COMPREHENSIVE ORGANIC CHEMISTRY

The Synthesis and Reactions of Organic Compounds

SIR DEREK BARTON, F.R.S.

AND

W. DAVID OLLIS, F.R.S.

Volume 6 Formula, Subject, Author, Reaction, and Reagent Indexes

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Edited by C. J. DRAYTON

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COMPREHENSIVE ORGANIC CHEMISTRY

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Foreword

During more than a century, the development of organic chemistry has been associated with extensive documentation. Vast numbers of textbooks, monographs, and reviews have been published with the objective of summarizing and correlating the results obtained by many thousands of organic chemists working in academic and industrial research laboratories. However, out of this colossal literature there is but a relatively small number of textbooks and multi-volumed works which have become generally accepted as representing real steps forward in the presentation of our subject.

During the classical era of organic chemistry (1820–1940), textbooks which had a profound influence on the teaching of the subject included, for example, works by Armstrong (1874), van't Hoff (1875), Roscoe–Schorlemmer (1878), Richter (1888), Gattermann (1895), van't Hoff–Werner–Eiloart (1898), Meyer–Jacobson (1902), Schmidt–Rule (1926), Karrer (1928), Freudenberg (1933), Richter–Anschütz (1935), and Gilman (1938). These texts provide an opportunity to comment on the relationship between the history of organic chemistry and its associated publications. The *Treatise on Chemistry* by Roscoe and Schorlemmer consisted of three volumes (5343 pages) published in nine parts over the period 1878–1892: the major component was Volume III (6 parts, 3516 pages) which was devoted to organic chemistry. Another instructive example is the important work *Lehrbuch der Organischen Chemie*, produced by Victor Meyer and Paul Jacobson. The increase in size from the edition (1735 pages) published during 1902–1903 to the edition (5115 pages) published over the period 1913–1924 is striking.

Many have expressed concern about the problems of maintaining effective contact with the expanding literature of organic chemistry, but few have allowed themselves to become involved with attempted solutions. The decision to publish Comprehensive Organic Chemistry was not taken lightly. The absence of a work reflecting the current rapid development of modern organic chemistry has been lamented by many eminent chemists, including the late Sir Robert Robinson (1886–1975) who played an important role in the initiation of this project shortly before his death. Comprehensive Organic Chemistry was conceived, designed, and produced in order to meet this deficiency. We realised that the current rate of growth of organic chemistry demanded speedy publication and, furthermore, that its interaction with other subjects including biochemistry, inorganic chemistry, molecular biology, medicinal chemistry, and pharmacology required the collaboration of many authors. The selection of topics to be included in order to justify the work as being comprehensive has not been easy. We recognize that some areas of organic chemistry have not been given the detailed treatment which can be justified, but we have done our best to meet the expectations of the majority of readers. In particular, we have not made a special section for Theoretical Organic Chemistry. This is not because of any lack of appreciation on our part of the importance of Theory. It is because a correct treatment of Theory cannot be made comprehensible in an abbreviated form. It is also because Theory changes with time more rapidly than the facts of the subject. Theory is better treated in our view in specialist monographs. The same arguments apply equally to the fundamental subject of Stereochemistry. Any comments regarding errors and omissions will be appreciated so that they can be dealt with in future editions.

The contents of each volume have been brought together so as to reflect what are judged to be the truly important facets of modern organic chemistry. The information is presented in a concise and logical manner with mechanistic organic chemistry being adopted to provide a constant and correlative theme. The dominating intention of the Editorial Board has been to ensure the publication of a contribution to the literature of

organic chemistry which will be genuinely useful and stimulating. Emphasis has therefore been given throughout to the properties and reactions of all the important classes of organic compounds, including the remarkable array of different compounds prepared by synthesis as well as natural products created by biosynthesis. Of course, the study of natural products provided the original foundation stones on which modern synthetic organic chemistry now firmly stands.

As a major presentation of modern organic chemistry, Comprehensive Organic Chemistry will be doubly useful because we have provided, in a separate volume, an extensive index. Not only have the contents of the work been indexed in the ordinary way, but we have also added a substantial number of additional references from the original literature. These do not appear in the text itself. Thus, the reader who wishes to obtain additional information about reactions and reagents mentioned in the text will quickly be able to consult the original literature. The Index volume has been prepared by a team from Pergamon Press.

Our debt to the Authors and to the Volume Editors is considerable. We are very grateful to all our colleagues for the efficient way in which they have tried to meet the challenges (and the deadlines!) which have been presented to them. We hope that the Authors have enjoyed their association with this venture. In a lighter vein, we also trust that their feelings are different from the statement 'this task put system into my soul but not much money into my purse' attributed to Henry Edward Armstrong (1848–1937) after he had written his *Introduction to Organic Chemistry* in 1874.

