case for many, particularly synthesis reactions, and it is a benefit for all to find them explained and illustrated by their basic classical examples. The present volume makes a significant advance towards providing a summarizing review of organic chemistry.

Frankfurt-on-Main
Fall, 1960

FRIEDRICH RICHTER

Abbreviations

THEILHEIMER	W. THEILHEIMER, <i>Synthetic Methods of Organic Chemistry</i> , 3rd edition, Verlag S. Karger Publishers, Basel-New York, (1950-60).
ULLMANN	F. ULLMANN, <i>Encyklopädie der technischen Chemie</i> , 3rd edition, Vols. 1-11, Urban und Schwarzenberg, Munich-Berlin (1953-60).
WHELAND	G. W. WHELAND, <i>Resonance in Organic Chemistry</i> , John Wiley and Sons, New York (1955).
WHITMORE	F. C. WHITMORE, <i>Organic Chemistry</i> , Van Nostrand, New York (1951).

Contents

	<i>page</i>
Acetoacetic ester synthesis	1
Acyloin rearrangement	2
Acyloin reductive condensation	3
ADKINS-PETERSON, Methanol \rightarrow Formaldehyde oxidation	4
ALDER-RICKERT, Aromatization rule	5
ALDER-STEIN, Lactone rule	6
Aldol addition (Aldolization)	6
Aldol condensation (Crotonization)	9
Alkyl aryl ether \rightarrow Alkylphenol rearrangement	10
Allyl rearrangement	11
AMADORI, Aldose- <i>N</i> -glycoside \rightarrow Isoglycosamine rearrangement	12
ANDRUSSOW, Ammonia-methane oxidation	14
ANSCHÜTZ, Anthracene synthesis	15
APPEL-ROBINSON, Catechin \rightarrow Cyanidin oxidation	16
ARBUSOV-MICHAELIS, Trialkylphosphite transformation	17
ARNDT-EISTERT, Homologous carboxylic acid formation	17
AUWERS, Cumarone \rightarrow Flavonol ring expansion	19
AUWERS-SKITA, Isomerization rule	20
BAEKELAND-LEDERER-MANASSE, Phenol-formaldehyde polycondensation	21
BAEYER, Phenol-aldehyde condensation	23
BAEYER, Oxindole synthesis	24
BAEYER, Pyrone \rightarrow Pyridine conversion	24
BAEYER-DREWSON, Indigo synthesis	26
BAEYER-VILLIGER, Ketone \rightarrow Ester oxidation	27
BAKER-NATHAN, Hyperconjugation	28
BAKER-VENKATARAMAN, <i>o</i> -Acyloxyaryl alkyl ketone \rightarrow β -Diketone rearrangement	29
BALSOHN, Benzene-olefin addition	31
BAMBERGER, Phenylhydroxylamine \rightarrow <i>p</i> -Aminophenol rearrangement	31
BARBIER-WIELAND, Carboxylic acid degradation	33
BARDHAN-SENGUPTA, Phenanthrene cyclization	34
BARGELLINI, Coumarin cyclization	35
BART, Arsenite arylation	36
BAUDISCH, Oxidative nitrosation	36
BÉCHAMP, Arsenic acid fusion (Arsonylation)	37
BÉCHAMP, Nitroaryl reduction	38
BECKMANN, Oxime \rightarrow Amide rearrangement	38
BENSMANN, Oil regeneration	40

