USAN *and the* *USP dictionary of drug names*

A compilation of the United States Adopted Names (USAN)
selected and released from June 15, 1961, through June 15, 1985,
and current USP and NF names for drugs (main list),
with two appendixes of other drug names

The authorized list of established names for drugs in the United States of America

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MARY C. GRIFFITHS, *Editor*

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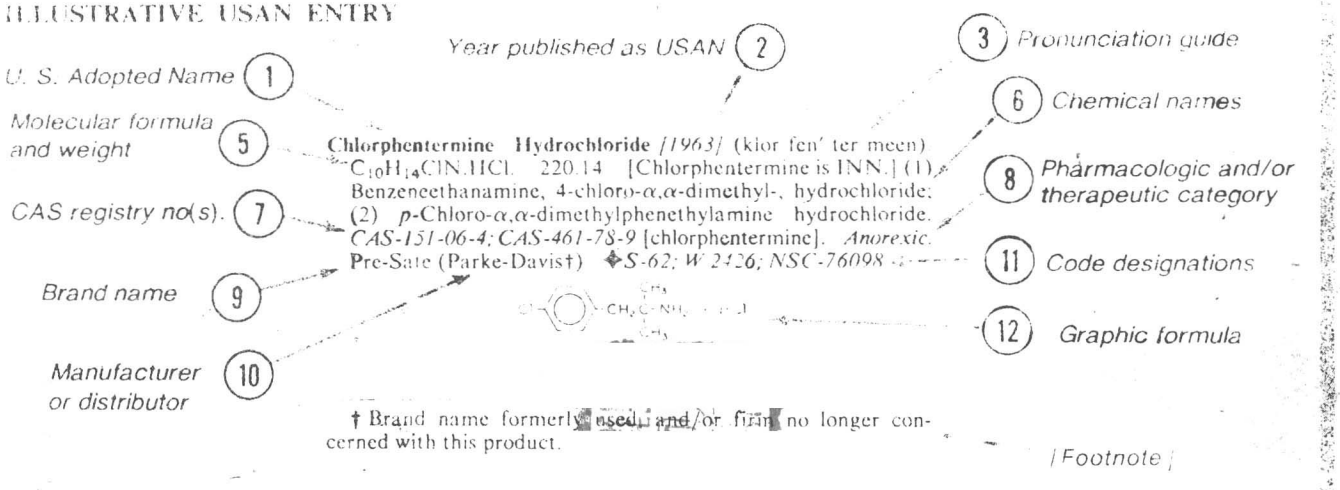
HOW TO USE THIS BOOK

For the most effective use of this book, the reader is urged to read the *Preface* and to consult the list of *Abbreviations* as needed. In addition, the following notes and examples are provided as pointers on how to use the book.

Each U. S. Adopted Name is shown in **boldface** type. The USAN entry typically includes:

(1) U. S. Adopted Name
(2) Year of publication as a USAN, in brackets and italicized
(3) Pronunciation guide
(4) Designation of official compendium in which title occurs; e.g., boldface **USP** or **NF** if current, or specific edition in lightface type if not current
(5) Molecular formula and weight
(6) Chemical name(s)
(7) CAS registry number(s)
(8) Pharmacologic and/or therapeutic activity claim (italicized), based largely on representations from the sponsor of the USAN and subject to possible change as additional information becomes available
(9) Brand name(s)
(10) Name(s) of manufacturer(s) or distributor(s) [a † symbol appears if the firm is no longer concerned with the product]
(11) Code designation(s), insofar as these have been ascertained, preceded by the symbol ✦
(12) Graphic formula

ILLUSTRATIVE USAN ENTRY



OTHER ILLUSTRATIVE ENTRIES

Main List

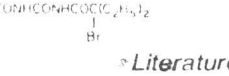
Allopurinol *[1964]* (al oh pure' i nole). USP. $C_5H_4N_4O$ 136.11. (1) 4*H*-Pyrazolo[3,4-*d*]pyrimidin-4-one, 1,5-dihydro-; (2) 1,5-Dihydro-4*H*-pyrazolo[3,4-*d*]pyrimidin-4-one; (3) 1*H*-Pyrazolo[3,4-*d*]pyrimidin-4-ol. *CAS-315-30-0.* INN. *Xanthine oxidase inhibitor.* Zyloprim (Burroughs Wellcome) ✦*BW 56-158; NSC-1390*

(4) *Official compendium in which title occurs*

Appendix II

Identification as international nonproprietary name

Acecarbromal $C_9H_{15}BrN_2O_4$ 279.13. N1-Acetyl-3-(α-bromoacethylbutyryl)urea. *CAS-77-66-7.* INN; MI. Sedamyl (Riker†)



