29th EDITION

英文原版

多兰医学词典

DORLAND'S Illustrated MEDICAL DICTIONARY

100 YEARS IN PRINT

人民卫生出版社 Harcourt Asia Pte Ltd

29th
EDITION

DORLAND'S Illustrated MEDICAL DICTIONARY

人 民 卫 生 出 版 社
Harcourt Asia Pte Ltd

Dorland's Illustrated Medical Dictionary, 29th edition
W.B.Saunders Company
ISBN:0-8089-2186-X(International)

Authorized English language reprint edition published by the Proprietor.
Reprint ISBN: 981-4095-07-9

Harcourt Asia Pte Ltd.
583 Orchard Road, #09-01 Forum, Singapore 238884
Tel:(65) 7373593 Fax:(65) 7341874

图字：01-2001-2468

多兰医学词典（英文版）

编　　著：W. B. SAUNDERS COMPANY
出版发行：人民卫生出版社（中继线 67616688）
地　　址：（100078）北京市丰台区方庄芳群园 3 区 3 号楼
网　　址：http：//www. pmph. com
E－mail：pmph @ pmph. com
印　　刷：三河市富华印刷包装有限公司
经　　销：新华书店
开　　本：889×1194　1/16　　印张：132　插页：4
字　　数：9354 千字
版　　次：2001 年 8 月第 1 版　2001 年 8 月第 1 版第 1 次印刷
印　　数：00 001—4 000
标准书号：ISBN 7-117-04385-7/R·4386
定　　价：360.00 元

DORLAND'S Illustrated MEDICAL DICTIONARY

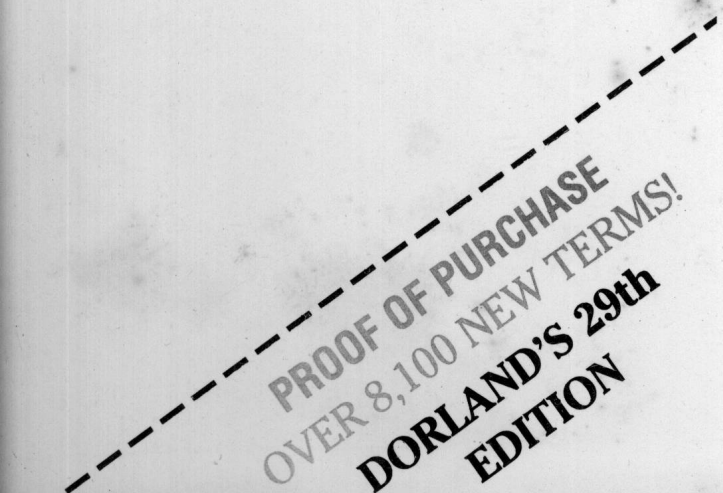
29th Edition

You are holding the world's best-selling medical dictionary.

For 100 years, *Dorland's* has mirrored the progress of the medical profession—providing practitioners and students with the terms, tools, and techniques they need to improve patient care, facilitate patient education, further research, and achieve success.

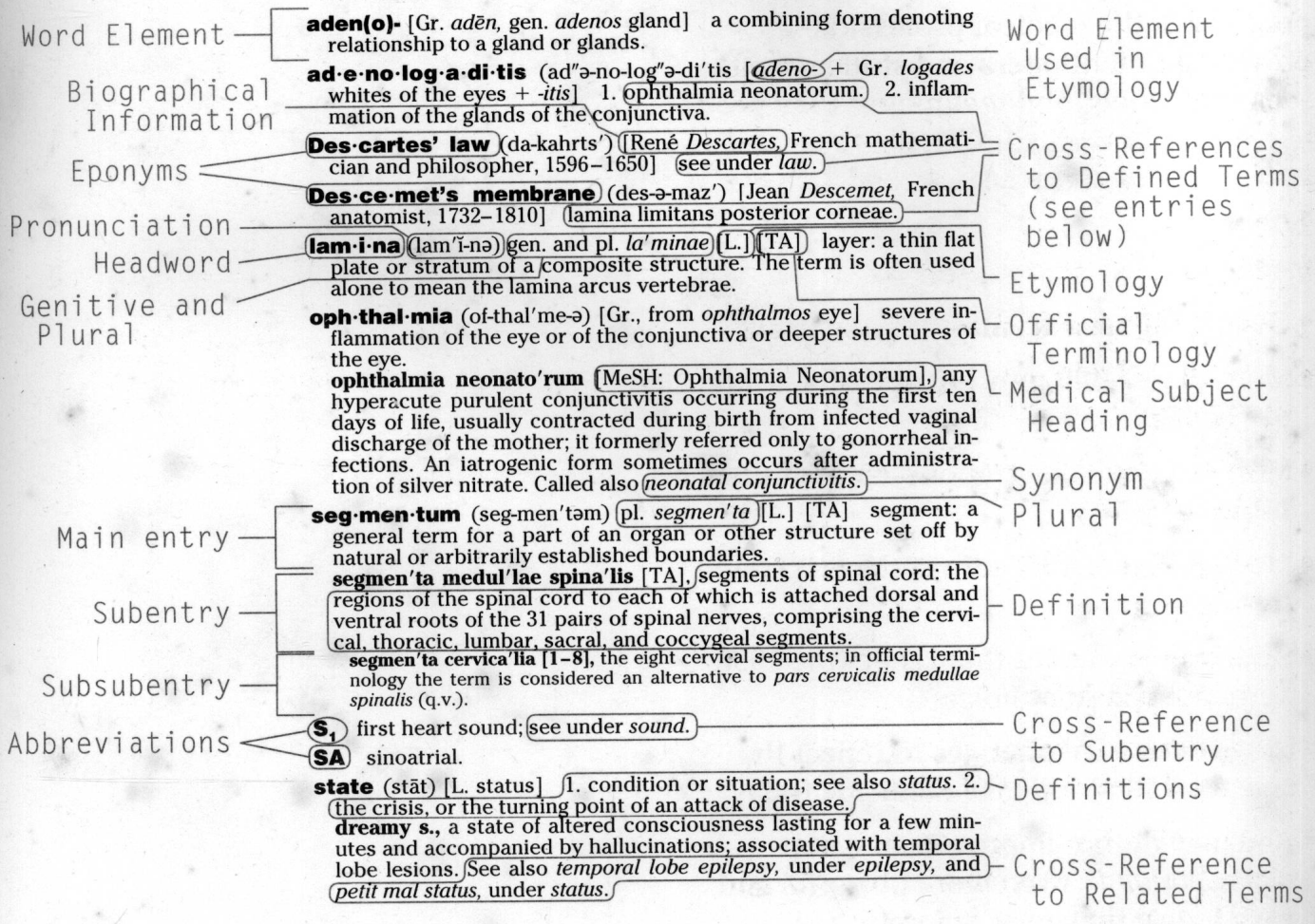
Inside this *29th Edition*, you''ll find...

- Over **8,100 new terms**—121,160 in all!
- More than **7,600 new entries**—for a total of 117,469!
- More than 820 illustrations—**566 of them brand new!**
- **Medical Subject Headings** *(MeSH)* added throughout.
- **Anatomical entries** that reflect the 1998 Terminologia Anatomica.
- **Comprehensive changes** to reflect the science and practice of medicine today.
- And many other improvements that make *Dorland's* even more powerful and easy to use than ever before!



Quick Guide to the Use of **Dorland's Illustrated Medical Dictionary**

For more detailed explanations, see "Notes on the Use of This Dictionary" beginning on page ix.



aden(o)- [Gr. *adēn,* gen. *adenos* gland] a combining form denoting relationship to a gland or glands.

ad·e·no·log·a·di·tis (ad″ə-no-log″ə-di′tis [*adeno-* + Gr. *logades* whites of the eyes + *-itis*] 1. ophthalmia neonatorum. 2. inflammation of the glands of the conjunctiva.