Contents

	<i>page</i>
Benzil → Benzilic acid rearrangement	41
Benzoin condensation	43
BERGIUS-IG, High pressure hydrogenation of coal	45
BERGIUS-WILLSTÄTTER-ZECHMEISTER, Wood saccharification	45
BERGMANN, Azlactone cleavage	46
BERGMANN, Polypeptide degradation	47
BERGMANN-ZERVAS, Carbobenzoylation	48
BERNTHSEN, Acridine cyclization	49
BERTRAND, Sugar alcohol oxidation	50
BETTI, Aminobenzylation	51
BIGINELLI, Pyrimidine cyclization	52
BIRCH-HÜCKEL, Reduction	53
BISCHLER-MÖHLAU, Indole synthesis	54
BISCHLER-NAPIERLSKI, Isoquinoline cyclization	55
BLACKMAN, Dark reaction	56
BLAISE, β -Keto ester synthesis	57
BLAISE, Ketone synthesis	57
BLAISE-GUERIN, α -Hydroxy acid → Aldehyde degradation	58
BLAISE-MAIRE, Ketone synthesis	58
BLANC, Chloromethylation	59
BLANC, Dicarboxylic acid → Ketone cyclization	60
BLANC, Cyclization rule	60
BODROUX, Ester amidation	61
BODROUX-TSCHITSCHIBABIN, Formylation	62
BOGERT-COOK, Phenanthrene cyclization	63
BOHN-SCHMIDT, Anthraquinone hydroxylation	64
BOORD, Olefin synthesis	64
BORSCHÉ-DRECHSEL, Carbazole cyclization	65
BOUGAULT, Indenecarboxylic ester synthesis	66
BOUVEAULT, Formylation	67
BOUVEAULT, Amide hydrolysis	68
BOUVEAULT-BLANC, Ester reduction	69
BOUVEAULT-LOCQUIN, α -Oximino ester cleavage	70
BRAUN, Secondary amine degradation	70
BRAUN, Tertiary amine degradation	71
BREDT, Bridgehead double-bond rule	72
BROWN, <i>cis</i> -Hydration	73
BRUNNER, Oxindole cyclization	74
BUCHERER, Carbazole synthesis	74
BUCHERER-BERGS, Hydantoin cyclization	76
BUCHERER-LEPETIT, Naphthol → Naphthylamine conversion	77
BUCHNER, Diazoacetic ester addition	78
BUCHNER-CURTIUS-SCHLOTTERBECK, Aldehyde alkylation	79

Contents

	<i>page</i>
CALVIN-BENSON, Photosynthesis cycle	81
CAMPS, Hydroxyquinoline cyclization	82
CANNIZZARO, Aldehyde disproportionation	83
CARIUS, Halogen and sulfur estimation	85
CARROL, Methylene addition	85
CHAPMAN, Imido ester → Amide rearrangement	86
CHARDONNET, Cellulose esterification	87
CIAMICIAN, Photochemical disproportionation	88
CIAMICIAN-DENNSTEDT, Pyrrole → Pyridine ring expansion	89
CLAISEN, Alkylation	89
CLAISEN, <i>O</i> -Allyl → <i>C</i> -Allyl rearrangement	90
CLAISEN, Crotonization to cinnamates	92
CLAISEN, Prototropy rule	92
CLAISEN-GEUTHER, Ester condensation	94
CLAISEN-SCHMIDT, Chalcone condensation	96
CLAISEN-SHADWELL, Isatin synthesis	97
CLAY-KINNEAR-PERREN, Alkylphosphonyl dichloride synthesis	97
CLEMMENSEN, Carbonyl → Methylene reduction	98
CLEMO, Quinolizine synthesis	99
COMBES, Quinoline synthesis (Anil condensation and cyclization)	100
CONRAD-LIMPACH, 4-Hydroxyquinoline synthesis (Anil condensation and cyclization)	100
COPE, Allyl → Vinyl rearrangement	102
COPE-MAMLOCK-WOLFENSTEIN, Hydroxylamine elimination	103
CRAIG, α -Bromination of pyridine ($\text{NH}_2 \rightarrow \text{Br}$ exchange)	104
CRAM, Asymmetric induction rule	105
CREIGHTON, Electrolytic reduction of sugars	106
CRIEGEE, Glycol cleavage	107
CROSS-BEVAN-BEADLE, Cellulose-xanthate process	108
CRUM BROWN-GIBSON, Substitution rule	108
CRUM BROWN-WALKER, Electrolysis of ester salts	109
CURTIUS, Carboxylic azide → Amine degradation	110
DAKIN, α -Amino acid separation	112
DAKIN, Phenolcarboxaldehyde oxidation	112
DAKIN-WEST, α -Acylamino ketone synthesis	114
DARZENS, Cycloolefin acylation	115
DARZENS, Tetralin cyclization	116
DARZENS-ERLENMEYER-CLAISEN, Glycidic ester condensation	116
DAVIDSON, Acyloin → Oxazole condensation	118
DECKER-FORSTER, Primary amine alkylation	119
DELBRÜCK-MEISENBERG, Enzymatic sugar degradation	120
DELÉPINE, Aldehyde oxidation	120

