THE PYRIMIDINES

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With a Chapter by

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And Sections by

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Northern Territory University
Darwin

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This is the fifty-second volume in the series

THE CHEMISTRY OF HETEROCYCLIC COMPOUNDS

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A SERIES OF MONOGRAPHS

EDWARD C. TAYLOR, *Editor*

ARNOLD WEISSBERGER, *Founding Editor*

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Dedicated to
Four of the Great Pyrimidine Chemists of Our Day

Vladimir Petrovich Mamaev
(Novosibirsk: † 1987)

Kjell Undheim
(Oslo)

Hendrickus C. van der Plas
(Wageningen)

Hiroshi Yamanaka
(Sendai)

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The Chemistry of Heterocyclic Compounds
Introduction to the Series

The chemistry of heterocyclic compounds constitutes one of the broadest and most complex branches of chemistry. The diversity of synthetic methods utilized in this field, coupled with the immense physiological and industrial significance of heterocycles, combine to make the general heterocyclic arena of central importance to organic chemistry.

The Chemistry of Heterocyclic Compounds, published since 1950 under the initial editorship of Arnold Weissberger, and later, until Dr. Weissberger's death in 1984, under our joint editorship, has attempted to make the extraordinarily complex and diverse field of heterocyclic chemistry as organized and readily accessible as possible. Each volume has dealt with syntheses, reactions, properties, structure, physical chemistry, and utility of compounds belonging to a specific ring system or class (e.g. pyridines, thiophenes, pyrimidines, three-membered ring systems). This series has become the basic reference collection for information on heterocyclic compounds.

Many broader aspects of heterocyclic chemistry are recognized as disciplines of general significance that impinge on almost all aspects of modern organic and medicinal chemistry, and for this reason we initiated several years ago a parallel series entitled *General Heterocyclic Chemistry*, which treated such topics as nuclear magnetic resonance, mass spectra, and photochemistry of heterocyclic compounds, the utility of heterocyclic compounds in organic synthesis, and the synthesis of heterocyclic compounds by means of 1,3-dipolar cycloaddition reactions. These volumes were intended to be of interest to all organic and medicinal chemists, as well as to those whose particular concern is heterocyclic chemistry.

It has become increasingly clear that this arbitrary distinction created as many problems as it solved, and we have therefore elected to discontinue the more recently initiated series *General Heterocyclic Chemistry*, and to publish all forthcoming volumes in the general area of heterocyclic chemistry in *The Chemistry of Heterocyclic Compounds* series.

EDWARD C. TAYLOR

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Preface

The first edition of this work (Volume 16 of the Chemistry of Heterocyclic Compounds) comprised three volumes, of which *The Pyrimidines* covered the literature from 1818 to 1957, *The Pyrimidines: Supplement I* covered the decade to 1967, and *The Pyrimidines: Supplement II* continued the reviewing process to 1983. Shortly afterward, the first two volumes were declared out of print so that a full digest of pyrimidine literature was no longer available to newly established libraries in academic or industrial laboratories. Accordingly, it was decided to prepare a second edition of *The Pyrimidines* based on still-useful information from all volumes of the first edition plus original material that had appeared subsequently. For pragmatic reasons, the second edition had to fit within a single volume, so the task of selection and compression has been considerable. For example, much relevant historical and anecdotal material has been omitted or drastically shortened; the criteria for inclusion of "simple pyrimidines" in the Appendix Table has been tightened to exclude higher homologs and other marginal categories of not-so-simple pyrimidines; only the better-described examples of each synthesis or reaction have been chosen for outlining; and background analyses of ionization and spectral data (except for nmr) have been deleted, simply because such techniques are now seldom used in the pyrimidine field. In addition, nomenclature has been modernized completely, as outlined in Section 1.2, and the use of trivial names (e.g., uracil) has been minimized throughout. Many recent patents have been ignored in the belief that useful factual material therein has appeared subsequently in the regular literature.

On the basis of references cited in this book, the geographic and ethnic origins of papers on pyrimidine chemistry may surprise some:

United States of America	24.7%
Germany, Switzerland, and Austria	18.6%
British Commonwealth (past & present)	16.7%
Japan	14.0%
Former USSR Republics	8.3%
France, Italy, Spain, and South America	5.7%
Eastern European Countries	5.7%
Netherlands and Belgium	2.1%
Scandinavian Countries	1.3%
Israel, Arabic Countries, China, etc.	2.9%

I am greatly indebted to Dr W. B. Cowden, Dr R. F. Evans (kindly encouraged and assisted by his wife, Carmel), and Dr. M. D. Fenn for writing sections on pyrimidine *N*-oxides, hydropyrimidines, and pyrimidine nmr spec-

tra, respectively. I also warmly thank my former colleagues, Dr. W. L. F. Armarego and Dr. G. B. Barlin, for helpful discussions; the successive Deans of the Research School of Chemistry, Professor A. L. G. Beckwith and Professor L. N. Mander, for the provision of excellent postretirement accommodation and facilities within the School; the branch librarian, Mrs. J. Smith, for her invaluable cooperation; Mrs. B. Cronin and Miss A. Hassan for skilled assistance in early stages of the data-collection process; Mr. D. Bogsanyi and Mr. A. Wallner for assistance with Hungarian and Czech language papers, respectively; and my wife, Jan, for her patience, forbearance, and practical help in proof reading.

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