The Anatomy of Medical Terminology

A FORMULAIC INTRODUCTION

Online edition

LEWIS STILES & STEPHEN RUSSELL

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discipulis nostris,
quibuscum et ex quibus
haec discimus

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PREFACE

PREFACE TO THE FIRST EDITION

This book is an "anatomy" in the sense that most words used in Medical Terminology can be "cut up" into their component Latin and Greek roots, the most important of which are presented here. It is "formulaic" in the sense that consistent ways of translating compounds made from those roots are given.

It will be most efficiently used in conjunction with a teacher who can discuss etymological and other aspects of the combining forms to make them easier to learn, and who can elucidate difficult points as they arise. Nevertheless, it can also be used for self-study as the exercises have answer keys. Access to a good etymological dictionary of English and to a standard medical dictionary is recommended for those who choose to study this material independently.

This book has grown out of classroom experience, throughout the first ten years of which students responded eagerly to my invitations to tell me from a medical point of view what is wrong and what is right, and from a pedagogical one, what is effective and what is not. My interest in the subject began when, during several years of marking weekly quizzes given in the Medical Terminology course offered by the Department of Classics at the University of British Columbia, I came to understand both the difficulties inherent in the subject itself and the shortcomings of one of the better available textbooks. Early versions of the material presented here were then offered as a new textbook in two classes to which I taught the same course at the University of British Columbia in 1982 and 1983, and to one non-credit class of medical students at the University of Saskatchewan in 1986. The textbook was extensively revised during and after each of these experiments and was used in substantially the same form each year from 1986 to 1992 in a course taught by myself and offered

by the Department of Classics at the University of Saskatchewan. Following its use in 1992 in a class of about six hundred students, whose enthusiastic response to my invitation to point out errors was both overwhelming and humbling, it was extensively revised once again.

The extent to which the text is now reasonably free of errors is a measure of the gratitude I here express to all the students who have contributed to its evolution over the past decades. Space forbids the use of names, but I wish also to thank Wendy Wobeser, Odrun Stiles, Jeanne Marken, Marlene Van Burgsteden, Roberta Gerwing, Sue Stewart, and Karen Sturgeon.

PREFACE TO THE THIRD EDITION

In 2014 Stephen Russell, teaching this material in the Department of Classics at McMaster University, joined me in the ongoing work of expanding and revising it yet one more time. This new edition, the accompanying *Workbook*, and the additional online exercises and instructional videos, are results of that collaboration. Stephen and I would like to express our gratitude to Kyle McLeister, for his help with the additional materials, and to Claude Eilers of Radix Antiqua for his help and continuing support during this process. We would also like to thank the student volunteers at McMaster, and especially acknowledge Julie Briscoe for her anatomical expertise and perspicacity.

In spite of everyone's best efforts, some errors and inconsistencies will have remained; these are of course entirely our own responsibility.

(August, 2017)

INTRODUCTION

THE NEED FOR MEDICAL TERMINOLOGY TEXTBOOKS

This book is an attempt to fill a gap in medical education created by three features of contemporary English. The first two have wide application to the whole of the language, while the third feature is more specifically applicable to Medical Terminology.

1) English is unique among modern languages in suffering a disjunction between its concrete vocabulary, which is largely native, and its abstract vocabulary, which is almost entirely borrowed from Latin and Greek.

2) The tenuous connection between abstract vocabulary and the concrete words upon which abstract ones are built, though maintained for most of the nine hundred years that the problem has been with us by the universal learning of Latin (at least at the level of education demanded of practitioners of medicine), has been broken in the last one or two generations.

3) To some degree at least, practitioners of medicine, like specialists in any area, are still more or less conscious of the power that comes from the possession of an arcane vocabulary.

All three features contribute to the difficulties contemporary native speakers of English have with all of their own language's abstract and technical words, but they make Medical Terminology, because of its heavy dependence on Latin and Greek, even more difficult to learn than other specialized vocabularies or jargons.

The first feature, at once the least widely understood and the most far-reaching in its implications, is perhaps the most difficult to grasp. A set of examples of the problem may help. English speakers are on safe ground if we "grasp" a "point" during a discussion, because both "grasp" and "point" are concrete words used abstractly here but with clear connections of meaning to their concrete denotations. If, on the other hand, we "comprehend" an "idea" or "perceive" the "argument," we are in a realm of abstraction without connection of meaning to tangible reality.

Let us consider only the verbs. When we "grasp" an idea, the metaphorical extension of meaning from the physical act of "grasping" an object is clear and appropriate; its clarity and appropriateness are further helped by the existence of well-known cognate or parallel abstractions such as "grapple with," "seize on," "take hold of" and "come to grips with."

When we "comprehend," on the other hand, we may be dimly aware that our action is related to that expressed by the word "apprehend," but we have no way of knowing, without special training in Latin or etymology, that both words derive from Latin "prehendo," meaning "I grasp" or "I seize," and that we are therefore using the same metaphorical extension of meaning as in the previous example. Similarly, if we "perceive," or "conceive," or understand a "concept," we are again making use of the same metaphor (Latin "capio" means "I seize" or "I take"), but again without being able to connect it, by meaning, to a physical act denoted by a cognate word in the world of concrete objects. The native speaker of Latin, to put this another way, would not suffer the English speaker's disjunction between abstract "comprehend," "apprehend" and "conceive" on the one hand and the concrete act of physically "grasping" or "seizing" on the other, because "prehendo" and "capio" were used of that physical act as well as in their metaphorically extended senses.

Similarly, a contemporary German speaker would find no disjunction between the abstract verb "begreifen" ("to comprehend" or "to understand") and cognate concrete words like "greifen" ("to grab" or "to grasp") and "Griff" ("handle; thing grasped"). Finally, French "comprendre" ("to comprehend") clearly derives, without disjunction, from "prendre" ("to take").

Thus native speakers of English are often disadvantaged, in a way that speakers of the above-mentioned languages are not, if confronted with an unfamiliar word made from the same root as one we already know ("prehensile" may serve as an example in the present context) or even by a word we do know if it is used in an unfamiliar way (for example, "reprehensible"): since our language lacks a cognate concrete word, or a use of the same root to denote something physical and real, we have no image to refer back to in order to guess the meaning of a word or in order to remember its meaning once learned. We must rely upon context alone if we are to guess, and upon memory alone if we are to remember.