Literature reference

TYPES OF ENTRIES IN THE BOOK

USAN (in **boldface** type)
Current USP and NF names (in **boldface** type)
Brand names
Code designations
CAS registry numbers and NSC numbers (Appendix IV)
Cross-references
Categories of pharmacologic and/or therapeutic activity (*See* list by categories at end of main list)

APPENDIXES

I—Guiding Principles for Coining U. S. Adopted Names for Drugs
II—International Nonproprietary Names (INN) for Drugs Not Currently Recognized in the U.S.A.
III—Miscellaneous Other Nonproprietary Names for Drugs
IV—CAS Registry Numbers and NSC Numbers
V—Molecular Formulas
VI—Names and Addresses of Domestic Firms Concerned with Compounds for Which USAN Have Been Selected

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Contents

Preface

Unlike previous editions of this Dictionary, which contained only one alphabetic listing, this edition separates names into three lists, i.e., the main list and two ancillary lists as Appendixes II and III.

The main list, pages 13–357, comprises the U. S. Adopted Names (USAN) and the official USP and NF (compendial) names. The Federal Food and Drug Administration has stated that interested persons may, in the absence of the designation of an official name, rely on *USAN and the USP Dictionary of Drug Names* for the established name for any drug in the U.S.A. (see *FDA Established Names*, page 7). The FDA has indicated also that it will not routinely designate official names and will do so only under certain specific conditions. Since it is the intent of the FDA that the USAN and the compendial names comprise the "established names," only those names are printed in the main list and they are printed in **boldface** type. Cross-reference entries in the main list which comprise brand names, code designations, and some international and other names given for informational purposes appear in lightface type.

Apart from the main list and provided for informational purposes are Appendix II, "International Nonproprietary Names (INN) for Drugs Not Currently Recognized in the U.S.A.," and Appendix III, "Miscellaneous Other Nonproprietary Names for Drugs."

23rd Edition

This dictionary of nonproprietary names, brand names, code designations, and Chemical Abstracts Service registry numbers for drugs, now in its twenty-third edition, includes the twenty-third annual compilation of United States Adopted Names (for which the abbreviation, USAN, generally is used). It is cumulative from June 15, 1961, when the U.S. Adopted Names program began, through June 15, 1985, and thus provides the complete list of USAN released through the latter date. It supersedes the 1985 edition and all earlier editions.

Publication of this annual volume in mid-year means that the book is current for half of the year of issuance and half of the following year. The latter year is the one designated, i.e., this is the 1986 edition.

Included herein are 107 new U. S. Adopted Names released since publication of the previous edition of this book, as well as additions of other names for drugs. This edition reflects also relevant changes affecting information given in previously published entries.

The need for such compilations grows ever greater as the lists lengthen. The body of compounds in active use as drugs does not increase greatly, because new and better drugs tend to displace older drugs intended for the same purposes. However, the number of nonproprietary names increases steadily because, once assigned, a name remains on record and may not be reassigned even though the compound that it designates has been abandoned.

This book contains in the main list and Appendixes II and III a total of more than 19,500 entries. Of these entries, more than 5500 are brand names; 2899 are code designations (including 373 NSC numbers); and more than 7600 are CAS registry numbers. The total number of U. S. Adopted Names herein is 2335.

All international nonproprietary names (INN) published by the World Health Organization in the form of Lists from the start of the INN program in 1953 through the year 1984 are included in this volume. Where an INN exists for a drug that is covered in the main list, the entry designates whether the INN is the same as the corresponding USAN or USP or NF name or differs, in which case the difference is shown. Appendix II comprises INN that pertain to drugs not currently recognized in the U.S.A., and Appendix III includes a number of such INN also. Succeeding editions of the dictionary will include also the INN published from 1985 onward, so that all INN will continue to be represented. This edition includes 4764 INN. More than 2700 graphic formulas, many of them published by the WHO, are in this edition as a complement to the policy of having all INN represented. As is stated in this preface under *Procedure*, there is increasing emphasis on the worldwide adoption of the same name for each therapeutic substance in view of the manifest advantages it offers to better communica-

tion and world trade. It is perhaps possible that the policy of including *all* INN in this dictionary may lend added perspective and eventually serve to reinforce that aim for more uniformity.

The main alphabetic list is followed by a section on USAN and USP and NF names listed by pharmacologic categories (see page 358).

In addition to the aforementioned Appendix II, appendixes are included on (I) guiding principles for coining U. S. Adopted Names for drugs; (III) "miscellaneous other nonproprietary names for drugs"; (IV) CAS Registry Numbers and NSC Numbers; (V) molecular formulas; and (VI) names and addresses of domestic firms concerned with compounds for which USAN have been selected.

With respect to the legal status of trademarks cited as brand names herein, inquiries should be directed to the U. S. Patent Office.

