

Contents

Preface to the Third Edition IX

Abbreviations and Symbols XI

1	The Structure of Heterocyclic Compounds	1
	Reference	4
2	Systematic Nomenclature of Heterocyclic Compounds	5
2.1	Hantzsch-Widman Nomenclature	6
2.2	Replacement Nomenclature	11
2.3	Examples of Systematic Nomenclature	12
2.4	Important Heterocyclic Systems	15
3	Three-Membered Heterocycles	17
3.1	Oxirane	17
3.2	Thiirane	26
3.3	2 <i>H</i> -Azirine	29
3.4	Aziridine	32
3.5	Dioxirane	37
3.6	Oxaziridine	38
3.7	3 <i>H</i> -Diazirine	40
3.8	Diaziridine	40
	References	41
4	Four-Membered Heterocycles	45
4.1	Oxetane	45
4.2	Thietane	49
4.3	Azete	50
4.4	Azetidine	51
4.5	1,2-Dioxetane	55
4.6	1,2-Dithiete	57
4.7	1,2-Dihydro-1,2-diazete	58
4.8	1,2-Diazetidine	58
	References	59

5	Five-Membered Heterocycles	61
5.1	Furan	61
5.2	Benzo[b]furan	80
5.3	Isobenzofuran	84
5.4	Dibenzofuran	86
5.5	Tetrahydrofuran	87
5.6	Thiophene	90
5.7	Benzo[b]thiophene	101
5.8	Benzo[c]thiophene	104
5.9	2,5-Dihydrothiophene	105
5.10	Thiolane	106
5.11	Selenophene	107
5.12	Pyrrole	108
5.13	Indole	125
5.14	Carbazole	148
5.15	Isoindole	150
5.16	Indolizine	152
5.17	Pyrrolidine	157
5.18	Phosphole	161
5.19	1,3-Dioxolane	162
5.20	1,2-Dithiolo	163
5.21	1,2-Dithiolane	164
5.22	1,3-Dithiolo	165
5.23	1,3-Dithiolane	165
5.24	Oxazole	166
5.25	Benzoxazole	177
5.26	4,5-Dihydrooxazole	181
5.27	Isoxazole	185
5.28	4,5-Dihydroisoxazole	193
5.29	2,3-Dihydroisoxazole	198
5.30	Thiazole	199
5.31	Benzothiazole	208
5.32	Penam	212
5.33	Isothiazole	214
5.34	Imidazole	217
5.35	Benzimidazole	229
5.36	Imidazolidine	234
5.37	Pyrazole	236
5.38	Indazole	243
5.39	4,5-Dihydropyrazole	246
5.40	Pyrazolidine	249
5.41	1,2,3-, 1,2,4-, 1,3,4-Oxadiazole	249
5.42	1,2,5-Oxadiazole	251
5.43	1,2,3-Thiadiazole	254
5.44	1,2,4-Thiadiazole	256

5.45	1,2,3-Triazole	258
5.46	Benzotriazole	265
5.47	1,2,4-Triazole	268
5.48	Tetrazole	273
	References	280
6	Six-Membered Heterocycles	297
6.1	Pyrylium Ion	297
6.2	2 <i>H</i> -Pyran	305
6.3	2 <i>H</i> -Pyran-2-one	306
6.4	3,4-Dihydro-2 <i>H</i> -pyran	313
6.5	Tetrahydropyran	317
6.6	2 <i>H</i> -Chromene	319
6.7	2 <i>H</i> -Chromen-2-one	321
6.8	1-Benzopyrylium Ion	327
6.9	4 <i>H</i> -Pyran	329
6.10	4 <i>H</i> -Pyran-4-one	331
6.11	4 <i>H</i> -Chromene	335
6.12	4 <i>H</i> -Chromen-4-one	336
6.13	Chroman	341
6.14	Pyridine	345
6.15	Pyridones	381
6.16	Quinoline	386
6.17	Isoquinoline	406
6.18	Quinolinizinium Ion	420
6.19	Dibenzopyridines	423
6.20	Piperidine	429
6.21	Phosphabenzene	434
6.22	1,4-Dioxin, 1,4-Dithiin, 1,4-Oxathiin	438
6.23	1,4-Dioxane	440
6.24	Oxazines	442
6.25	Morpholine	447
6.26	1,3-Dioxane	449
6.27	1,3-Dithiane	453
6.28	Cephams	455
6.29	Pyridazine	458
6.30	Pyrimidine	463
6.31	Purine	474
6.32	Pyrazine	481
6.33	Piperazine	486
6.34	Pteridine	487
6.35	Benzodiazines	491
6.36	1,2,3-Triazine	501
6.37	1,2,4-Triazine	504
6.38	1,3,5-Triazine	508

6.39	1,2,4,5-Tetrazine	512
	References	517
7	Seven-Membered Heterocycles	529
7.1	Oxepin	529
7.2	Thiepin	532
7.3	Azepine	533
7.4	Diazepines	540
	References	545
8	Larger Ring Heterocycles	547
8.1	Azocine	547
8.2	Heteronines and Larger-Membered Heterocycles	549
8.3	Tetrapyrroles	551
	References	558
9	Problems and Their Solutions	561
	References	614
	Indices	621