My second point, that the disjunction between English abstract and concrete vocabulary has been worsened by the cessation of that almost universal knowledge of Latin that prevailed until very recently among those who claimed to be educated, need not be labored. It does however need to be pointed out. This is because the advantages of knowing Latin in terms of the enhancement of one's understanding of English vocabulary are, for most people who do know Latin, unconscious ones, while for those who do not know Latin those advantages are, by definition, unknowable. Latin has dropped out of the curriculum, almost silently; where a clamor has arisen, the vital problem of disjunction between abstract and concrete vocabulary has not formed a large part of the protest. This is not to suggest that the resuscitation of Latin would in itself solve the problem, as a knowledge of Latin provides only the materials from which connections may be drawn between words in English. In practice, the only solution to this growing problem of communication is going to be specialized study of English etymology.

My final point, that Medical Terminology to a greater extent than other jargons confers a kind of mystical power upon its initiates, will perhaps be disputed. But words do have power, and always have had.

Some, in contemporary English, have so much power that few of us can bring ourselves even to utter them, in "polite" company at least. Again, the idea in primitive magic that learning the name of something gives one power over it persists, I believe, in contemporary conventions regarding last and first names and particularly in our almost universal reluctance to acknowledge our middle, or secret, names, except to intimates. Likewise, practitioners of medicine, knowing the special names of things, have, at least in the eyes of most of the rest

of us, a kind of power over the things themselves; in addition, in order for the special names to be efficacious they must remain secret or arcane. This kind of "word magic" may or may not have positive psychological value, and I hasten to add that in making this point I am not attempting to pass judgement.

The first lesson the serious student of language must learn, in fact, is the difference between describing linguistic phenomena and passing judgement upon them. If one writes a grammar (and this book is in a modest way a grammar of Medical Terminology) one must decide whether it is a descriptive grammar or a prescriptive one. This book is, I hope, mainly descriptive, and in that spirit I offer the theory of the mystical power of arcane vocabulary merely as a possible explanation of the observable fact that Medical Terminology (considered as a language and thus subject to strict internal rules of usage and equally strictly ruled patterns of change), exhibits few of those tendencies to self-simplification or assimilation to "plain English" that we find when the main intention of users of a jargon is to communicate effectively with the largest possible number of people.

SOME COMMON SHORTCOMINGS OF MEDICAL TERMINOLOGY TEXTBOOKS

A general acknowledgement of the gap in medical education which I have attempted to describe is shown by the relative proliferation of Medical Terminology textbooks (and courses) over the last fifty or more years. No one of these books, however, is universally held to be satisfactory. Most of their authors are either classicists specializing in the Latin and Greek languages, or practitioners of medicine, and both groups fail to pay enough attention to the disjunction between abstract and concrete vocabulary described above.

More specifically, books and courses written or designed by classicists concentrate too much on the meanings anciently borne by Latin and Greek roots; by tending to ignore the meanings these roots have acquired during two millennia of medical compounding, they fail to adequately explain (or even to acknowledge) contemporary usage.

Those created by medical specialists, on the other hand, tend to suffer from the opposite problem: by concentrating exclusively on contemporary usage, they pay too little attention to etymological features of compounding which

simplify the learning of Medical Terminology. This is because medical authors base their books upon the definitions of words found in standard medical dictionaries, but fail to look beyond those definitions. The editors of medical dictionaries, for their part, while they may acknowledge the role which roots play in compounding and may even present fairly comprehensive and accurate lists of them, quite properly make no attempt to reflect consistent meanings for those roots in the definitions given in their dictionaries. Unfortunately, they are followed in this inconsistency by the authors of textbooks in Medical Terminology, who frequently use in their definitions words just as arcane as the roots and words that they are "defining."

Neither approach, in other words, attempts to combine the pedagogical value of knowing the concrete meanings of the Latin and Greek roots with the goal of learning contemporary usage: the classicists do not address the developments of meaning through which all words pass over time, while the medical specialists do not explicate the original concrete, physical, tactile meanings of the roots of contemporary Medical Terminology.

Another difficulty is that books and courses designed by classicists are often prescriptive, rather than descriptive. They may contain, for example, injunctions against "hybrid" compounds (in which one element is Latin and another is Greek), in direct contradiction to usage, and they may give "preferred" meanings and forms on the basis of the rules of Latin and Greek grammar, thereby overlooking, or even denying the existence of, the grammar of contemporary Medical Terminology.

Disjunction between Greek and Latin roots two thousand years old, on the one hand, and contemporary English, on the other, leads to a further problem. No textbook which I have seen attempts seriously to point out relationships between the vocabulary to be learned and cognates and derivatives already familiar to the student. This oversight results in the loss not only of a potent aid to learning but also of an opportunity to stimulate that intellectual curiosity that should underlie and be part of any academic pursuit.

Finally, most currently available textbooks fail to give an adequate number of exercises designed to reinforce the material presented in each chapter or unit.

Many also lack answer keys, while those which do have them are not consistent in their translations of repeated combining forms.

THE PREMISES OF THIS BOOK

Bearing in mind the problems I have outlined and the failings of various attempts to solve them, I offer the present book in the conviction that the premises upon which it is based will make the learning of Medical Terminology more efficient and more thorough. Some of these premises are as follows.

1) Although my own training is in Classics, the book is mainly descriptive, not prescriptive. Every definition given is therefore based not upon my own prejudices, but upon usage. "Usage," for this purpose, has been determined by examination of the actual meanings borne by Greco-Roman roots in the compounds formed from them which are given in various editions of *Dorland's Illustrated Medical Dictionary* since 1981 (all published by W.B. Saunders, now Elsevier-Saunders).

2) The book is thus "formulaic," in the sense that the translation given for each combining form represents the simplest and most consistent meaning that can be elucidated by examination of that combining form's function in many compound words with diverse definitions. One example should suffice. The cognate suffixes "-gram," "-graph" and "-graphy" appear in very many, very diversely defined words in *Dorland's*.

A small selection of these follows, with definitions based upon those found in that dictionary (bolded words in the definitions translate the suffixes in question).

dactyl-o-**gram**	a finger**print** taken for purposes of identification
hyster-o-**gram**	a **roentgenogram** of the uterus
angi-o-**graphy**	the **roentgenographic visualization** of blood vessels, *or* a **treatise** on the vessels

hem-o-**gram**	the blood **picture**; a **written record** or a **graphic representation** of the differential blood count
kinemat-o-**graph**	an **instrument for exhibiting pictures** of objects in motion
stere-o-**gram**	a stereoscopic **drawing**
my-o-**gram**	the **record** or **tracing** obtained by a myo**graph**
my-o-**graphy**	the **use of** the myo**graph**

The suffixes, which derive ultimately from Greek grapho ("I scratch;" hence "I inscribe" and later "I write"), are translated in this book as follows ("x" stands for a combining form and denotes "any organ or part").

x-o-**gram**	**a record of** x
x-o-**graph**	**an instrument for recording** x
x-o-**graphy**	**the recording of** x