Completeness and accuracy are of course paramount objectives in a compilation such as this. However, it is recognized that improvement is always possible, and suggestions of corrections or additions to the text will be welcomed for future consideration.

The text of this 24-year cumulation of drug names has been composed by computer, with storage and retrieval capabilities designed to facilitate future revisions and additions to the text as needed. (The computer tape, devoid of typesetting commands, is obtainable from USP headquarters.)

USAN Council

The three organizations that sponsor the USAN program, i.e., the American Medical Association, the U. S. Pharmacopeial Convention, and the American Pharmaceutical Association, do so through representation on the USAN Council. During 1967, negotiations were completed to provide for participation by the U. S. Food and Drug Administration in the program as a means of consolidating the work of selecting suitable nonproprietary names for drugs on the part of the federal government and the existing Council. Thus, a liaison representative of the FDA sits on the Council. The roster of the Council for 1985 includes:

Lloyd C. Miller, Ph.D., *Chairman*
John V. Bergen, Ph.D.
John E. Kasik, M.D., Ph.D.
Charles S. Kumkumian, Ph.D.
Lauren A. Woods, M.D., Ph.D.

The USAN Council was formed January 2, 1964, to succeed the AMA–USP Nomenclature Committee. It works mainly by correspondence, although consultation by telephone is frequent and Council meetings generally are held twice a year.

The USAN Council secretariat is supported by the American Medical Association, and is housed in the AMA headquarters. Donald O. Schiffman, Ph.D., serves the Council as Secretary, Ruta Freimanis serves as Associate Secretary, and Charles W. Roscoe, Ph.D., serves as a consultant on various aspects of the work. Inquiries and proposals on USAN should be addressed to Dr. Schiffman.[1]

USAN Review Board

Short of resort to the courts, there existed prior to 1961 no effective means of settling controversy stemming from differences of opinion. The gap was filled by the establishment of a formal mechanism by which disputes may be settled.

To give effect to the procedure, a six-member board has been established and is known as the USAN Review Board. Members are appointed for one-year terms, subject to indefinite renewal.

Recourse to the Review Board in settling disputes over selection of the names has been relatively rare; in fact, its services have been employed in only four cases to date. Participants agree at the outset that the determination of the USAN Review Board is final and beyond appeal.

The USAN Review Board for 1985 comprises:

Alan H. Kaplan, J.D., *Chairman*
Durward F. Dodgen
Victor A. Drill, M.D., Ph.D.
August P. Lemberger, Ph.D.
Donn L. Smith, M.D., Ph.D.
Joseph V. Swintosky, Ph.D.

The USAN Review Board secretariat is supported by the U. S. Pharmacopeial Convention. Joseph G. Valentino, J.D., serves the Board as Secretary.

The USAN Program

The USAN program is the specifically organized effort in the United States directed to producing simple and useful nonproprietary names for drugs while the drug is still in its investigational stage. Indeed, USAN are frequently created for compounds that never come to be marketed as drugs.

It must be kept in mind that the adoption of a name is independent of clinical evaluation or acceptance by the medical profession of the article to which the name applies. Nevertheless, the USAN Council chooses each U. S. Adopted Name with the expectation that it will be suitable for prescribing and dispensing purposes and for designation as the title of the monograph, should the article be recognized in the official United States Pharmacopeia or National Formulary.

The USAN program has earned a measure of prestige and world-wide recognition as an undertaking in the public interest. In addition to long-standing prejudices that work against instituting an orderly and effectual system of name selection, there also is widespread misunderstanding with respect to what constitutes good nonproprietary names and what purposes they serve. The USAN Council is committed to following established principles for

[1] 535 North Dearborn Street, Chicago, Illinois 60610 [Telephone: (312) 645-4904].

coining nonproprietary names (see Appendix I) and to enlisting the cooperation of the pharmaceutical industry in this country and of nomenclature groups abroad with a view to selecting a single, good nonproprietary name for each promising new drug.

The Purpose of USAN—A nonproprietary name of a drug serves numerous and varied purposes. Its principal functions are to identify the substance to which it applies and to serve as a designation that may be used without restriction by the public at large, both lay and professional. The importance of the latter function is enhanced by the restrictions necessarily imposed upon the nature and use of a trademark, particularly in the pharmaceutical field. Teaching in pharmacy and medicine requires a common designation especially for a drug that is available from several sources, and for combinations of two or more drugs. Nonproprietary names greatly facilitate communication between health professionals, and most journals demand their use. State formularies and hospital formularies generally use nonproprietary names as the titles of the articles recognized. A nonproprietary name is essential to the pharmaceutical manufacturer as a means of preserving his trademark rights in his brand name for the article concerned. Finally, federal law obliges the manufacturer to use the "established" nonproprietary name in his advertising, labels, and brochures.