We are delighted to acknowledge the masterly way in which Robert Maxwell, the Publisher, and the staff at Pergamon Press have supported the Volume Editors and the Authors in our endeavour to produce a work which correctly portrays the relevance and achievements of organic chemists and their contributions to knowledge by research.

D. H. R. Barton
Chairman

W. D. Ollis
Deputy Chairman

Preface to Volume 6

A major reference work can be made very much more usable if it contains an extensive and detailed index. For Comprehensive Organic Chemistry we have therefore provided five separate indexes covering distinctly different features of the main text. Four of these indexes are chemical in nature and one is an author index. A reader can use these indexes individually or in combination to locate information about specific organic compounds, general classes of compound, reactions of organic compounds, the reagents used in organic synthesis, or the work of particular authors. However, a reader should familiarise himself with both the style and scope of each index before attempting to obtain any information from its pages. Only then will the considerable effort that has gone into the preparation of this volume be made most effective.

Throughout the world a particular organic compound may have many names and even in English there are often variants: IUPAC and Chemical Abstracts use different nomenclature systems for example. Since the molecular formula of a compound is universally accepted, a formula index provides a quick and accurate access to an individual compound. The **Formula Index** for Comprehensive Organic Chemistry consists of about 20,000 molecular formulae and has been compiled both from compound names mentioned in the text and from displayed structural formulae in Volumes 1–5. Only carbon-containing compounds have been indexed

There has been no attempt to index each compound every time it is mentioned, but only those compounds considered important in the context of surrounding text and formulae Therefore compounds were indexed when significant for the preparation or reactions of the compound type under discussion. Compounds have not been indexed if only their physical or spectroscopic properties were mentioned, nor if they were only intermediates in a reaction However, compounds have been indexed if they were isolable intermediates closely related to the compound type under discussion.

The element symbols within each formula are arranged according to the Hill system, in which the order is C, H, and then the remaining symbols arranged alphabetically. The names are the recommended IUPAC names,* trivial or systematic as appropriate, but in a few instances other trivial names in common use are included where these have been used by the chapter authors. In some cases we have used (British) Chemical Society modifications of IUPAC names. Where a number of isomeric compounds are discussed in the text together, a general name is used in the index (*e.g.* quinoline, bromo-) rather than a list of all the isomers.

To use the index readers should derive the molecular formula of the compound in which they are interested, turn to that formula in the index and then select the compound whose name is most appropriate.

The **Subject Index** contains entries both to classes of organic compound and to individual compounds mentioned in the text. In many cases we have also added descriptive sub-headings listing particular derivatives or reactions of a main entry Also included in this index are techniques of separation (*e.g.* gas chromatography) and methods of identification (*e.g.* infrared spectroscopy). Not included in this index as main entries are

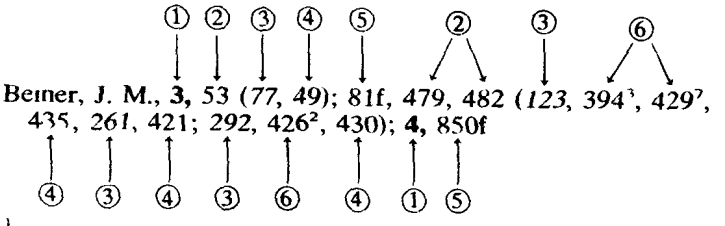
* See 'IUPAC Nomenclature of Organic Chemistry, sections A, B, C, D, E, F and H', 1979 edn , Pergamon Press Oxford, for the latest nomenclature rules

named reactions, types of reaction, or uses of organic and inorganic compounds as reagents, as these appear in the last two indexes.

The names of the compounds indexed are those that have been used in the text of Comprehensive Organic Chemistry, where we have tried to follow IUPAC recommended names throughout. In some cases, however, we have used Chemical Society modifications, as mentioned in the Formula Index above. Many classes of compounds also have acceptable synonyms, even under IUPAC rules, so readers should seek alternative names if they cannot find their initial selection In particular the following synonyms should be noted. alkenes and olefins; alkynes and acetylenes; cyanides and nitriles, oxirans and epoxides, carbenium ions, carbonium ions and carbocations. Readers should therefore consider all possibilities while using the index.