These translations reflect the simplest consistent meanings which can be discerned from usage and which the student may therefore safely apply when meeting these suffixes in new words. Inconsistency of translation can almost always be avoided, if necessary by the addition of words. The following examples are to be compared to the last two dictionary definitions given above (added words are in boldface; "my-o" means "muscle").

my-o-gram	a record of **something involving** muscles
my-o-graphy	the recording of **something involving** muscles

It is in the pursuit of consistency that I have occasionally, and reluctantly, been more prescriptive than descriptive. In so doing I have also sometimes quietly "corrected" inconsistencies of definition found in *Dorland's*, inconsistencies which I believe to have arisen from misapprehension of subtle distinctions in meaning. Again, one example should illustrate the problem and my

solution to it. A number of words in *Dorland's* consist of the combining form "hem(at)-o" ("blood"), another combining form designating an organ or part, and a nominative ending ("-us," "-a," "-um" or "-on," for example). By all rules of grammar, such words must denote concrete physical objects, rather than abstract processes. Here, however, is a partial list of such words, with definitions based upon those in the dictionary:

hem-o-thorax	**a collection** of blood in the thorax
hemat-o-colp-os	**an accumulation** of blood in the vagina
hemat-o-cyst	**an effusion** of blood into the bladder
hemat-encephal-on	**the effusion** of blood into the brain
hemat-o-colp-o-metr-a	**accumulation** of blood in the vagina and uterus
hemat-oste-on	**hemorrhage** into a bone cavity

Thus only the first three definitions are correct, for the last three imply (wrongly) a process rather than the concrete result of that process. Suitable medical words for the last three definitions would replace the nominative, concrete, endings by "-ia," which denotes a process. In this book, the words above (and many many others) are subsumed under a formula:

> Where a word consists of a combining form denoting a substance, a combining form denoting an organ or part, and a nominative ending, it will always mean "a collection of the substance, in the part." (See Notes in Chapter 5 for a symbolic formulation of this rule.)

3) Preference, in form or meaning, follows that indicated by frequency of occurrence in *Dorland*'s and other dictionaries, and is therefore based on usage. Many combining forms used in Medical Terminology occur in pairs, of which one reflects a Greek word and the other its Latin equivalent. This means that, in theory, many medical compounds have doublets constructed by means of synonymous roots. In practice, however, for a given object or concept one word will be used more frequently than its synonym. The latter is typically entered in a medical dictionary only as a

cross-reference to the more frequently used word. In this book, an attempt is made to reflect these more commonly used forms.

4) So far as is consistent with usage, definitions are made as concrete as possible in order to facilitate memory and recognition. This occasionally results in apparent over-simplification, as, for example, when the combining form "malle-o" is defined as "hammer" rather than as "malleus." The advantage in such concretization is that the student has the readily available mental image of a **malle**t to help in learning and remembering the word as well as the ensuing ability to define the same root in a totally different context (in the words "**malle**able" and "**malle**olus," for example). Similarly, given that in practice many students of Medical Terminology are not yet students of Medicine, defining "clavicul-o" as "collar bone" rather than as "clavicle" offers the student a way of remembering what a clavicle actually is.

5) Since one or more of the combining forms given in this book are found in approximately ninety-five percent of the words in any big medical dictionary like *Dorland's*, it is obviously to the advantage of the student to learn the combining forms, their definitions, and the rules governing translation of resultant compounds rather than to memorize the definitions of individual compound words. Hence in this book any one compound word, whether in the examples or in the exercises, will regularly occur once only.

6) If the "importance" of a combining form can be measured by the frequency with which it occurs in compound words or phrases, then this book presents the majority of the most important combining forms found in medical dictionaries. At the other end of this scale, I have (arbitrarily) excluded combining forms which are found in fewer than four such words or phrases.

7) A fundamental element of the "grammar" of Medical Terminology is the fact that virtually all its words (like most English compounds) are analyzed from right to left. The endings of words are therefore of primary importance, and this book deviates from most in that the majority of the frequently occurring

endings are given in the first chapter. A large number of systematically arranged combining forms denoting body parts follows, while prefixes are relegated to the last chapter in keeping with this "right to left" principle and in keeping with their relatively greater difficulty.

8) In the 1940s an international effort to standardize at least some aspects of Medical Terminology began. The corpus of anatomical terms thus produced is called *Nomina Anatomica*. These terms are, by and large, straight Latin. As they are virtually all formed by the addition of regular endings to standard Medical combining forms and put together into phrases according to a few simple rules of Latin grammar (augmented by restrictions on word order, specific to the corpus itself), they are presented in this book along with the combining forms from which they are made. In selecting Latin phrases for examples and for exercises, I have followed the usual practice of elementary Latin textbooks in resorting sometimes to simplification and occasionally to outright invention, in the interests of facilitating the learning of endings and the principles of agreement. More recently an overall standardization of this corpus, called *Terminologia Anatomica*, has been adopted, but this has not resulted in any significant changes to the grammar involved.

9) So far as has been possible, each combining form to be learned has been presented along with an English derivative or cognate chosen, at one level, to facilitate through association the memorization of the combining form itself and of its meaning. But the mere rote-learning of lists of words or parts of words is not an academic pursuit in itself, and therefore at another level the number and diversity of the derivative and cognate relationships thereby exemplified should provide a stimulus to the student's curiosity about etymology, historical linguistics, and the history of the English language. This curiosity often results in an enhanced ability not only to analyze words which fall outside the scope of Medical Terminology but also to think critically about both words themselves and the ways in which words are used for communication.

10) Users of this book who have previous training in medicine will occasionally encounter words which will, when translated by the formulaic principles

given here, yield medically nonsensical meanings. It should therefore be kept in mind that, like all languages, Medical Terminology has many exceptions to any "rules" which can be discerned governing its grammar and usage, and that I make no claim here to have taken all such exceptions into account. A further complication is that, since the decline of the study of Latin and Greek referred to above, a number of words, now well accepted, have come into Medical Terminology, and that many of these have been coined by medical practitioners who simply misunderstood the "rules." But comparatively few words fall into these categories and the occasional difficulties created by them are, in my opinion, greatly outweighed by the efficiency of learning, instead of individual words, combining forms and the principles that almost always govern translation of their combinations.

11) Similarly, readers with experience in classics or linguistics will occasionally be irritated by simplifications and also by grammatical terminology different from that which they have learned. My guiding principles here have been utility and clarity, in terms of the students for whom the book is intended. Thus, for example, my account of word order in the phrases of the *Nomina Anatomica* is specific to the simplifications which actually exist in that corpus and is not intended to apply to classical Latin. Likewise, from a plethora of grammatical terminology used inconsistently in a variety of disciplines and sub-disciplines, I have chosen to use words which seem to me unambiguous and easily understandable.