Des·cartes' law (da-kahrts′) [René *Descartes,* French mathematician and philosopher, 1596–1650] see under *law.*

Des·ce·met's membrane (des-ə-maz′) [Jean *Descemet,* French anatomist, 1732–1810] lamina limitans posterior corneae.

lam·i·na (lam′ĭ-nə) gen. and pl. *la′minae* [L.] [TA] layer: a thin flat plate or stratum of a composite structure. The term is often used alone to mean the lamina arcus vertebrae.

oph·thal·mia (of-thal′me-ə) [Gr., from *ophthalmos* eye] severe inflammation of the eye or of the conjunctiva or deeper structures of the eye.

ophthalmia neonato′rum [MeSH: Ophthalmia Neonatorum], any hyperacute purulent conjunctivitis occurring during the first ten days of life, usually contracted during birth from infected vaginal discharge of the mother; it formerly referred only to gonorrheal infections. An iatrogenic form sometimes occurs after administration of silver nitrate. Called also *neonatal conjunctivitis.*

seg·men·tum (seg-men′təm) pl. *segmen′ta* [L.] [TA] segment: a general term for a part of an organ or other structure set off by natural or arbitrarily established boundaries.

segmen′ta medul′lae spina′lis [TA], segments of spinal cord: the regions of the spinal cord to each of which is attached dorsal and ventral roots of the 31 pairs of spinal nerves, comprising the cervical, thoracic, lumbar, sacral, and coccygeal segments.

segmen′ta cervica′lia [1–8], the eight cervical segments; in official terminology the term is considered an alternative to *pars cervicalis medullae spinalis* (q.v.).

S_1 first heart sound; see under *sound.*

SA sinoatrial.

state (stāt) [L. status] 1. condition or situation; see also *status.* 2. the crisis, or the turning point of an attack of disease.

dreamy s., a state of altered consciousness lasting for a few minutes and accompanied by hallucinations; associated with temporal lobe lesions. See also *temporal lobe epilepsy,* under *epilepsy,* and *petit mal status,* under *status.*

PREFACE

"The aim of the author of this work has been to produce, in a volume of convenient size, an up-to-date Medical Dictionary, sufficiently full for the various requirements of all. . . . The book does not claim to be an encyclopedia; it is a dictionary, a concise and convenient word-book, aiming to furnish full definitions of the terms of medicine and kindred branches. . . . The author has sought a middle course between the large, unwieldy lexicon and the abridged students' dictionary, avoiding the disadvantages of each."

These excerpts from the Preface to the first edition of *The American Illustrated Medical Dictionary,* published in 1900, set forth the principles that have guided a succession of men and women who have worked on this book, both as *The American Illustrated Medical Dictionary* and, following Dr. Dorland's death in 1956, as *Dorland's Illustrated Medical Dictionary.* That *Dorland's* has remained in print for a century is witness to the care taken in ensuring that the essential attributes specified by its originator have been retained. It has, of necessity, grown appreciably over the years, owing to the vast and progressively rapid increase in medical and other scientific knowledge and in the body of vocabulary necessary to describe that knowledge. Balancing the need to include this growing vocabulary against the requirement of keeping the book to a convenient size, all the while updating the existing material, is a challenge that several generations of lexicographers have met successfully through what are now 29 editions.

The vast changes that have occurred in medicine during the 20th century are quickly apparent from a comparison of the original dictionary with the present volume; a handful of examples must suffice here. Immunology was still in its infancy (there is not even an entry for the term in the first edition); antibodies are described simply as "constituents of the blood and tissue-juices of animals rendered immune by inoculation . . ."; blood group antigens were discovered in the same year as the first edition's publication; and the term "allergy" had not yet been coined. A virus is "any animal poison, especially one produced by and capable of transmitting a disease"; filterable viruses would not make their first apearance until the seventh edition. What is now a large body of terms in the specialty of diagnostic imaging is confined primarily to entries for Röntgen rays, discovered only five years before the publication of the book, and skiagraphy ("the art or process of making skiagraphs or photographs by means of the Röntgen rays . . ."). Although entries can be found for aspirin, chloral hydrate, and vaccine, most of the drugs (not to mention entire classes of drugs) used today are absent from the first edition, and many of the drugs listed in the first edition gave only symptomatic relief rather than treating the underlying disease. Other differences between the books reflect changes in the users of the dictionary. In the first edition the etymologies were written with the assumption the user had studied the classical languages and could read Greek words written in Greek characters; this state of affairs continued for over half a century, until in the 23rd edition the Greek was transliterated in recognition of the fact that few people, aside from specialists in classical studies, were still studying ancient Greek.

Turning to the present edition, the most obvious change from the last edition is the addition of a large number of illustrations, bringing the total number of text illustrations and plates to nearly nine hundred. Most of the plates were redrawn for this edition to give them a cleaner, more modern appearance; some of the more crowded ones have been reorganized to improve the clarity of presentation. In all cases the illustrations have been chosen for the practical purpose of aiding the clarity of the definition of an entry and not simply for the sake of having an illustration. The appendices have been updated and reorganized (especially the tables of weights and measures and conversion tables, whose sections have been made easier to find), and a new appendix listing a large number of specific phobias has been added. In the Vocabulary, the format formerly used only for the "Table of Arteries," "Table of Ligaments," and the like, which we felt was easier to read for extremely long blocks of subentries, has been adopted for all long lists of subentries. As always, the entries themselves have been subjected to thorough and merciless revision, and over 8,000 entirely new terms have been added.

In the preparation of this edition, our consultants have performed a great deal of invaluable work in reviewing the entries, and we gratefully acknowledge the generous lending of their expertise. We are indebted to them for their assistance not only in revising existing entries, but also in selecting new terms for inclusion and deleting obsolete terms. The Appendices again include the "Reference Intervals for the Interpretation of Laboratory Tests"; we are grateful to William Z. Borer, M.D., for graciously allowing us to use it once more.

As in past editions, we have used a number of official and standard nomenclatures as guides: for anatomy, the *Terminologia Anatomica* as approved by the Federative Committee on Anatomical Terminology (1998); for enzyme nomenclature, the Recommendations of the Nomenclature Committee of the International Union of Biochemistry and Molecular Biology on the Nomenclature and Classification of Enzymes; for bacteriology, *Bergey's Manual of Systemic Bacteriology* and the ninth edition of *Bergey's Manual of Determinative Bacteriology;* for virology, *Virus Taxonomy: Sixth Report of the International Committee on Taxonomy of Viruses* (1995), together with the proposals approved at the Jerusalem (1996) and Strasburg (1997) ICTV meetings; for psychiatric terms, the *Diagnostic and Statistical Manual of Mental Disorders,* 4th Edition (DSM-IV) (1994), published by the American Psychiatric Association. Drugs are identified as being included in the twenty-fourth edition of the *United States Pharmacopeia (USP 24)* or the nineteenth edition of the *National Formulary (NF 19),* both official from January 1, 2000. The Medical Subject Headings given in the entries are from the 1999 Medical Subject Headings, which are created, maintained, and provided by the U.S. National Library of Medicine. We gratefully acknowledge our indebtedness to the compilers, editors, and publishers of these works, and we emphasize that any inaccuracies that may have arisen from our transcription or interpretation of this material are our sole responsibility.

We also thank the users of this dictionary who, over the years, have provided us with information, opinions, and innumerable suggestions. To them we owe a debt of gratitude; their ongoing interest in the book has helped to maintain *Dorland's* position as the preeminent, most authoritative, and best-selling medical dictionary.