	<i>page</i>
DELÉPINE, Amine synthesis	121
DEM'JANOV, Ring modification	122
Diazoaminobenzene \rightarrow Aminoazobenzene rearrangement	123
DIECKMANN, Intramolecular ester condensation	124
DIELS-ALDER, Diene 1,4-addition (Diene synthesis)	126
DIELS-REESE, Hydrazobenzene addition	130
Dienol \rightarrow Benzene rearrangement	131
Dienone \rightarrow Phenol rearrangement	131
DOEBNER, Cinchoninic acid cyclization	133
DOEBNER, Aldol condensation (Crotonization)	134
DOEBNER-MILLER, Quinoline synthesis	135
DUFF, Phenol formylation (Aldehyde synthesis)	136
DUMAS, Nitrogen estimation	137
DUTT-WORMALL, Aryl azide formation	138
EABORN, Silane iodination	139
EDELEANU, Selective extraction	139
EHRlich-SACHS, Anil condensation (Nitroso-methylene condensation)	140
EIJKMAN, Aryl addition	141
EINHORN, Acylation	141
EINHORN, Amide methylation	142
EINHORN-BRUNNER, Triazole cyclization	143
EISLEB, Aminoalkylation	144
ELBS, Anthracene cyclization	144
ELBS, Persulfate oxidation of phenols	146
ELTEKOFF, Dibromide hydrolysis (Ketone synthesis)	147
EMBDEN-MEYERHOF, Anaerobic glucose degradation	147
EMDE, Degradation of quaternary ammonium salts	149
EMMERT, Pyridine alkylation	150
ERLENMEYER-PLÖCHL, Azlactone condensation	151
ERLENMEYER-FRÜSTÜCK, Phenylserine synthesis	152
ESCHWEILER-CLARKE, Amine methylation	153
ÉTARD, Side chain partial oxidation	153
FAVORSKII, α -Halogeno ketone \rightarrow Carboxylic acid rearrangement	154
FAVORSKII-BABAYAN, Ketone ethnylation	156
FEIST-BENARY, Furan cyclization	157
FERRARIO-ACKERMANN, Phenoxthine cyclization	157
FISCHER, Glycosidation	158
FISCHER, Indole synthesis (Phenylhydrazone \rightarrow Indole rearrangement)	158
FISCHER, Oxazole condensation	160
FISCHER, Phenylhydrazine synthesis	161
FISCHER, Isolation of sugars	161