THE ORGANIZATION OF THIS BOOK

It remains to describe the organization of the material. As mentioned, most terminations are given in Chapter 1; a few more, less frequently occurring, are presented in various later chapters. Chapters 2-10 give roots designating body parts and are arranged according to medical systems, while Chapter 11 presents forms denoting aspects of Psychology and Chapter 12 those denoting substances. Prepositional prefixes are given in Chapter 13. Thus, these chapters are roughly arranged according to ascending order of difficulty and according to the order in which word-elements are regularly to be taken for analysis.

Each chapter consists of three parts (A, B, and C).

Part A) Combining Forms. A list of the combining forms which are to be learned. These are given according to certain conventions which can be illustrated by the following examples (taken from Chapter 2).

30.	**omphal-o**	(**umbili**cal)	**navel**	
31.	**umbil(ic)-o**	(**umbilic**al cord)	**navel**	**umbilic-us**
32.	**glute-o, glut-o**	("rump")	buttock	
33.	**gon-o, gony-o**	(pentagon)	**kn**ee	

The combining form's number, in conjunction with the chapter number, indicates how the combining form will be referred to throughout the book (as, 2.30, 2.31, 2.32 and 2.33).

The second column contains the combining form itself, which usually consists of a base or root ("omphal-") and the combining vowel (usually but not always "-o-") associated with it. Where brackets occur, as in "umbil(ic)-o" (2.31), they indicate that two combining forms, "umbil-o" and "umbilic-o" are used, and that the second is the one more frequently found. If the first were more frequent, the entry would be written "umbil- o, umbilic-o," and the relative frequency would be indicated by the order. Thus "glute-o" and "gon-o" (2.32 and 33) are found more frequently than "glut-o" and "gony-o."

When the combining form given in the second column is a termination, it is preceded by its combining vowel and the letter "x," standing for (unless otherwise indicated) "any organ or part" (for example, "x-o-gram," mentioned above).

The third column gives where possible either a related derivative word ("**umbilic**al" is derived from "umbilic-") or a cognate form (Latin-based "**umbil**ical" is cognate with Greek "**omphal**-") which should be familiar enough to the student to provide an aid to memory; alternatively, the concrete meaning of the combining form is given, within quotation marks ("glut-o" means "rump"). In those rare cases where the third column is left blank, the meaning

of the combining form can be assumed to be identical to the translation found in the fourth column. For more of this, see Appendix 2.

The fourth column presents what examination of the combining form's occurrences has proven to be its most consistently useful translation, and therefore the one which will be used throughout the book. Where the translation is itself a cognate or a derivative of the combining form, it is given in bold-face; thus Greek "**gon**y-" (2.33) is cognate with English "**kn**ee."

In the last column is given, where appropriate, the Latin singular noun as used in the *Nomina Anatomica*. This will usually consist of the combining form itself plus a nominative ending, as is the case with "umbilic-us" (2.31).

In the case of doublets (two distinct combining forms with the same meaning; 2.30 and 31 above, for example), I have regularly presented the more frequently used one ("omphal-o") first. An unfortunate but true observation may be made: generally speaking, where two distinct combining forms denote the same thing, the more frequently used one will be Greek and less familiar to the English speaker, while the more obvious Latin form will be less frequently used. Thus the meaning of Latin "umbilic-o" (2.31), for example, is immediately apparent, but in practice Greek "omphal-o" (2.30) is much more frequently found.

Part B) Notes. Explanations of the combining forms, their usage, and rules governing their translation, as well as on other matters as these seem appropriate to each chapter. The system of rules governing *Nomina Anatomica* terms, for example, is given in the "Notes" section of various chapters, beginning with Chapter 3. It should be pointed out that Chapter 1 is anomalous in that some notes on formation and usage are also given in Part A.

Part C) Further Notes and Exercises. These take up various aspects of the formation and translation of compound medical words, which will be particularly useful to the student who has already memorized the combining forms in Part A, by working through the examples in Part B and by doing the Exercises in the corresponding chapters of both the *Workbook* and the online material. The various subsections of this Part take up problems with material presented earlier, problems which are not likely to have been appreciated as such until students have had enough experience working through relevant exercises to have begun to formulate the questions which we attempt to answer

here. Thus, for example, Part C of Chapter 11 focuses on *Nomina Anatomica* phrases, which students have been grappling with since at least Chapter 6. By contrast, Part C of Chapter 13 uses the new prefixes presented in that chapter as the basis of what we hope is a summarizing review of one of the book's fundamental, presuasive, and earliest-introduced concepts, the value of distinguishing between nouns and adjectives.

The usefulness of doing the *Workbook* and online Exercises thoroughly for each chapter cannot be overstated, as they are designed so that each set gives not only practice with the forms learned in that chapter but also a review of much of what has been learned in previous chapters.

Three Appendices follow the last chapter. The first two will provide some help for those using the book without benefit of a teacher, particularly as the first one includes those features of "Grimm's Law" necessary for establishing the cognate relationships between the words and combining forms discussed in the second one. The third Appendix consists of brief notes on anatomy for those who are relatively unfamiliar with this subject.

Finally, there are three Indices: an Index and Glossary of Terminations, an Index and Glossary of Non-Terminal Combining Forms, and an Index of Complex Words and Phrases Defined in this book.

1

TERMINATIONS

PART A. COMBINING FORMS

[For the significance of various conventions followed in lists of combining forms, see the Introduction.]

Three types of word terminations are regularly used.

Primary Suffixes	(child-**hood**, child-**ish**)
Derived Suffixes	(child-**ish**-**ness**, child-**like**)
Inflectional Endings	(child-**'s**, child-**ren**, child-**ren**-**'s**)

Primary suffixes, which cannot stand alone as words and which usually cannot be divided into smaller meaningful parts, indicate whether a word is a noun ("child**hood**"), an adjective ("child**ish**"), or a verb.

In Medical Terminology there is only one frequently used verb-ending.

	TERMINATION	EXAMPLE	TRANSLATION
1.	**x-iz-e**	(sympath**ize**)	to (do the action of) x
		(final**ize**)	to make (something) x

Words of the following forms are **always** adjectives.