DOUGLAS M. ANDERSON
CHIEF LEXICOGRAPHER

CONSULTANTS

Thomas E. Andreoli, MD
Professor and Chairman, Department of Medicine
University of Arkansas for Medical Sciences College of Medicine
Little Rock, Arkansas

Paul G. Barash, MD
Professor and Chairman, Department of Anesthesiology
Yale University School of Medicine
New Haven, Connecticut

Richard E. Behrman, MD
Clinical Professor of Pediatrics
Stanford University and University of California, San Francisco
Senior Vice President for Medical Affairs
Lucile Packard Foundation for Children's Health

George L. Blackburn, MD, PhD
Associate Professor of Surgery
Harvard Medical School
Director, Nutrition Support Service
Chief, Nutrition/Metabolism Laboratory
New England Deaconess Hospital
Boston, Massachusetts

Neil R. Blacklow, MD
Chairman, Department of Medicine
Professor of Medicine
University of Massachusetts Medical School
Worcester, Massachusetts

William Z. Borer, MD
Professor, Department of Pathology
Thomas Jefferson University
Director, Clinical Chemistry
Thomas Jefferson University Hospital
Philadelphia, Pennsylvania

George P. Canellos, MD, FACP, FRCP, DSc (hon)
William Rosenberg Professor of Medicine
Harvard Medical School
Medical Director, Network Development
Dana-Farber/Partners CancerCare
Physician, Brigham and Women's Hospital
Boston, Massachusetts

Sidney Cohen, MD
Richard Laylord Evans Professor of Medicine
Chairman, Department of Medicine
Temple University Health Sciences Center
Philadelphia, PA

M. Wayne Flye, MD, PhD
Professor of Surgery, Immunology, and Radiology
Washington University School of Medicine
St. Louis, Missouri

Raymond J. Fonseca, DMD
Dean, University of Pennsylvania School of Dental Medicine
Professor, Department of Oral and Maxillofacial Surgery
School of Dental Medicine
University of Pennsylvania
Philadelphia, Pennsylvania

Lester Haddad, MD, FACEP
Clinical Professor of Family Medicine
Medical University of South Carolina
Charleston, South Carolina
Clinical Professor of Emergency Medicine
Medical College of Georgia
Augusta, Georgia
Staff Physician, Memorial and St. Joseph's Hospital
Savannah, Georgia

John Bernard Henry, MD
Professor of Distinguished Service
Director of Pathology 200
Director, Transfusion Medicine
Attending Pathologist
State University of New York Health Science Center at Syracuse
Syracuse, New York

Donald R. Hoover, MPH, PhD
Associate Professor, Department of Statistics
Institute for Health Care Policy and Aging Research
Rutgers University
Piscataway, New Jersey

David T. John, PhD
Professor of Microbiology and Parasitology
Associate Dean for Basic Sciences and Graduate Studies
Oklahoma State University College of Osteopathic Medicine
Tulsa, Oklahoma

Jeffrey N. Katz, MD
Associate Professor of Medicine
Harvard Medical School
Brigham and Women's Hospital
Boston, Massachusetts

Michael Kienzle, MD
Associate Professor of Medicine
Office of the Vice President for Research
The University of Iowa
Iowa City, Iowa

Robert W. Kirk, DVM, Dipl. ACVIM, ADVD
Professor of Medicine Emeritus
College of Veterinary Medicine
Cornell University
Ithaca, New York

Juha P. Kokko, MD, PhD
Asa G. Candler Professor and Chairman
of Medicine
Associate Dean for Clinical Research
Emory University School of Medicine
Atlanta, Georgia

William L. Meyerhoff, MD, PhD
Professor and Chairman
Arthur E. Meyerhoff Chair in Otolaryngology—Head and
Neck Surgery
The University of Texas Southwestern Medical Center at
Dallas
Dallas, Texas

J.P. Mohr, MD
Sciarra Professor of Clinical Neurology
College of Physicians and Surgeons of Columbia University
The Neurological Institute, Columbia Presbyterian Medical
Center
New York, New York

B. Keith Moore, PhD
Professor of Dental Materials
and Director of the Dental Materials Laboratory
Department of Restorative Dentistry
Indiana University School of Dentistry
Indianapolis, Indiana

Keith L. Moore, PhD, FIAC, FRSM
Professor of Anatomy and Cell Biology
Faculty of Medicine, University of Toronto
Toronto, Ontario, Canada
Member of the Federative Committee on Anatomical
Terminology of the International Federation of
Associations of Anatomists

Carl E. Ravin, MD
Professor and Chairman
Department of Radiology
Duke University Medical Center
Durham, North Carolina

David J. Skorton, MD
Professor of Medicine, Electrical and Computer Engineering
and Biomedical Engineering
Vice President for Research
The University of Iowa
Iowa City, Iowa

G. Thomas Strickland, MD, PhD
Professor of Epidemiology and Preventive Medicine,
Microbiology and Immunology, and Medicine
Director, International Health Program
University of Maryland School of Medicine
Senior Associate, Department of Immunology and Infectious
Diseases
Johns Hopkins School of Public Health
Baltimore, Maryland

Steven E. Weinberger, MD
Chief, Pulmonary and Critical Care Division
Associate Chairman for Education, Department of Medicine
Beth Israel Deaconess Medical Center
Harvard Medical School
Boston, Massachusetts

Sam W. Wiesel, M.D.
Professor and Chairman, Department of Orthopaedic
Surgery
Georgetown University Medical Center
Washington, DC

Main Entries and Subentries

Main entries appear in boldface type, with bullets indicating syllabication. Terms consisting of two or more words are ordinarily given as subentries under the noun, as is traditional in medical dictionaries; subentries are also set in boldface type, and each is set on a new line and followed by a comma. Although this arrangement may be confusing at first to those accustomed to general dictionaries, it has the advantage of allowing related terms to be grouped together (for example, all the *lymphocyte* entries appear under the main entry *lymphocyte*).

According to this scheme, *Howell-Jolly bodies, ketone bodies,* and *pineal body* are all to be found under the main entry *body,* and *carotid pulse, dicrotic pulse,* and *paradoxical pulse* are to be found under the main entry *pulse.* It is important for the user to bear in mind that it is impossible to provide entries for every variation of every term, so that a phrase that is not found under one main entry should be sought under a synonymous main entry. For example, the same entity may be described as a disease or a syndrome (as *Fabry's disease—Fabry's syndrome,* which is to be found under *disease*) or as a sign or a phenomenon (as *Gowers' sign—Gowers' phenomenon,* which appears under *sign*). In such cases, the main entry should be consulted for references to synonymous terms under which the desired phrase may be found.

Example:

treat·ment . . . the management and care of a patient for the purpose of combating disease or disorder. See also under *care, maneuver, method, technique, test,* and *therapy.*

In subentries, the main entry word is represented only by the initial letter, e.g., *cogwheel r.* under *respiration,* unless it occurs in the plural form. Regular English plurals are represented by the initial letter followed by *'s,* as *b's* for *bones* under *bone.* Irregular plurals, such as *teeth* under *tooth,* and Latin plurals, as *foramina* under *foramen,* are spelled out in full.

Chemical Compounds

Exceptions to the use of subentries are made for specific acids and for enzymes and enzyme deficiencies. Names of specific acids will be found as main entries under the first word of the name, e.g., *sulfuric acid* under *S,* as will enzyme names, e.g., *alkaline phosphatase* under *A.* Enzyme deficiencies will be found as main entries immediately following the entry for the enzyme in question, e.g., *carbamoyl phosphate synthetase deficiency* after *carbamoyl phosphate synthetase.*

Chemical compounds embodying the name of an element will be found as subentries under the element; for example, *aluminum acetate, aluminum hydroxide,* and *aluminum sulfate* are all located under *aluminum.* Chemical compounds that begin with the adjectival form denoting valence will be found under the salt or ester, e.g., *ferric citrate* under *citrate.*

Drug Names

Drugs are to be found under the active moiety, if that is a main entry. For example, *prednisolone acetate, prednisolone hemisuccinate,* and *prednisolone sodium phosphate* all appear under *prednisolone.* If the active moiety is not itself a main entry, then the entire drug name appears as a main entry, e.g., *methadone hydrochloride* under *M.*

Syllabication

Acceptable word divisions are indicated for main entries by the use of bullets within the entry word; syllabication is based on pronunciation. Not all syllable breaks are given; for example, the separation of a single vowel from the beginning or end of a word is not allowed and is not shown. Likewise, single letters should not be separated from the word elements to which they belong in compound words. In many cases a word may be broken at places other than the ones indicated; for example, different pronunciations imply different sets of breaks, so that *melanocyte* could be divided *mel·a·no·cyte* or *me·lano·cyte,* depending on which syllable, the first or second, is stressed. In any case, breaks that could confuse a reader as to the meaning of a word are to be avoided.