The **Author Index** contains the names of over 25,000 authors cited in the 20,000 or so references in Volumes 1–5 This index has been compiled so that the user can proceed directly either to the place in the text where an author's work is cited, or to the actual literature reference in the list at the end of each chapter. To do this the following points should be borne in mind when using the Index. Bold numbers after an author's name refer to the volume; ordinary numbers always refer to pages; and italic numbers refer to references

For each author we have first given the volume and page number where the author's name can be found in the appropriate chapter bibliography. This is followed in parentheses by the reference number (in italics) containing the author's name and then by the text page where that reference is cited This sequence is then repeated for every other reference which contains the author's name. If a reference is cited on a particular page more than once, this is indicated by a superscript 2, 3, *etc.* If the reference is cited as a page footnote or as a footnote to a table or scheme, this is indicated by the letter 'f' after the page number For example



① Volume number
② Page number of chapter bibliography
③ Reference number in chapter bibliography
④ Text page number where reference is cited
⑤ Text page number where reference occurs as a footnote
⑥ Text page number when reference occurs several times

The accuracy of the spelling of authors' names in this index has been affected by a number of factors One source of error arises when authors use different initials or a different spelling of their name in different papers or review articles. Sometimes this may arise from a transliteration process, e g. Chichibabin and Tschitschibabin. Another source of error stems from those journals which only give one initial for each author or disregard diacritical marks (for this index we have indexed ä as ae, ö and ø as oe, and u as ue). In an attempt to eliminate these and other sources of error we have checked for accuracy a large number (over 70%) of the 20,000 or so references which occur in the five text volumes.

The **Reaction Index** contains entries both to specific types of reaction (acylation, oxidative cleavage, *etc.*) and to named reactions (Birch reduction, Orton rearrangement, *etc.*) Each reaction type may contain up to three distinct parts. The first gives the volume and page numbers for Comprehensive Organic Chemistry where that reaction is discussed in the text for various individual compounds or types of compound The second part lists reagents or combinations of reagents which can be used to carry out that reaction. Often the reagents listed are used in conjunction with other reagents or solvents and under specific conditions which are not mentioned If a reader is interested in using a particular reagent he should turn to the Reagent Index, which gives the Comprehensive Organic Chemistry text pages where its use with specific compounds has been discussed and also gives additional literature references to that use not listed in the chapter bibliographies

The third part contains a list of literature references, mainly reviews, where that reaction is discussed in detail. The last two parts have been compiled largely from material not included in the five Comprehensive Organic Chemistry text volumes, and the literature coverage is up to mid-1978 Although there are three categories of entry that can occur for a particular reaction, all three are not necessarily present for every reaction. For example, a particular type of reaction may not have been discussed in Comprehensive Organic Chemistry, or a review article may not have been written

The comments regarding nomenclature made above for the Formula and Subject Indexes also apply to this index, but additional synonyms for some types of reaction should also be considered, *e g* condensation, cyclization, and ring closure can all be used to describe the same reaction. Readers should therefore consider all ways to describe a particular reaction while using the index Even named reactions have synonyms, one particularly confusing case involving the reactions due to Hofmann. Thus the Hofmann elimination (of amines) is often called the Hofmann (exhaustive) methylation; the Hofmann rearrangement (of amides) is sometimes called the Hofmann degradation or even just the Hofmann reaction; the Hofmann carbylamine reaction (of primary amines) fortunately appears to have no synonyms We have tried to use the most widely accepted names for all reactions, but the reader should consider possible alternatives if he is unable to locate his initial choice

With the aid of this index a reader can rapidly find examples of a particular reaction mentioned in Comprehensive Organic Chemistry, the different reagents that can be used for that reaction, and review articles which have discussed the reaction in detail.

The **Reagent Index** lists over 2500 organic and inorganic compounds which are of use to organic chemists in synthesis The reagents covered include those used as catalysts, but do not include compounds used for extraction, separation, identification or resolution. For each reagent (or combination of reagents) we give specific reactions performed by the reagent in organic synthesis, followed by compounds which undergo that reaction with the reagent Each reaction and compound so identified is then followed either by reference to pages in Volumes 1–5 of Comprehensive Organic Chemistry (entries have been extracted from both the text and displayed formulae) and/or literature references which describe that specific use of the reagent. These references, which are listed in date order, are supplementary to those which occur in the five text volumes The literature for this index has been scanned up to the middle of 1978 All the points regarding nomenclature and synonyms mentioned above for the other indexes should also be borne in mind when using the Reagent Index

Using this index as a guide, a reader should quickly be able to ascertain the use and scope of almost all the reagents used in organic synthesis

As well as the individual compilers, several others have greatly helped in the preparation of this volume It is therefore a pleasure to acknowledge the dedicated assistance of Christine Baldwin, Sally Harrison, Richard Nowak and Margaret Sims I should also like to thank Dr D A Lewis and Mr P Charnock of I.C.I. Plastics Division for generously supplying material from their forthcoming third cumulative edition of 'Index of Reviews in Organic Chemistry', the United Kingdom Chemical Information Service for the efficient and rapid way they supplied material for the Reagent Index; Lord Tedder for

kindly providing facilities in the Department of Chemistry at the University of St. Andrews; and Professor Sir Derek Barton and Professor David Ollis for their help and encouragement throughout.

Finally, the publishers would welcome comments from readers on the usefulness of all the five indexes. Suggestions for improvement in subsequent editions would be especially welcome.

Oxford C. J. DRAYTON

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