	TERMINATION	EXAMPLE	TRANSLATION	EQUIVALENT LATIN FORM		
				MASCULINE	FEMININE	NEUTER
2.	**x-al**	(nation**al**)	pertaining to x	**-al-is**	**-al-is**	**-al-e**
3.	**x-ic**	(cub**ic**)	pertaining to x	**-ic-us**	**-ic-a**	**-ic-um**
4.	**x-ous**	(ridicul**ous**)	pertaining to x	**-os-us**	**-os-a**	**-os-um**
5.	**x-ar-y**	(exempl**ary**)	pertaining to x	**-ar-i-us**	**-ar-i-a**	**-ar-i-um**
6.	**x-ar**	(stell**ar**)	pertaining to x	**-ar-is**	**-ar-is**	**-ar-e**
7.	**x-an**	(medi**an**)	pertaining to x	**-an-us**	**-an-a**	**-an-um**
8.	**x-in-e**	(can**ine**)	pertaining to x	**-in-us**	**-in-a**	**-in-um**
9.	**x-ac**	(cardi**ac**)	pertaining to x	**-ac-us**	**-ac-a**	**-ac-um**
10.	**x-oid**	(human**oid**)	resembling x	**-oid-e-us**	**-oid-e-a**	**-oid-e-um**

[Usage of the Latin masculine, feminine and neuter forms in the last column above will be explained in later chapters. At this stage it is sufficient to recognize them as variant forms of the English endings in the first column.]

Virtually all other word terminations indicate that a word is a noun. Some bear predictable meanings.

TERMINATION	EXAMPLE	TRANSLATION
11. **x-ia**	(insomn**ia**)	an abnormal condition involving x
12. **x-ist**	(biolog**ist**)	one who (does the action of) x
	(dent**ist**)	one who specializes in x
13. **x-in**	(adrenal**in**)	a substance (which does the action) of x

The following commonly occurring primary suffixes often indicate that a word is a noun, but do not themselves bear a predictable and independent meaning.

-e (exampl**e**)

-is (cris**is**)

-ism (human**ism**)

-s (physic**s**)

-y (geography)

A derived suffix is either a compound consisting of two or more elements which function together as a single meaningful unit ("child-**ish**-**ness**"), or (less commonly) a word ("child-**like**") or base which functions as though it were a suffix ("-**lith**," 40 below, for example). Some of the elements in compound suffixes may themselves be primary suffixes. For example, the derived suffix "-**scope**" (71 below), as in "micro**scope**," is made by adding the primary noun suffix "-**e**" to the base "-**scop**-" (given with an abstract noun ending at 62 below), while "-**scopic**" ("**microscopic**") is formed by the addition of "-**ic**" (3 above) to the same base.

Derived suffixes denoting nouns may be either abstract, indicating that a **process** of some kind is involved ("microscopy"), or concrete, denoting an **object** ("microscope"). Note that of the primary suffixes presented above, "x-ist" (12), "x-in" (13) and "-e" are concrete.

While adjectives can be made from all derived suffixes by replacing the noun ending with an adjectival one (for example, "microscop**ic**" from "microscope"), a few of these adjectival forms must be learned as derived suffixes in their own right.

Abstract nouns ending with derived suffixes fall into one of two categories: **Diagnostic Nouns** naming medical disorders and **Therapeutic Nouns** naming aspects of examination or treatment.

ABSTRACT NOUNS: DIAGNOSTIC

Derived suffixes denoting medical problems often end with the primary suffixes "-**is**" and "-**y.**"

TERMINATION	EXAMPLE	TRANSLATION
14. **x-it-is**	(laryng**itis**)	the inflammation of x
15. **x-o-rrhex-is**	(**break**)	the rupturing of x
16. **x-o-schis-is**	(**schism**)	the splitting of x
17. **x-ias-is**	(lith**iasis**)	the abnormal presence of x
18. **x-o-clas-is**	(icono**clastic**)	the breaking of x
19. **x-os-is**	(neur**osis**)	an abnormal condition involving x
20. **x-o-path-y**	(psycho**path**)	a disease of x
21. **x-o-megal-y**	(**mega**lith)	the enlargement of x
22. **x-o-phag-y**	(sarco**phag**us)	the ingestion of x

Some noun-endings are made by adding, to a base, the derived suffix "-es-is," which also bears no predictable independent meaning.

23.	**x-o-gen-es-is**	(**genesis**)	the production of x
24.	**x-o-poi-es-is**	(**poet**ic)	the formation of x
25.	**x-o-kin-es-is**	(**kinet**ic)	the movement of x

The primary suffix "-ia" (11 above) and the derived suffix "-osis" (19 above) are often added to bases to form new derived suffixes. Because the bases involved usually imply the idea of some specific "abnormality" in themselves, it is misleading to prefix the following definitions with the vague phrase (translating "-ia" and "-osis") "an abnormal condition involving."

26.	**x-alg-ia**	(nost**algia**)	pain in(volving) x
27.	**x-odyn-ia**	(an**odyn**e)	pain in(volving) x
28.	**x-o-pleg-ia**	(para**pleg**ic)	the paralysis of x
29.	**x-o-pen-ia**	(**pen**insula)	a deficiency of x
30.	**x-o-rrhag-ia**	(hem**orrhag**e)	the rapid flowing of (something from) x
31.	**x-o-malac-ia**	("softness")	the softening of x
32.	**x-o-necr-os-is**	(**necr**ophilia)	the death of x
33.	**x-o-sten-os-is**	(**sten**ography)	the narrowing of x
34.	**x-o-scler-os-is**	(**sclerosis**)	the hardening of x
35.	**x-o-pt-os-is**	("fall")	the downward displacement of x

A few derived suffixes have apparently irregular endings. In fact, these endings consist either of the base alone or of the base plus a noun ending. Note that the last three forms below (40-42) are rather more concrete than are the others in this category; they are included here because they each imply an abstract condition.

36.	**x-agr-a**		gouty pain in x
37.	**x-o-rrhe-a**	(dia**rrhea**)	the flowing of (something from) x
38.	**x-edema**	(**Oed**ipus)	the swelling of x
39.	**x-o-cel-e**		the protrusion of (something through) x
40.	**x-o-lith**	(mono**lith**)	a calculus in(volving) x
41.	**x-o-spasm**	(**spast**ic)	a **spasm** of x
42.	**x-ism-us**		a spasm of x

Some derived suffixes consist of a prefix (Chapter 13), a base and a noun-forming primary suffix.

"**ec**-" = "out" (13.11)

43.	**x-ec-top-ia**	(**top**ography)	the displacement of x
44.	**x-ec-tas-ia**	("draw out")	the distention of x

"**dys**-" = "bad, defective"

45.	**x-o-plas-ia**	(**plast**ic)	the formation of x [no "abnormality" is implied]
46.	**x-o-dys-plas-ia**	(**dys**function)	the defective formation of x
47.	**x-o-troph-y**	(a**trophy**)	the growth/nourishment of x
48.	**x-o-dys-troph-y**	(**dystrophy**)	the defective growth of x

"**a**-" = "lack of, without"

49.	**x-a-troph-y**	(**a**moral)	the lack of growth of x
50.	**x-a-sthen-ia**	(calli**sthen**ics)	the lack of strength of x

ABSTRACT NOUNS: THERAPEUTIC

Abstract nouns which denote the treatment and observation of disorders tend to end in "-**y**" and "-**is**", like many of the diagnostic forms.