Sequence of Entries

Main Entries

Main entries will be found alphabetized on the sequence of letters, regardless of spaces or hyphens that may occur between them. (Special rules govern terms that begin with proper names, which are mainly eponyms; see below.) Thus the following sequences will be found:

formboard
form-class
forme
form-family
heart
heartbeat
heart block
heartburn

Subentries

Subentries, like main entries, are alphabetized letter by letter. The main entry word, whether it is represented by the initial letter, the initial plus *'s,* or a spelled-out plural, is ignored in alphabetizing subentries, as are prepositions, conjunctions, and articles. Inflected forms, such as genitives and plurals of Latin words, are treated as if they were nominative singular. (For what is meant by "inflected forms," see "Presentation of Plurals and Other Inflections," page xi.) The following forms, all from *os craniale* "cranial bone," are considered equivalent for purposes of alphabetization: *os craniale, ossis cranialis, ossa cranialia,* and *ossium cranialium.*

In accordance with the above rules, the following sequences of subentries are found under *ganglion* and *prolapse:*

ganglion
Andersch's ganglia
ganglia aorticorenalia
auditory g.
Auerbach's g.
g. autonomicum

prolapse
anal p.
p. of anus
p. of the cord
frank p.
p. of the iris

A special case is that of what may be called inverted subentries, in which the initial word or words are moved to the end of the entry, set off by a comma. This is done in order to allow related terms to fall together in the subentry list; such inversions are especially common in the anatomical vocabulary for anterior/posterior structures and the like. These terms are alphabetized as usual up to the comma marking the inversion; words following the comma, however, are not counted except within the group of repeated entries:

lobe
inferior l., left
inferior l., right
inferior l. of lung, left
inferior l. of lung, right

Proper Names

A number of main entries are included for terms beginning with a proper name, usually eponymic terms; these give information about the term's origin (most often a bit of biographical information) and cross references to entries where definitions may be found. These cross references can be helpful in giving an indication of where to look for an entry that may go by more than one name (such as disease or syndrome). Entries of this sort are alphabetized as entries for the proper name only, following this set of rules:

(1) The *'s*, if one occurs, is never counted for alphabetization. *Addison's planes* precedes *addisonian.*
(2) Words following the name are not counted for alphabetical order unless the names are the same. Thus, *Addison's disease* precedes *Addison's planes.*
(3) Only the first name in a term containing more than one proper name is counted for alphabetization unless the entries are the same in all other respects. *Babinski's reflex, Babinski-Fröhlich syndrome, Babinski-Nageotte syndrome, Babinski-Vaquez* syndrome appear in that order.
(4) Umlauts (*ö, ü*) are ignored for purposes of alphabetization. *Löwe's ring, Lowe's syndrome, Lowe-Terry-MacLachlan syndrome, Löwenberg's canal, Löwenthal's tract, Lower's rings* appear in that order.
(5) Names beginning *Mac* or *Mc* are alphabetized as if spelled *Mac.*

Subentries that begin with a proper name also follow the above rules for sequencing.

Proper nouns (or capitalized entries) appear before common nouns (or lower case entries). Thus *Bacillus* precedes *bacillus.*

Chemical Terms

In the alphabetization of chemical names, italic prefixes (e.g., *o-, p-, m-, trans-, cis-*) are ignored, as are numbers, Greek letters, and the prefixes D-, L-, *d-, l-,* (+)-, and (−)-. When a prefix is spelled out, however, the term is to be found under the fully spelled out form, for example, *levodopa* under *L, orthocresol* under *O,* and *beta-naphtholsulfonic acid* under *B.*

Indication of Pronunciation

A phonetic spelling of a term appears in parentheses after the boldface entry word. The pronunciation is given for all main entries; it is generally not given for subentries but does appear in some subentries that are foreign phrases. As a rule, the most common pronunciation is given, with no effort to list the variants, although exceptions to this do occur. The phonetic spelling is kept as simple as possible, with few diacritical marks; the only special character used is ə, the schwa, used to represent the unstressed vowel sound heard at the end of *sofa.* The schwa is also used in combination with *r* to represent the sound heard in *fur* and the second syllable of *other.* This combination may be found in both stressed and unstressed syllables.

There are four basic rules:

(1) An unmarked vowel ending a syllable (an "open" syllable) is long. Thus *ma* represents the pronunciation of *may.*
(2) An unmarked vowel in a syllable ending in a consonant (a "closed" syllable) is short. Thus *not* represents the pronunciation of *knot.*
(3) A long vowel in a closed syllable is indicated by a macron. Thus *māt* represents the pronunciation of *mate.*
(4) A short vowel that ends or itself constitutes a syllable is indicated by a breve. Thus *ĭ-mūn′* represents the pronunciation of *immune.*

Primary (′) and secondary (″) stresses are shown in polysyllabic words, with unstressed syllables followed by hyphens, as in *rep″lĭ-kā′shən.* Monosyllables, even when part of a compound term, have no stress mark, as in *bens jōnz.* Primary stresses are also given as part of the boldface subentries for foreign phrases.

It is impossible with *Dorland's* simplified phonetics to represent the native pronunciations of many foreign words and proper names. These are shown as closely as possible in English phonetics.

Pronunciation Guide

Vowels

(For the use of breves and macrons, see the four rules above.)

ə	sof*a*	ŏ	got
ā	m*a*te	ū	f*u*el
ă	b*a*t	ŭ	b*u*t
ē	b*ea*m	aw	*a*ll
ĕ	m*e*t	oi	bo*i*l
ī	b*i*te	o͞o	b*oo*m
ĭ	b*i*t	o͝o	b*oo*k
ō	h*o*me	ou	f*ow*l

Consonants

b	*b*ook	h	*h*eat
d	*d*og	j	*j*ewel, *g*em
f	*f*og	k	*c*art, pi*ck*
g	*g*et	l	*l*ook

m	*m*ouse	ch	*ch*in
n	*n*ew	ks	si*x*
p	*p*ark	kw	*qu*ote
r	*r*at	ng	si*ng*
s	*s*igh	sh	*sh*ould
t	*t*in	th	*th*in, *th*an
w	*w*ood	zh	measure
z	size, pha*s*e		

Presentation of Plurals and Other Inflections

In main entries for foreign (nearly always Greek or Latin) nouns, the original and anglicized plurals are given after the phonetic spelling; irregular plurals of English nouns are also given.

Example:

sto·ma (sto′mə) pl. *stomas* or *sto′mata* . . .

tooth (tooth) pl. *teeth* . . .

The original foreign plural is often given a separate boldface listing in its proper alphabetical place in the vocabulary.

Example:

sto·ma·ta (sto′mə-tə) [Gr.] plural of *stoma.*

Latin is used, especially in anatomy, to form phrases of the type "the X of Y," for example, *arcus aortae,* "the arch of the aorta." The prepositional phrase introduced by "of" corresponds to the Latin genitive case (*aortae* "of the aorta," from *aorta*). For this reason, the genitive case (= English "of") for Latin nouns is also frequently given, introduced by the abbreviation *gen.*

Examples:

pa·pil·la . . . gen. and pl. *papil′lae* . . .

os[1] . . . gen. *o′ris,* pl. *o′ra* . . .

os[2] . . . gen. *os′sis,* pl. *os′sa* . . .