	<i>page</i>
O. FISCHER-HEPP, Nitrosamine rearrangement	163
FISCHER-SPEIER, Ester production	164
FISCHER-TROPSCH, High pressure hydrogenation of carbon monoxide	164
FLOOD, Siloxane cleavage	165
FORSTER, Diazo ketone synthesis	166
FRANCHIMONT, Carboxylic acid dimerization	167
FRANCK-RABINOWITCH, Radical recombination	168
FRANKLAND, Alkylzinc synthesis	168
FRANKLAND-DUPPA, α -Hydroxycarboxylic ester synthesis	169
FREUDENBERG, Optical displacement rule	170
FREUND, Propane cyclization (Cyclopropane)	171
FRIEDEL-CRAFTS, Alkylation of aromatics	171
FRIEDEL-CRAFTS, Acylation of aromatics	173
FRIEDLÄNDER, Quinoline cyclization	176
FRIES, Double bond rule	177
FRIES, Phenyl ester \rightarrow Acylphenol rearrangement	177
FRI TSCH-BUTTENBERG-WIECHELL, Diarylhalogenoethylene rearrangement	179
GABRIEL, Amine \rightarrow Ethylenimine cyclization	180
GABRIEL-COLMAN, Phthalimidoacetic ester \rightarrow Isoquinoline rearrangement	180
GABRIEL, Phthalimide cleavage	182
GALLAGHER-HOLLANDER, Carboxylic acid degradation	183
GASTALDI, Pyrazine cyclization	184
GATTERMANN, Aryl formylation (Aldehyde synthesis)	185
GATTERMANN, Diazonium substitution	186
GATTERMANN-KOCH, Aryl formylation (Aldehyde synthesis)	186
GATTERMANN-SKITA, Pyridine synthesis	188
GIBBS, Naphthalene oxidation	188
GLASER, Oxidative coupling	189
GÖGTE, α -Pyrone synthesis (Glutaconic acid C-acylation)	190
GOLDSCHMIDT, Carbon monoxide hydration	191
GOMBERG, Triarylmethyl radicals	191
GOMBERG-BACHMANN-HEY, Diaryl synthesis	192
GOULD-JACOBS, Hydroxyquinoline cyclization	194
GRAEBE-ULLMANN, Carbazole synthesis	195
GRÄNACHER, Aldehyde-rhodanine condensation	196
GRIESS, Diazotization	197
GRIGNARD, Dehalogenation	198
GRIGNARD, Organomagnesium addition	199
GRUNDMANN, Aldehyde synthesis	201
GRUNWALD-WINSTEIN, Solvolysis equation	202
GRYSZKIEWICZ-TROCHIMOWSKI-McCOMBIE, Ester fluorination	202
GUARESCHI-THORPE, Pyridine cyclization	202

Contents

	<i>page</i>
GUERBET, Alcohol condensation	203
GUSTAVSON, Dihalide → Hydrocarbon cyclization	204
GUTKNECHT, Pyrazine cyclization	205
HALLER-BAUER, Alkylating degradation	205
HAMMETT, Substituent effect	206
HAMMICK, Picolinic acid decarboxylation	207
HANSLEY-PRELOG-STOLL, Acyloin cyclization	208
HANTZSCH, Pyridine synthesis	210
HANTZSCH, Pyrrole synthesis	211
HARRIES, Ozonization	212
HASS, Vapor phase nitration	213
HASS, Propane cyclization	214
HAWORTH, Phenanthrene synthesis	214
HAWORTH, Methylation of sugars	216
HAYASHI, <i>o</i> -Benzoylbenzoic acid rearrangement	217
HELPERICH, Glycosidation	218
HELL-VOLHARD-ZELINSKY, α -Halogenation	218
HENRY, Aldol addition	219
HERBST-ENGEL, Transamination	220
HERZ, <i>o</i> -Aminothiophenol synthesis	220
HERZIG-MEYER, Alkylamine degradation (Alkyli iodide estimation).	221
HEUMANN, Indigo synthesis	222
HILBERT-RIST, Nucleoside synthesis	223
HILL, Photoreduction	224
HINSBERG, Amine sulfonation	225
HINSBERG, Oxindole synthesis	225
HINSBERG, Quinone-sulfinic acid addition	227
HOCH-CAMPBELL, Ethylenimine cyclization	227
HOCK-LANG, Benzene → Phenol oxidation	228
HOESCH-HOUBEN, Acylphenol synthesis	229
HOFER-MOEST, Alcohol production	231
HOFMANN, Degradation of quaternary ammonium hydroxides	231
HOFMANN, Carboxamide → Amine degradation	234
HOFMANN, Isonitrile reaction	235
HOFMANN, Degradation rule for tetraalkylammonium bases	236
HOFMANN-MARTIUS, <i>N</i> -Alkylaniline → <i>C</i> -Alkylaniline rearrangement	237
HOFMANN-SAND, Olefin mercuriation	238
HOOKER, Side-chain shortening	239
HORENSTEIN-PÄHLICKE, Transesterification	240
HOUBEN-FISCHER, Nitrile synthesis	240
HOUDRY, Catalytic cracking	241
HUDSON, Isorotation rule (Superposition)	241