51.	**x-o-therap-y**	(chemo**therapy**)	treatment by means of x
52.	**x-iatr-y**	(psych**iatry**)	the healing of x
53.	**x-o-stas-is**	(**stat**ic)	the stopping of x
54.	**x-o-plast-y**	(**plast**ic surgery)	the surgical repairing of x [compare 45]
55.	**x-o-cent-es-is**	(amnio**centesis**)	the surgical puncturing of x
56.	**x-o-rrhaph-y**	(**rhaps**ody)	the suturing of x
57.	**x-o-tom-y**	(a**tom**)	the cutting of x
58.	**x-ec-tom-y**	(tonsill**ectomy**)	the cutting out of x [see 43 and 44]
59.	**x-o-stom-y**	(**stom**ach)	the making of an opening in x
60.	**x-ic-s**	(phys**ics**)	the science of x
61.	**x-o-log-y**	(bi**ology**)	the study of x
62.	**x-o-scop-y**	(tele**scopy**)	the examination of x
63.	**x-o-metr-y**	(speedo**meter**)	the measurement of x
64.	**x-o-graph-y**	(tele**graphy**)	the recording of x

Three suffixes can refer to either diagnosis or therapy, depending upon their contexts.

65.	**x-o-pex-y**	(**pect**in)	the adhesion of x [diagnostic] the fixation of x [therapeutic]
66.	**x-o-lys-is**	(electro**lysis**)	the disintegration of x [diagnostic] the separation of the adhesions of x [therapeutic]
67.	**x-o-trop-ism**	(**trop**ical)	the tendency to preferentially affect x [diagnostic or therapeutic]

CONCRETE NOUNS

Some therapeutic nouns (and a few diagnostic ones) have derivative concrete forms denoting the instrument or the "doer."

Some are formed using the noun suffix "**-e.**"

68.	**x-o-phag-e**	(sarco**phag**us)	something which ingests x [22 above]
69.	**x-o-tom-e**	(a**tom**)	an instrument for cutting x [57]
70.	**x-ec-tom-e**	(tonsill**ectomy**)	an instrument for cutting out x [58]
71.	**x-o-scop-e**	(tele**scope**)	an instrument for examining x [62]

Others consist of the base alone.

72.	**x-o-clast**	(icono**clast**)	something which breaks x [18]
73.	**x-o-stat**	(thermo**stat**)	something which stops x [53]
74.	**x-o-gen**	(carcino**gen**)	a substance which produces x [23]
75.	**x-o-path**	(psycho**path**)	one with a disease of x [20]
76.	**x-o-graph**	(tele**graph**)	an instrument for recording x [64]
77.	**x-o-gram**	(tele**gram**)	a record of x [64]
78.	**x-o-meter**	(speedo**meter**)	an instrument for measuring x [63]

ADJECTIVES WITH SPECIAL MEANINGS

While most derived noun-suffixes have adjectival forms regularly translated by the formulaic phrase "pertaining to," three derived adjectival suffixes have more specific meanings.

79.	**x-o-gen-ic**	(carcino**genic**)	producing x [23 above]
80.	**x-o-gen-ous**	(indi**genous**)	produced by x [23, 79]
81.	**x-o-trop-ic**	(**tropi**cal)	preferentially affecting x [67]

LATIN INFLECTIONAL ENDINGS

Inflectional endings, which will be discussed in more detail in later chapters, are used in Latin to indicate whether a word is nominative or possessive, whether it is singular or plural, and in many cases whether it is masculine, feminine or neuter. Thus, for example, the base "crani-" means "skull," while "crani-**um**" (nominative singular neuter) means "**the** skull" or "**a** skull," "crani-**a**" (nominative plural neuter) means "skull**s**," "crani-**i**" (possessive singular) means "**of a** skull," and "crani-**orum**" (possessive plural) means "**of** skull**s**."

NOUNS

In the lists of combining forms in the ensuing chapters, most of the Latin words (in the columns at the extreme right) are of one of the following nominative singular forms. Other nominative endings, less predictable in form and gender, will be pointed out as they occur.

ENDING	GENDER	TRANSLATION	EXAMPLE	TRANSLATION
82. **x-us**	Masculine	(the/a) x	muc-**us**	"slime"
83. **x-a**	Feminine	(the/a) x	vertebr-**a**	"a joint"
84. **x-um**	Neuter	(the/a) x	crani-**um**	"the skull"
85. **x-on**	Neuter	(the/a) x	gangli-**on**	"a knot"

ADJECTIVES

The Latin adjectival forms (right column, 2-10 above) are also inflectional endings. To this group one more series must be added; note that the endings themselves are the same as those added to "x-**oid**" (10 above).

	MASCULINE	FEMININE	NEUTER	
86.	**x-(e)us**	**x-(e)a**	**x-(e)um**	pertaining to x

PART B. NOTES

NOUNS

Most abstract nouns contain a **verbal** idea. In other words, abstract nouns generally denote a **process** of doing something (or a process by which something happens). Thus, for example, "x-o-metry" (63), defined above as "the measurement of x," would be more literally rendered by "the process of measuring x." The shorter form is acceptable, but it must be distinguished from "**a** measurement of x," which in fact does not imply a process but rather the **result** of that process. This caution applies to most of the therapeutic nouns, as well as to many of the diagnostic ones. Note that the difference often hinges on the use of the definite (as opposed to indefinite) article, and on the use of the gerund. Study the following examples carefully, and satisfy yourself that you understand the difference between the **abstract process** and the **concrete result**.

x-orrhaphy (56)	**the** sutur**ing** of x (not "**a** suture of x")
x-orrhea (37)	**the** flow**ing** of (something from) x (not "**a flow** of [something] from x")
x-edema (38)	**the** swell**ing** of x (not "**a swelling** of x")

New derived suffixes are sometimes formed by combining various terminations, as the following group shows.

x-o-lith (40)	a calculus in(volving) x
x-ias-is (17)	the abnormal presence of x
x-o-lith-ias-is	the abnormal presence of a calculus in(volving) x

The noun endings "-ia," "-is," "-y" and "-esis" are interchangeable to some extent, and "-es-is" itself has a variant "-es-ia." This gives rise to a number of alternative forms (less frequently found than the ones given above) for the derived noun suffixes in Part A. These variants seem to occur most frequently with diagnostic terminations. For example, while "x-o-pex-**y**" (65) is the usual form, "x-o-pex-**is**" does occur. The meaning does not change with these alternative endings.