Latin and Greek (and a number of other languages, such as German and Russian, for that matter) are said to be inflected, that is, words change form to show how they are related to other words in a sentence. An example of this is the "aortae" phrase given above, where the change in the ending of the word corresponds to the use of the English preposition "of." Other Latin inflected forms are found in subentries; these forms will be the objects in a prepositional phrase. For example, under the main entry *fissura,* there is the subentry *f. in ano; ano* is the object of the preposition *in* and is one of the half dozen or so different inflected forms of *anus,* which is a main entry in the Dictionary and has listed with it the genitive and plural form *ani.* As in all subentries, differences in singular and plural forms do not count for alphabetizing, nor do prepositions or conjunctions (e.g., *et* "and," *in* "in"); thus under the main entry *fissura,* the subentry *f. in ano* precedes *f. antitragohelicina.*

Etymology

Information on the origin of a word appears in brackets after the phonetic spelling or a plural form of the entry when that is given. The information is necessarily brief, and the reader must often reason from the etymon, the original word from which other words are derived, to the meaning. For example, for the main entry *dualism* the etymological section reads [L. *duo* two]. L. stands for Latin (languages are either abbreviated or spelled out; see "Abbreviations Used in This Dictionary," p. xiii). The word *duo* is the etymon, and "two" is the English translation of the etymon, not of the entry. The reader proceeds from *duo* to *dual* to *dualism.* Furthermore, space limitations preclude the listing of all the stages in the passage from the etymon to the modern derivative (i.e., the entry). For example, the etymological part of the entry for *vein* is simply [L. *vena*]; in full, it would be [Middle English *veine,* from Old Fr., from L. *vena*].

For those foreign words or phrases taken into English entire, only the language is given, with a translation given within quotation marks.

Example:

déjà vu [Fr. "already seen"] . . .

If the meaning of the foreign word or phrase is the same as that of the entry word, no translation is given.

There are four further additions:

(1) As a guide to related vocabulary, especially for anatomical terms, the main entry may be followed in brackets by its Greek or Latin equivalent (or both).

Example:

kid·ney . . . [L. *ren;* Gr. *nephros*]

(2) Many technical terms of Greek or Latin derivation are listed twice as main entries (and both times with etymology, meaning, and cross references), first as an independent word, then as a combining form, e.g., *ectomy* and *-ectomy.*

(3) There is an essay, "Fundamentals of Medical Etymology" (see p. xiv), which explains the basic rules for the derivation and composition of Greek, Latin, and Greco-Latin terms in medicine. At the end of the essay there is an analytical word list of Greek and Latin roots, prefixes, and combining forms; the list is an aid for the analysis of existing medical terms and the creation of new ones.

(4) The prefixes (e.g., *hyper-, hypo-*), suffixes (e.g., *-ia, -oid*), and combining forms (e.g., *actino-, -emia*) from the analytical word list are also listed as main entries in the vocabulary.

Official Publications

Certain terms listed in official publications are identified by an abbreviation in brackets. In main entries, these abbreviations usually appear after the etymology (or after the phonetic spelling if no etymology is given). In subentries, they appear immediately after the boldface subentry word. When a term has more than one meaning, the abbreviation is placed at the beginning of the definition to which it applies. The following abbreviations are used:

[DSM-IV]	*Diagnostic and Statistical Manual of Mental Disorders* of the American Psychiatric Association, 4th edition, 1994
[EC]	Enzyme Commission number (e.g., citrate (*si*)-synthase . . . [EC 4.1.3.7]) from the Recommendations of the Nomenclature Committee of the International Union of Biochemistry and Molecular Biology on the Nomenclature and Classification of Enzymes published in *Enzyme Nomenclature* (1992)
[TA]	*Terminologia Anatomica* (1998)
[NF]	*The National Formulary,* 19th edition (2000)
[USP]	*The United States Pharmacopeia,* 24th edition (2000)

Medical Subject Headings

Medical Subject Headings (MeSH) and tree numbers are given for a number of terms. In some cases, the Medical Subject Heading is also given on synonyms for such terms; in the interest of conserving space, these are generally confined to MeSH synonyms.

Placement of Definitions and Cross References

With few exceptions, a definition is given in only one place for two or more synonymous terms. Entries for the synonyms provide cross references to the term where the definition is to be found. Such cross references are in place of a definition and are set in roman type:

mas·to·plas·ty (mas′to-plas″te) mammaplasty.

The definition will be found at *mammaplasty.* In many cases, a list of synonyms is given at the end of the entry where the definition appears. This list is introduced by the phrase "called also" and the synonyms are set in italic type.

Cross references from one subentry to another subentry under the same main heading use the abbreviated form of the main entry:

syndrome
hypersomnia-bulimia s., Kleine-Levin s.

Cross-referencing has also been used for earlier terms that have been supplanted and for variant spellings of a term. In such instances, the definition is attached to the term that is currently the preferred term. A word of warning is, however, warranted here. In some instances, preference for one term over another may be slight or even nonexistent, while in others, different spellings or terms may be preferred by different authorities, by different specialties, or in different regions. In such cases, the practice of defining words only at one place has been adhered to as a means of keeping down the size of the Dictionary by avoiding duplication of definitions, and the user should remember that the appearance of a cross reference or definition does not always indicate a preference for one form or synonym over another.

Related Entries

Cross references to related entries or to entries where additional information may be found are also given. They are identified by "see also," "cf.," and "q.v." (or "qq. v."). (For the abbreviations, see "Abbreviations Used in This Dictionary," page xiii). Cross references introduced by "see also" or "cf." are set in italic type.

Official Terminology

In general, when a term is included in one of the official publications listed in the preceding section ("Official Publications"), its definition appears at the official term. Thus the definition for "pelvic bone" is found at *os coxae;* a cross reference to the official term is found at the subentry under *bone.* Exceptions have been made in a few cases where the nonofficial term is so common or important that it makes the most sense to put the definition on the unofficial term (for example, *heart* is defined, not *cor*).

Entries Containing a Proper Name

Entries containing a proper name are generally entered twice. The definition for the entity is given in a subentry under the appropriate main entry, as *Down syndrome* under *syndrome.* Biographical, geographical, or other information attached to the proper name is given in a main entry (see "Proper Names" in the section "Sequence of Entries," p. x). A cross reference is given from the main entry for the proper name to the subentry where the term is defined. For example:

Down syndrome (disease) (down) [John Langdon Haydon *Down,* English physician, 1828–1896] see under *syndrome.*

Form of Eponyms

The use of the possessive form ending in *'s* for eponyms is becoming progressively less common, and the entries for eponymic terms in this Dictionary reflect this ongoing change in usage. The Dictionary therefore presents an inconsistent mixture of forms. The user should be aware that although the use of the nonpossessive form is increasingly common, it is by no means universal. (The user should also be aware that some terms, such as *Apgar score,* have never had an *'s* and that for some terms, such as *Christmas disease* and *Down syndrome,* the nonpossessive form is actually preferred.) The variation in forms seen in the Dictionary is thus only a reflection of change and *not* a prescription for the use of possessive and nonpossessive forms.

Symbols and Abbreviations

Symbols, abbreviations, and acronyms are included as main entries; definitions consist of the term for which the symbol or the abbreviation stands, with a translation if the term is in a foreign language. These terms will usually be found at the appropriate places in the vocabulary; some terms, however, are self-explanatory and have no entry, such as the names of organizations and phrases like the following:

q.h. abbreviation for L. *qua'que ho'ra,* every hour.

In a few cases, the definition is placed at the abbreviation or acronym instead of at the term for which it stands, e.g., *ELISA;* in such cases, the abbreviation, not the term, is what is actually in use.

Abbreviations appear both with and without periods. This should not be taken to denote proper usage, since abbreviations may appear either way; at the present the trend is away from the use of the period for most abbreviations.

A list of selected abbreviations also appears in Appendix 1.

