

Contents

Chapter 1	Biosynthesis	1
	<i>By R. B. Herbert</i>	
1	Piperidine, Pyridine, and Pyrrolidine Alkaloids	1
	Lycopodine	1
	Dioscorine	3
	Anabasine	4
	Nicotine	7
	Miscellaneous Pyridine Alkaloids	9
	Coniine	10
	Nigrifactin	11
	<i>Rhizoctomia leguminicola</i> Bases	12
	Quinolizidine Alkaloids	12
	Cryogenine	13
	Tropane Alkaloids	13
2	Isoquinoline Alkaloids	15
	Morphine Alkaloids	15
	Magnoflorine	17
	Alpinigenin	18
	Colchicine	19
3	Amaryllidaceae Alkaloids	23
	Lycorenine	23
	Lycorine	24
	Ismine	25
4	Alkaloids Derived from Tryptophan	26
	Dimethyltryptamine Derivatives	26
	Pyrrolnitrin	28
	Echinulin	29
	Strychnine	30
	Ergot	32
5	Terpenoid and Steroidal Alkaloids	35
	<i>Daphniphyllum</i> Alkaloids	35
	Steroidal Alkaloids	37

6 Miscellaneous Aliphatic Bases	38
Betalaines	38
Cephalosporin C	40
Mitomycins	40
Mycelianamide	42
7 Miscellaneous Aromatic Bases	42
Dolichotheleine	42
Quinoline Alkaloids	43
Nybomycin	44
Benzoxazinones	44
Pyrimidines	45
Phenazines	46
Chapter 2 Pyrrolidine, Piperidine, and Pyridine Alkaloids <i>By V. A. Snieckus</i>	50
1 Pyrrolidine Alkaloids	50
2 Piperidine Alkaloids	51
3 Pyridine Alkaloids	58
4 Mono- and Sesqui-terpenoid Alkaloids	67
Chapter 3 Tropane Alkaloids <i>By J. E. Saxton</i>	78
Chapter 4 The Pyrrolizidine Alkaloids <i>By J. E. Saxton</i>	84
1 General	84
2 The Ester Alkaloids	85
3 Pharmacological Aspects	98
Chapter 5 The Indolizidine Group <i>By J. E. Saxton</i>	100

<i>Contents</i>	vii
Chapter 6 The Quinolizidine Alkaloids	104
<i>By J. E. Saxton</i>	
1 The Cytisine-Lupanine-Sparteine-Matrine Group	104
Occurrence, and Isolation of New Alkaloids	104
Structural, Spectroscopic, and Chemical Studies	107
2 <i>Ormosia</i> Alkaloids	113
3 Alkaloids of Coccinellidae	115
Chapter 7 Quinoline, Quinazoline, Acridone, and Related Alkaloids	117
<i>By V. A. Snieckus</i>	
1 Quinoline Alkaloids	117
2 Quinazoline Alkaloids	124
3 Acridone and Related Alkaloids	125
Chapter 8 β-Phenethylamines and the Isoquinoline Alkaloids	128
<i>By V. A. Snieckus</i>	
1 General	128
2 β-Phenethylamines	129
3 Simple Isoquinoline Alkaloids	133
4 Benzyloisoquinoline Alkaloids	137
5 Pavine Alkaloids	142
6 Dibenzopyrrocolines	143
7 Proaporphine, Aporphine, and Phenanthrene Alkaloids	143
8 Morphine and Morphinandienone Alkaloids	154
9 Colchicine Alkaloids	162
10 Cularine	164
11 Protoberberine Alkaloids	164
12 Protopine Alkaloids	172
13 Benzophenanthridine Alkaloids	174