It is this wide variety of function that makes difficult the task of expressing very exactly the criteria for judging simplicity and usefulness in drug names, attributes generally conceded to be desirable. Actually, the criteria differ according to the drug and the manner in which it is distributed, e.g., whether it is dispensed only on prescription, or whether alone or solely in combination with other drugs.

FDA Established Names

Under the terms of the Drug Amendments of 1962 to the Federal Food, Drug, and Cosmetic Act, which became law October 10, 1962, the Secretary of Health and Human Services [formerly Health, Education, and Welfare] is authorized to designate an official name for any drug wherever deemed "necessary or desirable in the interest of usefulness and simplicity." [2]

The Commissioner of Food and Drugs and the Secretary of Health and Human Services published in the *Federal Register* regulations effective November 26, 1984, which state, in part:

Sec. 299.4 Established names of drugs.

(d) "... the Food and Drug Administration agrees with 'Guiding Principles for Coining U. S. Adopted Names for Drugs,' published in *USAN and the USP Dictionary of Drug Names* ...."

(e) "The Food and Drug Administration will not routinely designate official names under section 508 of the act. As a result, the established name under section 502(e) of the act will ordinarily be either the compendial name of the drug or, if there is no compendial name, the common or usual name of the drug. Interested persons, in the absence of the designation of an official name, may rely on as the established name for any drug the nonproprietary name listed in *USAN and the USP Dictionary of Drug Names* ...." [3]

It is to make absolutely clear which names are compendial (USP or NF) or common or usual (USAN) that this Dictionary is divided into the main list and the Appendixes II and III which provide information on other nonproprietary names.

International Nonproprietary Names

Under its charter, the World Health Organization is empowered simply to *recommend* specific actions or procedures to its Member States. This limitation is incorporated into the WHO program concerned with the selection of international nonproprietary names for pharmaceutical substances, in that the WHO first publishes the selected names as proposals (PINN; i.e., "Proposed International Nonproprietary Names"). A period of four months from the date of publication in the *WHO Chronicle* is allowed for entering comments on, or objections to, any proposal on the part of Member States or other interested parties. In general, an objection reflects a belief that the proposal concerned is confusingly close to (i.e., conflicts with) a name already in use, perhaps in only a restricted area in which the party has a proprietary interest in the form of trademark rights. In the event that no objection is received, the WHO proceeds with listing and publishing the PINN as a RINN ("Recommended International Nonproprietary Name"), which many Member States then recognize as the sole or preferred nonproprietary name for use within their respective territories.

International nonproprietary names selected during 1953–1984 are included herein, either in the main list or in Appendix II, or in Appendix III, for informational purposes. For the INN given in Appendix II, the chemical names and any graphic formulas shown are generally those provided by the WHO.

Orphan Drugs

Under the terms of the Orphan Drug Act[4] of 1983, the development and marketing of drug products that are of limited commercial appeal but potentially useful in relatively rare disease conditions are encouraged. The selection of a U. S. Adopted Name for an orphan drug may be based on special considerations that pertain to this rather selective group of drugs. Therefore, where a USAN for an orphan drug appears, for example, to follow a more chemically oriented terminology than is customary for drug nomenclature generally, such instance is not to be regarded as a basis or a precedent for a future selection of a U. S. Adopted Name.

[2] F.D.&C. Act, Sec. 508 [358].

[3] 49 Fed. Reg. 37575 (1984) amending 21 CFR § 299.4.

[4] Pub. L. 97-414.

Procedure

A proposal[5] for a USAN originates usually from a firm or an individual who has developed a substance of potential therapeutic utility to the point where there is a distinct possibility of its being marketed in the United States of America. Occasionally, the initiative is taken by the USAN Council in the form of a request to parties interested in a substance for which a nonproprietary name appears to be lacking.

In the case of a substance that is regarded as an "Investigational New Drug" within the terms of the Federal Food, Drug, and Cosmetic Act of 1938, the process of selecting a USAN should be initiated preferably during the period of investigation when the substance is under clinical study in human and animal subjects, so that the adoption of the USAN will be complete by the time the relevant New Drug Application is filed.

Proposals are expected to conform to the established Guiding Principles (see Appendix I) and to be reasonably free from conflict with other names, including both trademarks and nonproprietary names. An effort is made to discourage the occasional, undesirable practice of incorporating in trademarks the syllables used in an established nonproprietary name, or syllables recommended for USAN. Such trademarks may act as a bar to the subsequent adoption of appropriate nonproprietary names for closely related drugs. Where the initial screening of the proposals suggests that they fail to conform or that they appear to conflict, the USAN Council Secretary offers suggestions with a view to expediting the selection process.