Abbreviations Used in This Dictionary

a.	artery (L. *arteria*); agar
aa.	arteries (L. *arteriae*)
ant.	anterior
Ar.	Arabic
A.S.	Anglo-Saxon
c.	about (L. *circa*)
cf.	compare (L. *confer*)
def.	definition
dim.	diminutive
EC	Enzyme Commission
e.g.	for example (L. *exempli gratia*)
Fr.	French
gen.	genitive
Ger.	German
Gr.	Greek
i.e.	that is (L. *id est*)
inf.	inferior
It.	Italian
L.	Latin
l.	ligament (L. *ligamentum*)
ligg.	ligaments (L. *ligamenta*)
lat.	lateral
m.	muscle (L. *musculus*)
med.	medial; median
mm.	muscles (L. *musculi*)
n.	nerve (L. *nervus*)
neg.	negative
NF	National Formulary
nn.	nerves (L. *nervi*)
obs.	obsolete
pl.	plural
Port.	Portuguese
post.	posterior
qq. v.	which (things) see (L. *quae vide*)
q.v.	which see (L. *quod vide*)
sing.	singular
Sp.	Spanish
sup.	superior
TA	Terminologia Anatomica
USAN	United States Adopted Names
USP	United States Pharmacopeia
v.	vein (L. *vena*)
vv.	veins (L. *venae*)

FUNDAMENTALS OF MEDICAL ETYMOLOGY

By Joseph M. Patwell, PhD

Twenty-six hundred years ago the Asiatic Greeks of Ionia and the Italian Greeks in Magna Graecia began the speculative and investigational sciences, pushing the then Greek to its limits, pushing beyond those limits, riveting new meanings onto old words, smithing new words for new ideas and discoveries—*philosophia,* "the love of wisdom," was supposedly first used by Pythagoras.

The sciences still go their robust way, iconoclastic but also indebted to and respectful of their ancient tradition. In anatomy, surgery, clinical medicine, and laboratory medicine, Greek, Latin, and Greco-Latin have always formed well over ninety per cent of the technical terms. Knowing the fundamentals of Greek and Latin word formation is immensely helpful in learning the vocabulary of modern medicine or of any modern science and is absolutely necessary for anyone coining a word for a new hypothesis, theory, process, or entity. The purpose of this introduction is to present those fundamentals in as practical and concise a form as possible; any statements contrary to historical and comparative linguistic fact that are made in the following pages are deliberate in keeping with this purpose.

Alphabet and Pronunciation

The Latin alphabet is a modification of one of the many Greek alphabets. The order and shape of the Latin letters is the same as ours except that the Classical Latin alphabet has no *j*, *u*, or *w*, which are improvements dating from the Middle Ages.

The consonants of the Latin alphabet have about the same values as the English except that *c*, *ch*, *g*, *s*, *t*, and *v* are pronounced as in *c*old, *ch*rome, *g*et, *s*o, *t*in, and *w*ine, and not as in *c*ent, *ch*ill, *g*em, ro*s*e, men*t*ion, and *v*ine. *Ph* and *th* may be pronounced as in *ph*ilosophy and *th*eology.

Latin vowels may be long or short. The short vowels are pronounced very much like the American w*a*nder, b*e*d, *i*t, h*o*pe, and p*u*t; short *y* sounds like the *ü* in German *dünn.* The long vowels are pronounced as in *a*ther, h*e*y, mar*i*ne, st*o*ve, and r*u*de; long *y* is pronounced like the *ü* in the German *über.*

Words are stressed on the next-to-last syllable, called the penult, if that syllable contains a long vowel or diphthong or is followed by two or more consonants, otherwise on the syllable before the penult.

The Greek alphabet used today is based on that used in Athens by the end of the fifth century B.C. The accompanying table shows one modern English pronunciation of each ancient Greek character in terms of English.

Capital	Small Letter	Sound	Name	Transcription
A	α	*a*rchaic	alpha	a
B	β	*b*arbarism	beta	b
Γ	γ	*g*rammar	gamma	g
Δ	δ	*d*ogma	delta	d
E	ε	*e*lephant	epsilon	e
Z	ζ	*z*oology	zeta	z
H	η	*a*ir	eta	ē
Θ	θ, ϑ	*th*eist	theta	th
I	ι	mach*i*ne	iota	i
K	κ	s*k*eleton	kappa	c (Latin), k (Dorland's)
Λ	λ	*l*ithograph	lambda	l
M	μ	*m*usic	mu	m
N	ν	*n*eolithic	nu	n
Ξ	ξ	e*x*egesis	xi	x
O	ο	*o*belisk	omicron	o
Π	π	*sp*asm	pi	p
P	ρ	*a*rachnid	rho	r
Σ	σ, ς	*s*ymbol	sigma	s
T	τ	s*t*adium	tau	t
Y	υ	ü, über (German)	upsilon	y
Φ	φ	*ph*oto	phi	ph
X	χ	Ba*ch* (German)	chi	ch
Ψ	ψ	di*ps*omania	psi	ps
Ω	ω	*o*cher, Sh*aw*	omega	ō

The vowels are α, ε, η, ι, ο, υ, ω, most of which may be followed by ι or υ to form diphthongs, the most common of which are shown below.

Diphthong	Sound	Transcription
αι	*ai*sle	ae, e, or ai
αυ	*ou*t	au
ει	*ei*ght	i or ei
ευ	*eu*phony	eu
οι	p*oi*son	oe, e, or oi
ου	gh*ou*l	ou or u
υι	*sui*te	ui, l*ui* (French)

Transliteration

The Romans transliterated kappa with *c*, not *k*, and chi with *ch*, not *kh*; thus *ch*aracter, not *kh*arakter. This Dictionary transliterates kappa with *k* in its etymologies in order to make immediately clear the nature of the underlying Greek sound: Spelling *cystis* for *kystis,* cyst, could cause doubt whether the sound was "kystis" or "systis." Similar difficulties with chi are less likely, and therefore *Dorland's* retains the traditional *ch*; hence our etymological spelling is *charakter.*

Classical Greek ει was pronounced as in *skein,* but by the end of the fourth century B.C. it was pronounced as in *seize;* thus the city that Alexander the Greek founded in Egypt, *Alexandreia,* became Alexandria in Latin. English generally prefers the Latin transliteration, but the use of *ei* for ει is growing. This Dictionary transliterates ει with *ei* in its etymologies.

The Romans transliterated Greek αι and οι with their own *ae* and *oe*, which had nearly the same pronunciation. By late antiquity the Greek and Latin diphthongs had become simple vowels, having gone through the regular progression *ai*sle to *ai*r to *ai*m, and the spelling wavered between the old diphthongs and the new pronunciation. This vacillation persists in English: the British prefer the diphthongs (*oe*dema, h*ae*morrhage); the Americans, the simple vowel (*e*dema, hemorrhage). In official nomenclature, e.g., the *Terminologia Anatom-*

ica, the *Index nominum genericorum (plantarum),* and the *International Code of Nomenclature of Bacteria,* the official orthography fluctuates from edition to edition, swinging from *oesophagus* to *esophagus* and *Haemophilus* to *Hemophilus* and back again. In the etymologies of this Dictionary Greek αι and οι are transliterated by *ai* and *oi*, and Latin *ae* and *oe* retained, for clarity's sake.

The Greeks especially but also the Romans had the same troubles with aitch *(h)* that Cockneys do, dropping it where it belonged and adding it where it did not. In Greek, initial *h-* ordinarily remained in simple words (*haima,* blood) but would either assimilate with or disappear before a prefix. For assimilation, *hypo* and *haima* make *hyphaimos,* suffused with blood (first appearing in Hippocrates); for disappearance, *a-, an-* and *haima* make *anaimia,* anemia (first appearing in Aristotle), not *ahaimia* and *ahemia.*

Latin usually preserved initial *h-* even after prefixes *(homo habilis, habilitas, inhabilitas; honor, honestus, inhonestus),* but very much of our Latin has come through French with inconsistent (to say the least) spellings and pronunciations: *able, ability* and *inability,* not *hable, hability,* and *inhability; honor* and *honest,* not *onor* and *onest.*

Speakers of American English generally have no difficulty with *h-* and treat it as a full consonant when adding prefixes; thus we have *inharmonious,* not *anarmonious; ahaptoglobinemia,* not *anaptoglobinemia;* and *anhydride,* not *anydride* or *ahydride.*

Greek words are written with several accents that now indicate the stressed syllable. Words beginning with a vowel, diphthong, or rho (ρ) are written with a so-called breathing mark over the initial vowel or rho or over the second element of the diphthong (ἑτεροδοξία, *heterodoxia;* αἰσθητικός, *aisthētikos;* ῥυθμός, *rhythmos*). The *rough* breathing mark (῾) indicates that the syllable begins with an aspiration (aitch) as in *heterodoxia,* above, and words beginning with the rough breathing are usually transcribed into English with an initial *h.* Words beginning with a rho or an upsilon always have a rough breathing (ὑπέρ, *hyper;* ῥεῦμα, *rheuma*). The smooth breathing (᾽) shows the absence of aspiration and so has no effect on pronunciation (ἀρωματικός, *arōmatikos;* αὐτογράφος, *autographos*).