14 Phthalideisoquinoline Alkaloids	178
15 Rhoeadine and Papaverrubine Alkaloids	179
16 Spirobenzylisoquinoline Alkaloids	183
17 Alkaloids from <i>Hypecoum erectum</i>	185
18 Ipecacuanha Alkaloids	186
19 Dimeric Benzylisoquinoline Alkaloids	188
Chapter 9 The Aporphines	197
<i>By M. Shamma and S. S. Salgar</i>	
1 Introduction	197
2 New Alkaloids	199
<i>O</i> -Methylbulbocarpine	199
Norcorydine	199
<i>N</i> -Methylhernovine	200
10- <i>O</i> -Methylhernovine	200
<i>N</i> -Methyl-10- <i>O</i> -methylhernovine	201
Lindcarpine	201
<i>N</i> -Methyl-lindcarpine	202
Norglaucine	202
Wilsonirine	203
Predicentrine	204
Norpredicentrine	204
Bracteoline	205
(–)-Dicentrine	205
Dehydrodicentrine	206
(±)-Isoboldine	206
Duguetine	206
Cataline	207
Dehydroglaucine	208
Nornantenine	208
Nordomesticine	209
Hernandine	210
Ookryptine	211
Oconovine	211
Thalicsimidine (purpureine)	212
Norpurpureine	212
<i>O</i> -Demethylpurpureine	212
Dehydro-ocoteine	213
Didehydro-ocoteine	214

Ocopodine	214
Dehydro-ocopodine	215
<i>O</i> -Methylpukateine	215
Nuciferoline	216
(-)-Mecambroline	216
(-)-Apoglaziovine	217
(+)-Apoglaziovine	217
Roemeroline	217
(+)-Roemerine (\equiv Aporheine)	217
Remrefidine	218
(+)-Nuciferine	218
<i>O</i> -Demethylnuciferine	218
Steporphine	219
(\pm)-Variabiline	219
Thalphenine	220
Lirinine	221
1,2-Dimethoxy-8,9-methylenedioxyaporphine	222
Michelanugine	222
3 Reactions of Aporphines	222
Conversion of Magnoflorine into Taspine	222
N-Demethylation, and Hofmann and Emde Degradation	223
<i>O</i> -Demethylation	224
Oxidation	225
Ether Formation	227
4 Synthesis	227
Bischler-Napieralski Cyclization and Pschorr Ring Closure	227
<i>o</i> -Nitrotoluene Approach and Pschorr Ring Closure	228
Syntheses of 7-Hydroxyaporphines through Pschorr Ring Closure	232
Syntheses <i>via</i> Modified Pschorr Ring Closure	232
Reissert Alkylation and Pschorr Ring Closure	234
Benzyne Generation with or without Pschorr Ring Closure	236
Photochemical Routes	238
Phenolic Oxidative Coupling	243
Quinol Acetates	246
Oxidative Cyclization of Monophenolic Benzyloisoquinolines	246
5 Biosynthesis	247
Coupling to Proaporphines	247
Coupling to Neoproaporphines	248
Direct Coupling to Aporphines	248
6 Pharmacology	250

7 Specific Rotations, Absolute Configurations, and Structural Relationships among Aporphines	253
1,2-Substitution	254
1,2,3-Substitution	255
1,2,8-Substitution	256
1,2,9-Substitution	256
1,2,10-Substitution	256
1,2,11-Substitution	257
1,2,8,9-Substitution	258
1,2,9,10-Substitution	258
1,2,10,11-Substitution	261
1,2,3,9,10-Substitution	263
1,2,3,10,11-Substitution	264
1,2,8,9,10-Substitution	264
1,2,9,10,11-Substitution	264
8 N.M.R. Spectroscopy and Labelled Aporphines	264
9 U.V. Spectroscopy	265
(An Addendum to Chapter 9 appears on p. 428)	
Chapter 10 Amaryllidaceae and Related Alkaloids	266
<i>By V. A. Snieckus</i>	
Chapter 11 <i>Erythrina</i> and Related Alkaloids	273
<i>By V. A. Snieckus</i>	
Chapter 12 Indole Alkaloids	280
<i>By J. A. Joule</i>	
1 Simple Alkaloids	284
Non-tryptamines	284
Non-isoprenoid Tryptamines	285
2 Isoprenoid Tryptamine and Tryptophan Alkaloids	287
Non-terpenoid Alkaloids	287
Monoterpenoid Alkaloids	290
Yohimbine-Coryantheine-Heteroyohimbine (and Related Oxindoles) Group	290
Sarpagine-Ajmaline-Picaline Group	297
Strychnine-Akuammicine-Condylocarpine-Ellipticine Group	300
Eburnamine-Aspidospermine-Aspidofractine Group	303
Ibogamine Group	308
Skeletal Rearrangements and Interconversions	309