ADJECTIVES

Most derived noun suffixes can be made into adjectives by replacing the primary noun suffix with an adjectival one. Some paired examples follow.

x-o-plast-**y** (54)	the surgical repairing of x
x-o-plast-**ic** (54 & 3)	pertaining to the surgical repairing of x
x-o-dys-troph-**y** (48)	the defective growth of x
x-o-dys-troph-**ic** (48 & 3)	pertaining to the defective growth of x
x-o-phag-**y** (22)	the ingestion of x
x-o-phag-**ous** (22 & 4)	pertaining to the ingestion of x

Note that for most nouns ending "-**s**-**is**," the corresponding adjective ends "-**t**-**ic**." That is, the noun suffix "-**is**" is dropped, the final "-**s**-" of the base changes to "-**t**-," and the adjective suffix "-**ic**" (3) is added. English derivatives often reflect this stem change.

x-o-gen-e**s**-**is**	(gene**s**is)	the production of x (23 above)
x-o-gen-e**t**-**ic**	(gene**t**ic)	pertaining to the production of x
x-o-sta**s**-**is**	(sta**s**is)	the stopping of x (53 above)
x-o-sta**t**-**ic**	(sta**t**ic)	pertaining to the stopping of x

An exception is "x-o-cla**st**-ic" from "x-o-cla**s**-**is**" (18), where the "**s**" and the "**t**" both appear in the adjective. An occasional exception is "x-o-pla**st**-ic," but the adjective is in fact usually formed from "x-o-pla**st**-y" (54) rather than from "x-o-pla**s**-ia" (45).

Adjectival forms which do not obviously follow either of these patterns are given below. Notice again that English derivatives will sometimes be helpful.

Some of these must simply be memorized.

x-edema (38)		the swelling of x
x-edem**at**-ous		pertaining to the swelling of x
x-o-spas**m** (41)	(**spast**ic)	a **spasm** of x
x-o-spas**t**-ic		pertaining to a spasm of x
x-ec-ta**s-ia** (44)		the distention of x
x-ec-ta**t-ic**		pertaining to the distention of x (as if from "x-ec-ta**s-is**")

The letter "x" often stands for the two sounds "**ks**" (see the Notes in Chapter 3), which explains the following two apparent irregularities.

x-o-pe**x-y**	("pe**cs**-y")	the adhesion/fixation of x (65 above)
x-o-pec**t-ic**	(pe**ct**-in)	pertaining to the adhesion/fixation of x (as if from "x-o-pe**cs-is**")
x-o-rrhe**x-is**	("rrhe**cs-is**")	the rupturing of x (15 above)
x-o-rrhe**ct-ic**		pertaining to the rupturing of x

Review the special adjectives given at 79-81 above. Virtually all other adjectival forms can be translated by a phrase beginning with "pertaining to" and are unambiguous in their reference, but a few can have two meanings. Mention has already been made of "x-o-plast-ic," which usually means "pertaining to the surgical repairing of x" ("x-o-plast-y" [54]) but which occasionally means "pertaining to the formation of x" ("x-o-plas-ia" [45]). In addition, for all of the abstract nouns which have concrete nouns derived from them (68-78 above), the corresponding adjective will **usually** refer to the abstract form but **occasionally** can refer to the concrete one. Study the following examples.

x-o-scop-ic	(62)	pertaining to the examination of x (x-o-scop-y), **or**
	(71)	pertaining to an instrument for examining x (x-o-scop-e)
x-o-graph-ic	(64)	pertaining to the recording of x (x-o-graph-y), **or**
	(76)	pertaining to an instrument for recording x (x-o-graph), **or**
	(77)	pertaining to a record of x (x-o-gram)

COMBINING VOWELS

In a form like "x-o-schisis" (16), the "-**o**-" is a combining vowel, inserted to make the word easier to pronounce. The rules for its use are straightforward.

- If the termination begins with a consonant the combining vowel must be inserted, but if the termination begins with a vowel it is omitted. Thus we find "x-**o**-schisis" (16), but "x-**i**tis" (14).
- The combining vowel is usually "-o-," but other vowels are occasionally used; these will be pointed out as they occur.
- An additional rule will be presented in Chapter 2.

Note that in some terminations, such as "x-o-logy" (61), the "o," although etymologically the combining vowel, is regarded as an integral part of the termination.

COMMON SENSE

For some forms in Part A above two meanings are given. In practice, the base to which the termination has been added will usually indicate which meaning is to be preferred.

For the following terminations, attention must be paid to whether the base is ultimately verbal or substantive in meaning.

"x-ize" (1), where "x" represents a **verbal** idea ("**sympath**ize"), will mean "to (do the action of) x;" where "x" represents a **substantive** idea ("**final**ize") it will mean "to make (something) x." Study the following literal translations of the two example words.

sympathize	to **have** or **give** or **offer** sympathy
finalize	to **make** (something) final

"x-ist" (12), where "x" represents a **verbal** idea (bi**olog**ist), will mean "one who (does the action of) x;" where "x" represents a **substantive** idea (**dent**ist) it will mean "one who specializes in x." Literal translations of the example words follow.

biologist	one who **studies** life
dentist	one who specializes in teeth

"x-in" (13), where "x" represents a **verbal** idea ("**pect**in;" see 65), will mean "a substance which does (the action of) x;" where "x" represents a **substantive** idea ("**adrenal**in") it will mean "a substance of x." Literal translations of the example words follow.

pectin	a substance which fixes
adrenalin	a substance of the adrenal gland

For several other terminations, attention must be paid to the nature of what the base represents.

- "x-orrhea" (37) will mean "the flowing of x" where "x" represents a substance which **can** flow; if not, the form will mean "the flowing of something **from** x."
- "x-orrhagia" (30) and "x-o-cele" (39) are analyzed similarly.
- "x-algia" (26) and "x-odynia" (27) will regularly mean "pain in x;" where "x" is by nature incapable of feeling pain, however, they will mean "pain involving x." "x-o-lith" (40) is similarly analyzed.

Remember that the phrase "pertaining to," as a translation for adjectival endings, is very vague and is only used when a more specific adjectival phrase is not consistently implied by a particular termination. The translations given for the adjectives at 79-81 above are examples of such specific phrases. They are repeated below; satisfy yourself that in each case the translation given is more specific (and therefore more useful) than the vague phrase "pertaining to."

x-o-gen-ic (79)	producing x (not "pertaining to the production of x")
x-o-gen-ous (80)	produced by x
x-o-trop-ic (81)	preferentially affecting x (not "p.t. the tendency to preferentially affect x")

More adjectival endings with specific translations will be pointed out as they occur in subsequent chapters.