Contents

	<i>page</i>
HUDSON, Lactone rule	243
HUDSON-LEVENE, Amide and hydrazide rule	244
HUNSDIECKER, Ketone cyclization	245
HUNSDIECKER-BORODIN, Silver salt decarboxylation	245
Hydrazobenzene → Benzidine rearrangement	247
IRVINE-PURDIE, Sugar methylation	250
IVANOFF, Hydroxycarboxylic acid synthesis	250
JACOBSEN, Alkyl migration	251
JAPP, Oxazole cyclization	252
JAPP-KLINGEMANN, Arylhydrazone production	253
JOURDAN-ULLMANN-GOLDBERG, Acridone synthesis	254
KAMLET, Aldol addition	255
KILIANI-FISCHER, Cyanohydrin synthesis	255
KINDLER, Redox amidation	257
KING, Ketoalkylation	258
KISHNER, Pyrazoline cleavage	258
KISHNER-WOLFF, Carbonyl → Methylene reduction	259
KJELDAHL, Nitrogen estimation	260
KNOEVENAGEL, Aldol condensation	261
KNOEVENAGEL, Diazotization	263
KNOOP, Fatty acid β -oxidation	263
KNOOP-OESTERLIN, α -Keto acid amination	264
KNORR, Hydroxyquinoline synthesis	265
KNORR, Pyrazole cyclization	266
KNORR, Pyrrole synthesis	267
KOENIGS-KNORR, β -Glucosidation	269
KOLBE, Cyanide alkylation	270
KOLBE, Fatty acid electrolysis	271
KOLBE-SCHMITT, Phenoxide carboxylation (Salicylic acid synthesis)	273
KONDAKOFF, Halogenation rule	275
KOSTANECKI-ROBINSON, Chromone synthesis	275
KRAFFT, Carboxylic acid degradation	277
KREBS, Citric acid cycle	278
KREBS-HENSELEIT, Ornithine cycle	279
KRIEWITZ-PRINS, Formaldehyde-olefin addition	281
KRÖHNKE, Aldehydes from nitrones	283
KUHN-FREUDENBERG, Vicinal rule	284
KUHN-ROTH, <i>C</i> -Methyl determination	284
KUTSCHEROFF, Acetylene hydration	285

	<i>page</i>
LADENBURG, Pyridine C-alkylation	286
LADENBURG, Diamine cyclization	286
LEBEDEFF, Butadiene synthesis	287
LEHMSTEDT-TANASESCU, Acridone synthesis	287
LETTS, Nitrile synthesis	288
LEUCKART, Amine alkylation (Reductive carbonyl amination)	289
LEUCKART, Xanthate hydrolysis	290
LIEBEN, Iodoform test	290
LIEBIG, Determination of carbon and hydrogen	291
LOBRY DE BRUYN-VAN EKENSTEIN, Sugar rearrangement (Intramolecular redox reaction)	292
LÖFFLER-FREYTAG, Pyrrolidine cyclization	293
LOHMANN, ATP \rightleftharpoons Creatine transphosphorylation	293
LOSSEN, Hydroxamic acid \rightarrow Isocyanate degradation	294
LOWRY, Simultaneous acid-base catalysis	295
LÜTTRINGHAUS, Diaryl ether \rightarrow <i>o</i> -Arylphenol rearrangement	297
MACDONALD-FISCHER, Sugar mercaptal degradation	298
MCFADYEN-STEVENS, Carboxylic acid reduction	298
MADELUNG, Indole synthesis	299
MALAPRADE, Glycol cleavage with periodate	300
Malonic ester synthesis	302
MANNICH, Aminomethylation	303
MARCKWALD, Asymmetric synthesis	305
MARKOWNIKOFF, Addition rule	305
MARTINET, Dihydroxyindole synthesis	307
MATTOX-KENDALL, Dehydrobromination of α -bromo ketones	307
MEERWEIN-PONNDORF-VERLEY, Carbonyl reduction	308
MEERWEIN-SCHUSTER, Arylation	310
MENKE, Nitration	311
MEYER, Nitroparaffin synthesis	311
MEYER, Stannite alkylation	312
MEYER-SCHUSTER, Ethynyl carbinol \rightarrow Ketone rearrangement	313
MICHAEL, Glycosidation	314
MICHAEL, Nucleophilic methylene addition	315
MICHAELIS-MENTEN, Enzyme-substrate bonding (Michaelis constants)	317
MIESCHER, Carboxylic acid degradation	318
MILLS-NIXON, Substituent effect	319
MÜLLER-MÜLLER-RODLOFF, Biradical rule	320
NAMETKIN, Retropinacolone rearrangement	321
NAZAROV, Indanone synthesis	322
NEBER, Oxime \rightarrow Aminomethyl ketone rearrangement	322