Each proposal should be accompanied by a statement covering as much as possible of the following information regarding the substance: the chemical structure; the chemical name (preferably the preferred *Chemical Abstracts* index name); any code designation(s) by which the substance may have been known in the course of its testing and development; the source (if it is a product of natural origin) or such other descriptive characteristics as will distinguish it adequately; the kind of pharmacologic activity or therapeutic utility claimed for it; and any trademark(s) that may have been applied to it or products containing it. This information, supplemented by the results of searches conducted by the Secretary, is referred to the Council members, whose views then are exchanged until a tentative decision can be submitted to the sponsor for comment. It should be emphasized that while the Council can ascertain the preferred chemical nomenclature for a structure claimed for any compound of definite composition, the Council is not in a position to confirm the structure or the claims for pharmacologic activity.

When general agreement has been reached on a name, the latter is published in the Trademark Bulletin of the Pharmaceutical Manufacturers Association as a "Proposed USAN." This informs those who have access to the Bulletin of the Council's intention to adopt the name and serves as an invitation for comments or protests within 30 days following its publication. No disclosure of the name of the sponsor or of the chemical nature of the substance appears in these Bulletin statements.

Provided the sponsor consents, and in any case if there has been publication of the name elsewhere, the tentatively adopted USAN is then submitted for consideration to several cooperating agencies. The latter agencies include the World Health Organization, the British Pharmacopoeia Commission, the French Codex Commission, and the Nordic Pharmacopoeia Council, as well as the United States Pharmacopeia and the National Formulary,[6] and the Food and Drug Administration. If no objections are raised by the cooperating agencies, adoption is considered final and the USAN is published in a "New Names" section such as in *Clinical Pharmacology and Therapeutics*.[7] Copies of the new USAN lists are distributed widely to the American pharmaceutical press, with the result that the USAN quickly receive wide publicity.

Despite the efforts to give notice of the proposed adoption of a USAN in the early stages and to exercise care in avoiding conflicts with established names, valid objections sometimes arise rather late. All such objections receive conscientious attention from the Council.

Occasionally, a USAN will be found unsuitable for adoption elsewhere, either internationally by the World Health Organization or by one or more national bodies. Sometimes a closely similar name proves acceptable to one or more of these agencies, as in the case of the British Approved Name "cyclobarbitone" and its U. S. counterpart "cyclobarbital." There is increasing emphasis, however, on the worldwide adoption of the same name for each therapeutic substance in view of the manifest advantages it offers to better communication and world trade.

Among the Guiding Principles for Coining U. S. Adopted Names for Drugs (see Appendix I) is the principle that for most organic compounds, the designation for the pharmacologically active portion should appear first in the name; e.g., oxacillin sodium. This principle is applied generally in the entries herein.

Chemical Nomenclature

A nonproprietary name (often referred to as a *generic* name) and a proprietary name (often referred to as a *brand name* or a *trademark*) serve different useful purposes, but neither is designed to

[5] Inquiries and proposals on USAN should be addressed to the Secretary, USAN Council, c/o American Medical Association, 535 North Dearborn Street, Chicago, Illinois 60610.

[6] The NF was acquired on January 2, 1975, by the USP Convention, Inc., which publishes the legally recognized compendia of standards for drugs in the United States of America.

[7] Published monthly by The C. V. Mosby Co., 11830 Westline Industrial Drive, St. Louis, Missouri 63141.

provide precise information concerning the chemical structure of the drug substance. To describe the chemical structure, a third type of name, i.e., a *chemical name*, is needed.

Chemical names tend to be complex and cumbersome; thus, although they may provide, for scientific and technical personnel, a complete, precise, and unambiguous description of the substance, they fail to constitute a concise, convenient designation that meets the day-to-day needs of the pharmacist, the physician, the jurist, and others functioning in related activities that involve pharmaceuticals. These latter needs are more appropriately served by nonproprietary names, of which U. S. Adopted Names (USAN) are primary examples.

For USAN entries pertaining to drugs that are strictly definable chemical substances (and the vast majority of single-entity drugs are of this type), two *chemical names* are usually included in each entry to provide such definition. Of the many chemical names that could be used, the ones selected for this compilation are those that have been used as the American Chemical Society's *Chemical Abstracts* (CA) index names; thus, fundamentally and advantageously, they all stem from the same basic system of chemical nomenclature and they function, through CA, as keys to the world's chemical literature.