The other conventions for transliterations from Greek are as follows: Gamma (γ), which before gamma (γ), kappa (κ), chi (χ), or xi (ξ) has the sound of *n* as in *finger,* is transcribed as *n.** Initial *rho* and its rough breathing (ῥ) are transcribed as *rh* not *hr,* as *rheuma,* above; double *rho* (ρρ) is transcribed as *rrh* (διάρροια, *diarrhoea, diarrhea*). *Upsilon* (υ) is transcribed as *y* (ῥυθμός, *rhythmos*) except in diphthongs, where it is reproduced by *u* (ῥεῦμα, *rheuma*).

A few Greek words have come into English unchanged (σκελετόν, *skeleton;* αὐτόματον, *automaton*); most Greek words have passed into English through Latin, undergoing slight change (Greek στέρνον, *sternon;* Latin *sternum*); and some Greek words have passed through a secondary intermediary language, such as French, with still further change (Greek χειρουργία, *cheirourgia;* Latin *chirurgia;* French *cirurgerie;* English *surgery*). Other changes are accounted for by our tendency to drop Greek and Latin inflectional endings (ἀξίωμα, *axioma,* becomes axiom; *dorsalis* becomes dorsal) or replace them with a final mute *e* as if the words had come into English through French (γονοφόρος, *gonophoros,* becomes gonophore; *spina* becomes spine).

Word Formation

The most frequent, the most important, and the seemingly most capricious changes in Greek or Latin words (or in English words, for that matter) arise not when the words pass from Greek or Latin into English, but when these words are first formed in the original language.

Many words in English and nearly all words in the Classical languages are combinations of roots and affixes. The root of a word contains the basic, lexical meaning, and the affixes give the root its shape as a word. (Affixes for the most part are prefixes and suffixes, including the inflections, added before or after the root, respectively.)

For example, in the English *love, loves, lover, lovers, loving, loved, lovingly, unloved,* and *unlovable,* the root is *love,* and the various prefixes *(un-)* and suffixes (*-s, -r, -r-s, -ing, -ing-ly,* etc.) form the foot into a word and modify that word for use in an utterance.

In English a root may very often function as an independent word, as *love, hate, smile, frown, milk;* these "root words" are extremely rare in the Classical languages. Nearly always in Latin and Greek, and usually in English, a word is a complex consisting of a form of a root and one or more affixes, which are not independent words themselves but may be used only to modify the root in some way (as *un-, -er, -ed*); such words are called "derived words."

When the root remains unchanged from derived word to derived word (a "regular" or "weak" root) and the affixes remain unaffected in their surroundings, the entire system of derived words has a transparent, instantly comprehended simplicity, as in *love* and its forms. So in Latin and Greek: there is a systematic clarity to the derivations of the Latin root *laud-* (praise)—the nouns *laudis* and *laudator* (praise, praiser); the principal parts of the regular verb, *laudo* (I praise), *laudare* (to praise); and the adjectives *laudabilis* and *laudatorius* (laudable, laudatory). There is also a regular system in the Greek root *pau-* (stop): the nouns *pausis* (pause) and *paustēr* (reliever, calmer); the regular principal parts of the verb *pauō* (I stop), *pausō* (I shall stop); and the adjectives *pausteon* (to be ended) and *paustērios* (relieving, calming).

Difficulties arise in English, Latin, and Greek with roots that change from word to word ("irregular" or "strong" roots) as in the English *sing, sang, sung, song;* and one says *singer,* not *songer; unsung,* not *unsing;* and *unsingable,* not *unsungable.* One example will suffice. The root *ten-* (stretch) appears in Latin and Greek (and also in English as *thin*). In Latin the root is as regular as the English *talk,* and the derivations are obvious: *ten*do (tendon), *ten*sio (tension), *ten*ius (tenuous, thin), ex*ten*uatus (stretched out, thinned out, weakened). In Greek, however, the same root appears as *ten-, tein-, ton-, ta-, tan-,* and *tain-.* Indeed, the rules for ancient Greek word formation would make a heavy book, and therefore, for efficiency's sake, the analytical word list, which follows this essay, gives examples of which affixes are attached to which forms of the root, for both the methodical Latin and the exuberant Greek.

---

* During World War II, *Ancistrodon* (from ἄγκιστρον, fishhook, and ὀδοντ-, tooth) was reformed to *Agkistrodon,* which is the official spelling. *Ancistrodon* and *Ankistrodon* are both correct, but not *Agkistrodon:* Greek ἄγγελος (messenger) becomes *angelus* in Latin and *angel* in English, not *aggelus* and *aggel.*

In the Latin system there is an inconsistency affecting many common Latin and therefore English words: Latin roots with short vowels will have the normal, strong vowel in simple, unprefixed words but a reduced, weakened vowel in prefixed words.

Consider the Latin root *făc-* (do, make). The normal *ă* remains in unprefixed words; hence the principal parts of the verb are:

făcio	I make
făcere	to make
făctus	made

Other unprefixed derivatives are:

facies	thing made or formed, face, "facies"
factor	factor
factura	as in manu*facture*
faction-	faction
factiosus	factious
facil-	doable, feasible, easy

From *facil-* are derived in turn:

facultat-	faculty
facilitat-	facility

Now let us add the prefix *ex* to the root *fac-*. *Ex* assimilates to *ef-* before *f* and changes the meaning of *fac-* to "complete." This or any prefix will cause a short *ă* to become a short *ĭ* before one consonant and a short *ĕ* before two consonants. Note the changes in the principal parts of the prefixed verb:

efficio	from	*exfacio*
efficere	from	*exfacere*
effectus	from	*exfactus*

It is from words like *efficio* that one can most clearly understand the derivations of Latin words. One forms the present participle by dropping the final *-re* from the present active infinitive, which is the form used in the etymologies of *Dorland's,* and adding *-nt* (verbs like *efficio* drop the final *-ere* and add *-ient*). The present participle of *efficio, efficere* is *efficient-* (efficient). And from the present participle is derived the noun *efficientia* (efficiency).

From the last principal part, *effectus,* one forms derivatives by dropping the *-us* and adding other suffixes. Thus from *effect-* one derives

effectum	effect
effector	effector
effectivus	effective

Occasionally the Romans would recompose a prefixed form according to the unprefixed norm. The most common example, and perfect for medical use, is *calefacio,* I warm, not *calefício,* and therefore *calefacient-,* not *calefícient-*.

Alas, there are exceptions. *Tenant* comes to English not directly from the Latin *tenēre,* to hold, which would give us *tenent,* but through the French *tenir,* and in French all verbs form their present participles in *-ant,* therefore *tenant;* a *locum tenens* is a *lieu tenant.*

Assimilation may affect the consonants between roots and affixes. In English the *v* in dri*v*e and thri*v*e becomes voiceless and changes to *f* before the voiceless suffix *-t* that forms the nouns *drift* and *thrift.* In Latin, assimilation is usually minimal and obvious: *scribo* ("I write") and *scriba* ("writer, scribe") alternate with *scripsi* ("I wrote") and *scriptura* ("writing, scripture"). Occasionally the assimilation between Latin roots, prefixes, and suffixes may cause enough distortion to result in confusion. Below are listed some common Latin prefixes (most of them are also used as prepositions) showing the assimilation of the prefix to the following element. Note that the prefix *in-* has two sources and hence two uses: as a spatial prefix meaning *in, on,* or *into* (*in*scribe, *im*bibe, *il*luminate, *ir*radiate) and the antonymous prefix (*in*sensitive, *im*mature, *il*legible, *ir*reverent).