	<i>page</i>
NEBER-BOSEL, 3-Hydroxycinnoline synthesis	323
NEF, <i>aci</i> -Nitroalkane cleavage	324
NEF, Ketone ethynylation	325
NENCKI, C-Alkylation and C-Acylation	326
NENITZESCU, Oxindole cyclization	326
NENITZESCU, Hydrogenative acylation	327
NESMEYANOV, Metallation	327
NEUBERG, Aldehyde capture reaction	328
NIEMENTOWSKI, Quinazolone cyclization	330
NIEMENTOWSKI, Quinoline cyclization	330
NIEUWLAND, Acetylene hydration	332
OHLE, Quinoxaline cleavage	332
OPPENAUER, Alcohol dehydrogenation	333
ORTON, Halogen migration	334
OSTROMYSSLENSKI, Butadiene synthesis	335
PAAL-KNORR, Pyrrole cyclization	336
PANETH-HOFEDITZ, Detection of alkyl radicals	337
PASSERINI, α -Hydroxy <i>N</i> -arylamide synthesis	338
PASTEUR, Inhibition of anaerobic degradation	339
PECHMANN, Addition of acetylene onto diazomethane (Pyrazole synthesis)	339
PECHMANN-DUISBERG, Coumarin cyclization	340
PELLIZZARI, Triazole synthesis	342
PELOUZE, Cyanide alkylation (Nitrile synthesis)	342
PERKIN, Coumarin \rightarrow Benzofuran ring contraction	343
PERKIN, Polymethylene ring synthesis	343
PERKIN, Cinnamic acid synthesis (Aldol condensation)	344
PETRENKO-KRITSCHENKO, Piperidone cyclization	347
PFAU-PLATTNER, Indane \rightarrow Azulene ring expansion	348
PFITZINGER, Quinoline cyclization	349
PHILLIPS-LADENBURG, Benzimidazole cyclization	350
PICTET-GAMS, Isoquinoline cyclization	350
PICTET-HUBERT (MORGAN-WALLS), Phenanthridine cyclization	352
PICTET-SPENGLER, Isoquinoline cyclization	352
PILOTY, Alloxazine cyclization	354
PILOTY-ROBINSON, Pyrrole synthesis	354
Pinacol \rightarrow Pinacolone rearrangement	355
PINNER, Imino ether ammonolysis	357
PINNER, Imino ether alcoholysis	358
PINNER, Triazine cyclization	358
PIRIA, Reductive sulfonation	359
PLANCHER, Indolenine rearrangement	360