The first of these two names is the inverted form of the new systematic chemical name developed by Chemical Abstracts Service (CAS), in general accordance with the rules established over the years by the International Union of Pure and Applied Chemistry (IUPAC) and the International Union of Biochemistry (IUB), and employed in the current issues of CA. The second name is included in view of the general recognition that it is neither practical nor desirable to rely solely on the new CA index names for all purposes of identification and reference. The inverted form of the name is provided because it guides the user *directly* to the CA literature—since that is the style in which chemical substances are indexed in that literature. Conversion to the uninverted form of the name is readily accomplished:

Thus, Hydrazinecarboximidamide, 2-[2-(2,6-dichlorophenoxy)ethyl]-, sulfate, (2:1) becomes 2-[2-(2,6-Dichlorophenoxy)ethyl]hydrazinecarboximidamide sulfate (2:1). Similarly, 3-Pyridinecarboxylic acid, 2-[(3-chloro-2-methylphenyl)amino]-, 2,3-dihydroxypropyl ester becomes 2,3-Dihydroxypropyl 2-[(3-chloro-2-methylphenyl)amino]pyridinecarboxylate; Pregna-1,4-diene-3,20-dione, 11,17-dihydroxy-6-methyl-21-(phosphonooxy)-, (6α,17β)- becomes 11,17β-Dihydroxy-6α-methyl-21-(phosphonooxy)pregna-1,4-diene-3,20-dione; Benzeneacetic acid, α-(hydroxymethyl)-8-methyl-8-azabicyclo[3.2.1]oct-3-yl ester, 8-oxide, hydrochloride, *endo*-(±)- becomes (±)-*endo*-α-(Hydroxymethyl)-8-methyl-8-azabicyclo[3.2.1]oct-3-yl benzeneacetate 8-oxide hydrochloride.

This second name is given in uninverted form and is of a systematic type formerly used in CA; it is identical with, or closely resembles, the chemical name sanctioned and employed by the IUPAC and by the World Health Organization (WHO).

These two types of chemical names differ primarily in that while the IUPAC names make generous use of nonsystematic and semisystematic (often referred to as *trivial*) names and qualifying terms, all of which impede electro-mechanical manipulation, the new CAS names are fully systematic for most substances. It is primarily by virtue of this strict adherence to systematic nomenclature that the new CAS chemical names are readily amenable to the ever-increasing demand for automated processing by various means, including especially computers, thus greatly facilitating literature searches and the processing of other queries based on chemical composition described in terms of nomenclature.

A third chemical name is occasionally supplied in an entry herein, especially in instances where that name is of a type that has become firmly established through long-continued use, e.g., see under Bolasterone; Calcium Glubionate; Panthenol; and Taleranol. Also, a CAS chemical synonym is occasionally supplied as an additional name in the relatively rare instances where the CA index name for a chemical substance is not a chemical name, e.g., see under Cosyntropin; Pepstatin.

[NOTE—The foregoing does not apply to chemical names shown for entries other than U. S. Adopted Names and current compendial names established before the USAN program began. In those other entries, any chemical name shown, whether conforming to CAS nomenclature or otherwise, is given only for descriptive purposes to help identify the substance. The chemical name shown in an INN entry in Appendix II is usually that provided by the WHO.]

Identification of Names by Number

To meet the need for rapid handling of data on drugs for many purposes, compounds and preparations are being identified by number. This trend in no way minimizes the importance of adopting the best possible nonproprietary names for drugs; indeed, its success is related to the soundness of the names program, to the end that taken together the nonproprietary name and the number(s) assigned to it provide increasingly effective control of data and information on drugs.

In the system developed and being used by the Chemical Abstracts Service, registry numbers are assigned to compounds at random, and although unique, the numbers convey no compositional or other kinds of information. A data base developed by the American Society of Hospital Pharmacists, the *Drug Products Information File*, assigns numbers to drug products by brand and to the related information elements thereof; i.e., the nonproprietary name, dosage form, strength, brand name, size and type of package, manufacturer, etc. The Food and Drug Administration maintains the National Drug Code Directory, in which a three-part number is assigned to identify the manufacturer, the drug product, and the package. Other numerical classifications exist for literature searching. To judge from

the degree of interest being shown in these systems for machine processing of data, there is a sound basis for predicting that names will be supplanted by numbers for many routine activities in dealing with drugs in the near future.

In this book, USAN entries, and other entries such as from current or former revisions of the USP and the NF, carry Chemical Abstracts Service (CAS) registry numbers. A given entry usually carries only one such number, but because of (a) variations in the way in which information is reported in the literature, and therefore stored in automated files, and (b) the variety of searches expected to be conducted on such files, sometimes two, or occasionally more, CAS numbers are pertinent to a single entry. For example, information on the pharmacology of ampicillin may be stored in a file under either anhydrous ampicillin or ampicillin trihydrate, depending on how it was reported in the literature, and each of these substances carries its own CAS registry number. Similarly, information on the synthesis of doxorubicin hydrochloride may be stored under that entry or under the parent substance, doxorubicin.