<i>Contents</i>	xi
3 Biogenetically Related Quinoline Alkaloids	313
4 Bisindole Alkaloids	317
Chapter 13 <i>Lycopodium</i> Alkaloids <i>By V. A. Snieckus</i>	322
Chapter 14 Chemistry of the Diterpenoid Alkaloids <i>By S. W. Pelletier and S. W. Page</i>	323
1 Introduction	323
2 Structural and Chemical Investigations	325
C ₂₀ Diterpenoid Alkaloids	325
Anopterine	325
Vakatisine	326
Carbon-13 Nuclear Magnetic Resonance Studies	326
<i>Delphinium</i> Alkaloids	327
Alkaloids from <i>Delphinium bicolor</i>	327
Alkaloids from <i>Delphinium dictyocarpum</i> : Dictyocar- pine, Base of Mol. Wt. 453, and Base of Mol. Wt. 541	327
Excelsine	329
Alkaloids from <i>Aconitum karakolicum</i>	330
Aconifine, Karakoline, and Karakolidine	330
Sulphuric Acid Rearrangement Products of Lappaconine and Lapaconidine	332
<i>Daphniphyllum</i> Alkaloids	333
Daphniphyllidine	333
Yuzurimine, Yuzurimine-A, and Yuzurimine-B	333
Daphmacropodine	336
3 Diterpenoid Alkaloid Synthesis	337
Atisane–Aconane Conversions	337
Annellation Procedure for the Synthesis of the Diterpenoid Ring A	339
Model Studies for the Synthesis of C/D Ring Systems of the Delphinine-type Alkaloids	340
Synthesis directed towards Songorine	341
Chapter 15 Steroidal Alkaloids of the Apocynaceae, Buxaceae, Asclepiadaceae, and of the <i>Salamandra–Phyllobates</i> Group <i>By F. Khuong-Huu and R. Goutarel</i>	346
1 Alkaloids of the Apocynaceae: The <i>Holarrhena</i> and <i>Paravallaris</i> Alkaloids	346
Steroidal Alkaloids and Amines	346

Phytochemistry	346
Synthesis, Reactions, and Transformations of Steroidal Amines	346
Photochemistry	363
Aminoglycosteroids	364
Mass and N.M.R. Spectra	365
2 Alkaloids of the Asclepiadaceae	366
3 <i>Salamandra</i> Alkaloids	366
4 <i>Phyllobates</i> Alkaloids	368
5 Alkaloids of the Buxaceae	379
6 Biological Notes	382
Chapter 16 <i>Solanum</i> and <i>Veratrum</i> Steroidal Alkaloids By R. B. Herbert	383
1 <i>Solanum</i> Alkaloids	383
2 <i>Veratrum</i> Alkaloids	388
Chapter 17 Miscellaneous Alkaloids By V. A. Snieckus	395
1 Muscarine Alkaloids	395
2 Imidazole Alkaloids	396
3 Purine Alkaloids	398
4 <i>Securinega</i> Alkaloids	406
5 Peptide Alkaloids	408
6 Unclassified Alkaloids and Alkaloid-containing Plants	414
Addendum to Chapter 9	428
Errata	429
Author Index	430