	page
POLONOVSKI, Demethylation	361
POMERANZ-FRITSCH, Isoquinoline cyclization	361
PONZIO, Oxime nitration	363
PRÉVOST, Iodine/silver salt addition	363
PREY, Aryl alkyl ether cleavage	365
PRILESCHAJEW, Olefin epoxidation	365
PSCHORR, Phenanthrene cyclization	367
RADZIEWANOWSKI, Alkylation and arylation	368
RASCHIG, Phenol synthesis (Chlorobenzene hydrolysis)	368
REED, Photochemical sulfochlorination	369
REFORMATSKY, β -Hydroxycarboxylic acid synthesis	370
REIMER-TIEMANN, Phenol C-formylation (Aldehyde synthesis)	372
REISSERT, Indole synthesis	373
REISSERT-GROSHEINTZ-FISCHER, Quinoline derivatives	375
REPPE, Ethynation	376
REPPE, Butadiene synthesis	377
REPPE, Carbonylation	378
REPPE, Cyclizing polymerization	381
REPPE, Vinylation	382
Retropinacol rearrangement	384
REVERDIN, Iodine migration	385
RICHTER, Cinnoline cyclization	386
RICHTER, Nitrobenzene carboxylation	387
RIEHM, Quinoline synthesis	388
RIEMSCHNEIDER, Thiocyanate hydration	389
RILEY, Selenium dioxide oxidation	389
RITTER, Nitrile/olefin addition	391
ROBINSON-GABRIEL, Oxazole cyclization	392
ROBINSON-SCHÖPF, Tropinone synthesis	393
ROELEN, Hydroformylation (Oxo-process)	393
ROSENMUND, Arsonylation	394
ROSENMUND-BRAUN, Aryl cyanide synthesis (Cyanide arylation)	395
ROSENMUND-SAYTZEFF, Acid chloride reduction	396
ROWE, Phthalazone rearrangement	396
RUFF, Chlorosilane transhalogenation	397
RUFF-FENTON, Sugar degradation	398
RUGGLI-ZIEGLER, Dilution principle	399
RUPE, Butyn-3-ol rearrangement	400
RUPE, α -Cinenic acid \rightarrow Geronic acid rearrangement	401
RUZICKA, Metal salt distillation	402
SABATIER-SENDERENS, Catalytic hydrogenation	403

	page
SANDMEYER, Diazonium exchange	404
SANDMEYER, Isatin synthesis	405
SANDMEYER, Isatin synthesis	406
SAYTZEFF, Elimination rule	407
SHELLER, Arsonylation	408
SCHIEHMANN, Nuclear fluorination	409
SCHIFF, Aldimine formation	410
SCHLACK-KUMPF, Peptide degradation	411
SCHLITTLER-MÜLLER, Isoquinoline cyclization	412
SCHMIDLIN-BERGMAN-WILSMORE, Acetone \rightarrow Ketene Pyrolysis (Ketene generator)	413
SCHMIDT, Degradation of carbonyl compounds	413
SCHMIDT-RUTZ, Nitro olefin production (2-Deoxyaldose production)	415
SCHÖNBERG, Phototropic addition of <i>o</i> -quinones	416
SCHOLL, <i>peri</i> -Condensation	417
SCHOLLER, Wood saccharification	418
SCHORIGIN-WANKLYN, Organosodium addition	419
SCHOTTEN-BAUMANN, Acylation	420
SCHROETER, Oxime rearrangement	421
SERINI, Glycol \rightarrow Deoxy ketone transformation	421
SIMONINI, Silver salt degradation (Decarboxylation)	422
SIMONIS, Chromone cyclization	423
SKITA, Hydrogenation rule	425
SKRAUP, Quinoline synthesis	426
VAN SLYKE, Primary amine determination	427
SMILES, Aryl migration	428
SOMMELET, Aldehyde synthesis	429
SOMMELET, Ylide-methylene isomerization	430
SONN-MÜLLER, Imido chloride reduction	431
SPENGLER-PFANNENSTIEL, Carbohydrate degradation	432
STAEDEL-RÜGHEIMER, Pyrazine cyclization	433
STEFFENS, Saccharate precipitation	434
STEPHEN, Nitrile reduction	435
STEVENS, Ylide-amine rearrangement	436
STICKLAND, Redox deamination	437
STIEGLITZ, Triarylmethylhydroxylamine rearrangement	438
STOBBE, Succinic ester condensation	439
STOLLÉ, Oxindole cyclization	441
STRECKER, Amino acid synthesis	442
STRECKER, Oxidative deamination	443
STRECKER, Sulfite alkylation	444
STUFFER, γ -Disulfone hydrolysis rule	444
SWARTS, Fluorination	446