With entries carrying multiple CAS registry numbers, the one carrying no annotation enclosed within brackets (usually the first one) is the registry number assigned to that entry. Each additional number is followed by a bracketed term which, as is apparent from the following examples, discloses its relationship to the assigned number. Prominent categories of entries carrying more than one CAS registry number are exemplified in the following:

Hydrated substances carry one registry number for the hydrate and another one for the anhydrous substance. Examples:
Theophylline 5967-84-0; 58-55-9 [anhydrous]
Ampicillin 69-53-4; 7177-48-2 [trihydrate]

Addition salts of organic bases carry one registry number for the salt and another one for the organic base. Examples:
Promethazine Hydrochloride 58-33-3; 60-87-7 [promethazine]
Acetophenazine Maleate 5714-00-1; 2751-68-0 [acetophenazine]

Quaternary salts carry one registry number for the salt and another one for the quaternary radical, if that radical has had a number assigned to it by CAS. Examples:
Bretylium Tosylate 61-75-6; 59-41-6 [bretylium]
Choline Chloride 67-48-1; 62-49-7 [choline]

Metal salts of uncommon organic acids and all salt-like substances carry one registry number for the salt and another one for the acid or acidic substance. Examples:
Sodium Edetate 64-02-8; 60-00-4 [edetic acid]
Hexobarbital Sodium 50-09-9; 56-29-1 [hexobarbital]

Entries for which CAS has replaced a registry number with another one carry both numbers, as recommended by CAS since the replaced number was in use prior to its replacement. Examples:
Aspartocin 4117-65-1; 1402-89-1 [replaced]
Phendimetrazine Tartrate 50-58-8; 21102-82-9 [replaced]; 634-03-7 [phendimetrazine]
Methohexital Sodium 309-36-4; 60634-69-7 [±]; 22151-68-4 [replaced]; 151-83-7 [methohexital]

In general, when using CAS registry numbers as search terms, all numbers *deemed pertinent* to the search at hand should be used. To omit one or more of such numbers is to risk failing to retrieve all of the stored information pertinent to the search. This does not mean that all of the registry numbers associated with a substance in this book must always be used in searches involving that substance. According to the nature of the query that has prompted the search, one can decide whether one or more of the registry numbers are not pertinent and can therefore be omitted.

Appendix IV provides a tabulation of entries in the order of increasing CAS registry number. This is followed by a similar tabulation in the order of increasing NSC number; the corresponding NSC numbers are also in the respective individual entries.

Graphic Formulas

Consonant with the employment of Chemical Abstracts nomenclature, and also in the interest of uniformity of style, the orientation of ring systems and the depiction of stereoisomeric features in graphic formulas are generally consistent with CAS practices. A circle within a hexagon is used in graphic formulas to represent the bonding in benzene rings and all others that contain six atoms of any kind that are connected in conjugate (Kekulé) style in one or more of the individual resonant structures that contribute to the hybrid structure actually present in the molecule. The circle portrayal is applied to one-ring systems and to the individual rings in poly-ring systems. Aside from the circle portrayal where used, the graphic formula shown for an INN entry in Appendix II is usually that provided by the WHO.

Pronunciation Guide

Although to some extent the pronunciation is a subjective attribute and universal agreement would be but a vain hope, a simple guide, based on English-language spelling, on a limited scale is provided for most of the nonproprietary names herein. Inasmuch as slight differences in phonetics are regarded as relatively unimportant, no attempt is made to give a highly sophisticated system of diacritical marks. [NOTE—The pronunciation guide is not repeated if the guide has been given for the same word in a previous entry.] In any event, comments will be welcomed with respect to instances where an alternative pronunciation is preferred in a particular area.

Biologic Products

The U. S. Public Health Service name for a biologic product is included, in general, only where it differs from the USAN or the USP or NF name. Biologic products are licensed in accordance with the federal Public Health Service Act and comply with the regulations of the Center for Drugs and Biologics of the Food and Drug Administration.

Radioactive Pharmaceuticals

Since the radioactive pharmaceuticals are specially packaged in distinctive containers, labeled with the internationally recognized symbols for radioactivity, and available only to specially trained personnel, the USAN Council has agreed on the general principle that for these drugs the nonproprietary name should include the name of the basic compound serving as the carrier for the radioactivity, the symbol for the radioactive isotope, and the atomic weight (inasmuch as several radioactive isotopes of a given element may be in use).

Brand Names

Brand names in use in America for the compounds listed are generally shown. (The inclusion of trademarks herein is not to be regarded as indication that the marks necessarily have been registered with the U. S. Patent Office.)