Consonant Changes		English
ad-	before *c* becomes *ac-*	*ac*celerate
ad-	before *f* becomes *af-*	*af*finity
ad-	before *g* becomes *ag-*	*ag*glutinant
ad-	before *p* becomes *ap-*	*ap*pendix
ad-	before *s* becomes *as-*	*as*similate
ad-	before *t* becomes *at-*	*at*trition
ex-	before *f* becomes *ef-*	*ef*fusion
in-	before *l* becomes *il-*	*il*linition
in-	before *m* becomes *im-*	*im*mersion
in-	before *r* becomes *ir-*	*ir*radiation
ob-	before *c* becomes *oc-*	*oc*clusion
sub-	before *f* becomes *suf-*	*suf*focate
sub-	before *p* becomes *sup-*	*sup*pository
trans-	before *s* becomes *tran-*	*tran*spiration

In Greek, assimilation may cause drastic changes to a word, and the phonetic laws governing these assimilations are far beyond the limits of this Dictionary. Fortunately, however, Greek prefixes are fairly regular. Like Latin prefixes, they may also function as prepositions of motion or location. Most Greek prefixes end in a vowel, which is maintained when the following element begins with a consonant and is lost (elided) when that element begins with a vowel: for example, the iota in *epi* ("on, upon") is unchanged in *epi*demic and is elided before *o* in *epo*nychium ("cuticle"). When a Greek prefix ends in a consonant and the following element begins with a consonant, assimilation takes place with results as in Latin: the nu *(n)* of *syn* ("with") changes in *symphatheia* and *syllogismos* (sympathy and syllogism). Note that the prevocalic prefix *an-* has two sources and therefore two uses: it is the spatial preposition *ana* ("up, back"), as in *ana*bolism and *ano*de; and it is the antonymous prefix *a-, an-,* as in *a*theist and *an*odyne, coming from the same source as Latin and English antonymous prefixes *in-* and *un-*.

Below are listed some common Greek prefixes with examples of elision and assimilation.

Preposition	Combining Forms	English
amphi	amphi-	*amphi*crania
	amph-	*amph*eclexis
ana	ana-	*ana*bolism
	an-	*ano*de
anti	anti-	*anti*gen
	ant-	*ant*helminthic
apo	apo-	*apo*physis
	ap-	*ap*andria
dia	dia-	*dia*thermy
	di-	*di*uretic
ek	ek-	*ec*topia
ex	ex-	*ex*osmosis

en	en-	*en*ostosis
	em-	*em*bolus
epi	epi-	*epi*nephrine
	ep-	*ep*arterial
hyper	hyper-	*hyper*trophy
hypo	hypo-	*hypo*dermic
	hyp-	*hyp*axial
kata	kata-	*cata*lepsy
	kat-	*cat*ion
meta	meta-	*meta*morphosis
	met-	*met*encephalon
para	para-	*para*mastoid
	par-	*par*otid
peri	peri-	*peri*toneum
pro	pro-	*pro*gnosis
syn	syn-	*syn*thesis
	sym-	*sym*physis
	syl-	*syl*lepsis
	sy-	*sy*stole

Many Latin suffixes have been naturalized in English for centuries, and little comment is needed on their morphology and use. Some common suffixes of particular use in medicine are listed below with their English derivatives. Note that the suffixes *-abilis* and *-alis/-aris* are attached to verb stems of the first conjugation (the infinitives end in *-āre,* as in *laudāre* to praise); and *-ibilis* and *-ilis* are used with the other conjugations *(vidēre, visibilis; legĕre, legibilis; audīre, audibilis).*

Latin Components	English
avis + -arium	aviary
dormio (dormitus) + -orium	dormitory
nutrio (nutritus) + -io	nutrition
moveo (motus) + -or	motor
porosus + -tas	porosity
frio + -abilis	friable
edo + -ibilis	edible
corpus (corporis) + -alis	corporal
febris + -ilis	febrile
oculus + -aris	ocular
cilium + -arius	ciliary
sensus + -orius	sensory
reticulum + -atus	reticulate
morbus + -idus	morbid
aborior (abortus) + -ivus	abortive
squama + -osus	squamous
adeps (adipis) + -osus	adipose
prae + caveo (cautus) + -io + -arius	precautionary

Greek suffixes in general have not been naturalized in English as the Latin have, with the spectacular exception of the family of suffixes represented by verbs in *-izō* (-ize), agent nouns in *-istēs* (-ist), and verbal nouns in *-ismos* (-ism).

So far we have examined the various forms of roots, root words, and derived words; only compound words remain. A compound word is one formed from two (or more) independent words, the first word modifying, dependent upon, or being object of the next. In English, *housewife, kidney transplant, salesman, schoolboy, store-bought, backbreaking,* and *anteater* are compound words. In English the individual elements undergo little if any change from their basic, lexical forms but remain isolated, as it were, and receive their new meaning solely from juxtaposition (an example is the difference between *house guest* and *guest house*).

The conditions are vastly different in Latin and Greek; in the Classical languages one must use so-called combining forms of substantives (i.e., nouns and adjectives including past participles) that are often considerably different from the lexical forms.

In Latin all native compound words ordinarily will consist of the stem of the first word; then the connecting vowel, usually -i-, sometimes -u-; then the stem of the second word; then the inflection: magn-i-ficient-ia, *magnificientia,* magnificence. In science there are many compounds like *dorsoradial* and *frenosecretory* with Latin words and Greek connecting vowels; the true Latin forms for such compounds would be *dorsiradialis* and *frenisecretorius.*

In Greek the rules for forming compound words are much more complicated. If the first substantive of a Greek compound ends in *-a* (but not *-ma*) or *-ē*, one nearly always changes that vowel to *-o-*:

glōssa, tongue + *ptōsis,* fall = glossoptosis

phōnē, voice, sound + *logos,* word, reason, study = *phōnologia,* phonology

Substantives ending in *-on*, *-os*, or *-ys* usually drop the final consonant and leave the vowel unchanged:

osteon, bone + *arthritis,* gout (first appears in Hippocrates) = osteoarthritis

myelos, marrow + *poiēsis,* production = myelopoiesis

pachys, thick + *derma,* skin = pachydermia (first appears in Hippocrates)

If the second element begins with a vowel, one merely drops the final *-a* or *-ē* from the first element without adding *-o-*:

archē, beginning, chief, rule + *enteron,* intestine = archenteron

bradys, slow, dull + *akusis,* hearing = bradyacousia

There are exceptions:

idea, idea + *logos* = ideology is regular,

but

genea, family, lineage + *logos* = *genealogia,* genealogy is irregular, as are

architektōn not *archotektōn,* architect

archetypos not *archotypos,* archetype

Indeed the regular *archo-* is extremely rare compared with *arche-* and *archi-* and is therefore "irregular."

Forming compounds from other substantives is complicated by the fact that one cannot generally predict the combining form of a substantive from the lexical entry, and in fact one usually predicts the lexical entry from the combining form, not vice versa.

In Greek, substantives ending in *-ma* have a stem or combining form in *-mat-;* so *haima* (blood), *haimat-* and *poiēsis* (making, "poesy") make *haimatopoiēsis,* hematopoiesis. But Hippocrates himself uses *haimorrhagia,* hemorrhage, not *haimatorrhagia.* And no one could predict from the nominative *gynē* (woman), which looks like a regular noun, a combining form *gynaik-,* whence gynecology; or from *gala* (milk), *galakt-,* whence galactophorous.

Latin is not so irregular, but even so *lac* (milk) has a combining stem *lact-* (lactacidemia); *cor* (heart), one in *cord-* (cordial); *miles* (soldier), *milit-* (military); *rex* (king), *reg-* (regicide); *nomen* (name), *nomin-* (nominate). The combining form of *homo* (human being, man) is *homin-* (hominoid ape), but Cicero himself uses *homicida* (murderer, homicide), not *hominicida.*

Analytical Word List

The following list includes those Greek and Latin words occurring most frequently in this Dictionary, arranged alpha-