Contents

	<i>page</i>
TAFEL, Electrolytic acetoacetic ester reduction	446
TAFT, Linear "free energy" relationship	447
THIELE-WINTER, Quinone aromatization	448
THORPE, Nitrile addition	449
THUNBERG-WIELAND, Dicarboxylic acid cycle	449
TIEMANN, Amidoxime \rightarrow Urea rearrangement	451
TIEMANN, Cyanohydrin amination	451
TIFFENEAU, Ring expansion	452
TISCHTSCHENKO-CLAISEN, Aldehyde \rightarrow Ester hydride anionotropy	453
TOLLENS, Aldol addition	455
TRAUBE, Uric acid condensation (Purine synthesis)	455
TSCHITSCHIBABIN, Biradical mesomeric equilibration	456
TSCHITSCHIBABIN, Pyridine amination	457
TSCHITSCHIBABIN, Pyridine condensation	458
TSCHUGAEFF, Separation rule of optical rotation	459
TSCHUGAEFF, Xanthate cleavage	460
TSCHUGAEFF-ZEREWITINOFF, Acidic hydrogen determination	461
TWITCHELL, Hydrolysis of fats	462
TYRER, Sulfonation of benzene	463
ULLMANN, Diaryl condensation	463
ULLMANN, Diaryl ether condensation	465
ULLMANN, Phenylanthranilic acid synthesis	466
ULLMANN-FETVADJIAN, Acridine ring condensation	467
ULTEE, Cyanohydrin synthesis	467
URECH, Cyanohydrin synthesis	468
URECH, Hydantoin cyclization	469
VARRENTAPP, Oleic acid cleavage (Prototropy)	471
VILSMEIER, Formylation	472
VOIGT, Benzoin amination	474
VOLHARD-ERDMANN, Thiophene cyclization	475
WAGNER-MEERWEIN, Alkyl carbonium ion rearrangement	475
WALDEN, Inversion of configuration	477
WALLACH, Amine alkylation	479
WALLACH, Azoxybenzene rearrangement	479
WALLACH, Ring contraction	480
WARBURG-DICKENS, Direct glucose oxidation	481
WEERMAN, Aldonamide degradation	482
WEIDENHAGEN, Imidazole synthesis	483
WEIDLICH, Hydrogenation rule	483
WESSELY-MOSER, Hydroxyl migration	484

Contents

	<i>page</i>
WEYGAND-LÖWENFELD, Sugar oxime degradation	485
WHITING, Alkynediol reduction	486
WHITMORE, Anionomerism	486
WIDMAN-STOERMER, Cinnoline cyclization	487
WILLGERODT, Redox amidation	488
WIELAND, Trityl peroxide rearrangement	490
WILLIAMSON, Alkoxide alkylation	491
WITT, Diazotization	491
WITTIG, Ether \rightarrow Carbinol rearrangement	492
WITTIG, Carbonyl olefination (Methylenephosphorane reaction)	494
WITTIG, Phenanthrene synthesis	496
WITTIG-WITT, Lithium/halogen exchange	497
WÖHLER, Urea synthesis	498
WOHL, Sugar nitrile degradation	499
WOHL-ZIEGLER, Allyl bromination	500
WOLFF, Diazo ketone \rightarrow Ketene rearrangement	502
WOLFFENSTEIN-BÖTERS, Hydroxynitration of benzene	503
WOOD-WERKMAN, Pyruvic acid β -carboxylation	504
WOODWARD, <i>cis</i> -Hydroxylation	505
WOODWARD, Ring opening	506
WOODWARD, Ultraviolet absorption rules	507
WURTZ, Alkyl halide condensation	507
WURTZ-FITTIG, Aryl halide-alkyl halide condensation	508
ZEISEL, Methoxyl determination	510
ZELINSKY-STADNIKOFF, Amino nitrile synthesis	511
ZEMPLÉN, Sodium methoxide cleavage	511
ZIEGLER, Oxidation of trialkylaluminum	513
ZIEGLER, Low pressure polymerization	513
ZIEGLER, Dinitrile cyclization	514
ZINCKE, Disulfide cleavage	517
ZINCKE, Halogenophenol nitration	518
ZINCKE-SUHL, Phenol \rightarrow Dienone rearrangement	518
ZINCKE, Pyridinium cleavage	519
ADDENDUM	521
AUTHOR INDEX	561
SUBJECT INDEX	605