The information on brand names for inclusion in this volume was made available principally from earlier editions; from current literature sources; and from the office of the Secretary of the USAN Council. No attempt is made to be exhaustive with respect to the inclusion of brand names. As a general principle, emphasis is on listing brand names of those domestic firms that have participated in the USAN program by sponsoring one or more compounds for which USAN have been selected. The inclusion of various brand names bears no relationship to, and is not intended to affect, any brand interchange requirements.

It should be noted that the pharmacologic and/or therapeutic category stated in an entry may not necessarily apply to every brand name listed in that entry; e.g., the category may pertain to one or more dosage forms whereas a particular brand name may represent such dosage form(s) or perhaps some other dosage form not contemplated by the stated category.

Usually a drug product has only one formulator and one labeler, which are one and the same firm; however, sometimes a single formulator produces a drug product for several labelers and sometimes a single labeler purchases a drug product from more than one formulator. While there is no general effort to make in this book a distinction between the formulator and the labeler of a product, it may be of interest to note that such information may in the future become a more generally available item of drug information.

Where a firm has indicated that it is distributor as distinct from manufacturer, its name is shown within brackets, e.g., "[Pharmacia]," in the entry on Somatropin.

Code Designations

Alphanumeric combinations frequently are used during the investigational phase required to demonstrate the utility of new, potentially therapeutic substances. The alphabetic portion of a code designation usually is identifiable with the institution or firm that assigns the code designation to the agent under test. For example, among the code designations commonly encountered are some that include the initials "NSC" (National Service Center of the National Cancer Institute, NIH). Code designations find their way into the scientific literature because it is customary to use them in identifying the compounds in early publications, often prior to adoption of a USAN.

To accommodate to computer sorting procedures, and thereby retain a more conventional sequence of entries, a few of the alphanumeric code designations in this edition have been modified by the insertion of a space between the alpha and the numeric character(s); e.g., "A5MP" becomes A 5MP, and "R19,317" becomes R 19,317.

Summary of Types of Information Provided

The individual entries in this volume comprise, in general, the following: (1) USAN (in **boldface** type), with year of its publication in brackets; (2) official names (usually of the drug substances as distinct from the dosage forms) from the current editions of the United States Pharmacopeia and the National Formulary (in **boldface** type), with some exceptions, e.g., combinations; (3) brand names; and (4) code designations. Appendixes II and III list International Nonproprietary Names (INN) for drugs not currently recognized in the U.S.A., and miscellaneous other nonproprietary names for drugs, respectively.

The statement of claimed pharmacologic and/or therapeutic activity is italicized in USAN entries and in entries for current USP and NF names. In the case of many new entries, the sponsors of the USAN may not have complete information insofar as all of the categories of activity are concerned. Comments aimed toward the attainment of greater uniformity and usefulness in the pharmacologic classification system used herein will be welcomed, particularly if they are supported by authoritative information.

Literature references (e.g., "AMA-DE"; "MI") are given in some entries solely as sources of possible further information about the compound, and do not imply any connection with the program for selection of nonproprietary names. [NOTE—See explanation of abbreviations on page 12.]

The names of the manufacturers currently or formerly concerned with the respective compounds are mentioned. Information that a manufacturer is no longer concerned with a compound will be gratefully received.

Further analysis of the content of this edition is given under *How to Use This Book*, on the inside front cover.

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It is particularly true that much of the work on the USAN program is hidden from view. The results, however, are shared by many, all of whom thus benefit from the labors of the few who give freely of time and effort and of others whose cooperation makes success possible. The continued willing cooperation from all segments of the pharmaceutical industry, which contributes immeasurably to the success of the USAN program as well as provides helpful information on the various entries throughout this book, is gratefully recorded.

M. C. G.

ABBREVIATIONS

AMA-DE	*AMA Drug Evaluations*, published by the American Medical Association
BAN	British Approved Name
BVC	British Veterinary Codex
CA	*Chemical Abstracts*, published by the American Chemical Society
CAS	Chemical Abstracts Service
CID	*CTFA Cosmetic Ingredient Dictionary*, published by The Cosmetic, Toiletry and Fragrance Association, Inc.
DCF	Dénomination Commune Française (French approved nonproprietary name)
FDA	Food and Drug Administration
INN	International Nonproprietary Name
JAMA	*Journal of the American Medical Association*
MI	*Merck Index*, published by Merck & Company, Inc.
ND	*New Drugs*, former publication of the American Medical Association
NF	National Formulary
NFN	Nordiska Farmakopénämden (Nordic Pharmacopoeia Council approved name)
NND	*New and Nonofficial Drugs*, former publication of the American Medical Association
NNR	*New and Nonofficial Remedies*, former publication of the American Medical Association
NSC	National Service Center, National Cancer Institute, National Institutes of Health
PHS	Public Health Service [United States]
USP	United States Pharmacopeia
USPC	The United States Pharmacopeial Convention, Inc.