The useful distinction between "x-o-gen**ic**" and "x-o-gen**ous**" is ignored in certain words, presumably because of confusion or ignorance on the part of those who coined them. In this book, however, the distinction is observed throughout.

The double adjectival ending "-ic-al," found in many commonly occurring English words, usually referring to fields of study ("biologi**cal**," "pharmaceuti**cal**," "psychologi**cal**" and "histori**cal**," for example), is translated as though it were singular ("pertaining to the study of life," etc.); despite its prevalence in academic English, it is extremely rare in Medical Terminology.

LATIN INFLECTIONAL ENDINGS

Notice that most of the Latin adjectival endings (3, 4, 5, 7, 8, 9, 10 and 86 above) can be understood as being composed of an adjectival base (usually identical with or similar to the English form) followed by one of the noun endings (82, 83 or 84, according to gender).

The remaining adjectival endings (2 and 6 above) can be similarly analyzed, into adjectival bases followed by the noun endings "-is" or "-e." Note that, as noun ending, "-is" can be either masculine or feminine, depending upon the word to which it is attached (see further the Notes in Chapter 2), while "-e" is always neuter.

The neuter nominative ending "-on" (85 above) is Greek and is retained in some words borrowed from Greek into Latin.

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTER 1

Translate the words in each of the following sections to the best of your abilities. Then check your answers to that group and study the accompanying notes. Do all this before you move to the next group of questions; in many cases a new group will build upon the one before it or otherwise presuppose your mastery of concepts that have been presented earlier. For the best results, cover the answers until you have done the translations.

NUMBER AND SPECIFICITY: HOW MANY HAIRS?

1. **trichophagy** (x = trich = hair)_____
2. **dactylitis** (x = dactyl = digit)_____
3. **cytonecrosis** (x = cyt = cell) _____
4. **trichoschisis** _____

ANSWERS AND EXPLANATIONS

As a general rule, in a word of the form x-T, where T is a termination, there is no way of knowing how many of the items denoted here by "x" are meant. The process or condition named by any given Diagnostic or Therapeutic termination is usually capable of affecting all of (or some of, or one of) any given body part or organ. This means that several translations are often equally valid, as the following examples indicate. (Typically, in this book, the *Workbook*, and in the Online Exercises, **only one answer of the following types will be given in any answer key**.)

1. **trich-ophagy**
   - the ingestion of hair
   - *or* the ingestion of hair**s**
   - *or* the ingestion of **a** hair
   - *or* the ingestion of **the** hair

2. **dactyl-itis**
   - the inflammation of a digit
   - *or* the inflammation of **the** digit
   - *or* the inflammation of digit**s**
   - *or* the inflammation of **the** digit**s**
3. **cyt-onecrosis**
   - the death of the cell
   - *or* the death of **a** cell
   - *or* the death of cell**s**
   - *or* the death of **the** cell**s**

Sometimes, as the words in the next section illustrate, the layout of the human body or other considerations will make one choice clearly best. For example, occasionally even the number of hairs might be constrained by the logic of the word.

4. **trich-oschisis**
   - the splitting of a hair
   - *or* the splitting of hair**s**
   - *not* the splitting of **the** hair

ANATOMICAL CONSTRAINTS: HOW MANY NOSES?

The average word in Medical Terminology is predicated on the notion of one patient, with the normal number of body parts, as the translations of the following words indicate.

1. **facial** (x = faci = face) _____
2. **arthrolith** (x = arthr = joint) _____
3. **dermatic** (x = dermat = skin) _____
4. **pneumostomy** (x = pneum = lung)_____
5. **rhinorrhea** (x = rhin = nose) _____

ANSWERS AND EXPLANATIONS

1. **faci-al**
   - p.t. the face
   - *not* p.t. face**s** (because we've only got the one)
   - *not* p.t. **a** face (this also implies that we have more than one)
2. **arthro-lith**
   - a calculus in a joint
   - *not* a calculus in the joint**s** (because one calculus cannot be in two places at once)
3. **dermat-ic**
   - p.t. the skin
   - p.t. skin
   - *not* p.t. skins; *not* p.t the skins
4. **pneum-ostom-y**
   - the making of an opening in the lung
   - *not* the making of an opening in the lungs (one opening cannot be made in two lungs)

   Note here that, as usual, the number and specificity associated with the termination is *not* up for debate.
   - *not* the making of **the** opening in the lung
   - *not* the making of opening**s** in the lung
5. **rhin-orrhea**
   - the flowing of something from the nose
   - *not* the flowing of the nose

   But notice that "the flowing of the nose" is at least a better answer than "the flowing of nose**s**".

ADJECTIVES MADE FROM TERMINATIONS: PERTAINING TO WHAT EXACTLY?

Note carefully the relationship between the following pairs and groups of words.

1. **cytogenesis** (x = cyt = cell)_____
2. **cytogenetic** _____
3. **cephalitis** (x = cephal = head) _____
4. **cephalitic**_____
5. **omography** (x = om = shoulder) _____
6. **omographic** _____
7. **arthropathy** (x = arthr = joint) _____
8. **arthropathic** _____
9. **onychomalacia** (x = onych = nails)_____
10. **onychomalacic**_____
11. **cardiomegaly** (x = cardi = heart)_____
12. **cardiomegalic** _____
13. **cytopathology** (x = cyt = cell)_____
14. **cytopathologist** _____
15. **cytogenetics** _____

ANSWERS AND EXPLANATIONS

1. **cyto-genes-is**
   - the production of cells

2. **cyto-genet-ic**
   - p.t. cytogenesis
     = p.t. **the** production of cells
   - *not* p.t. **a** production of cells
   - *not* p.t. production**s** of cells

Generally speaking, the complex endings in Chapter 1 form abstract words. This is why the initial article "the" is vital in most of their translations, as in the following case.

3. **cephal-it-is**
   - the inflammation of the head

When an abstract noun is made into an adjective, the translation of the new word needs to reflect the abstraction of the original noun. Thus the following word cannot mean "pertaining to **an** inflammation of the head" and it cannot mean "pertaining to the inflammation**s** of the head."

4. **cephal-it-ic**
   - pertaining to **the** inflammation of the head

Notice, however, that the adjective x-o-graphic could be the adjective for the process, the result, or the instrument involved in "recording" something (1.64, 76-7). Hence three translations are possible for any x-o-graphic.

5. **om-ograph-y**
   - the recording of the shoulder

6. **om-ograph-ic**
   - p.t. omography
     = p.t. the recording of the shoulder
   - *or* p.t. an omogram
     = p.t. a record of the shoulder
   - *or* p.t. an omograph
     = p.t. an instrument for recording the shoulder

A few exceptions occur when an adjective is made from a less abstract noun, as exemplified by the following pair (note that the translation of this noun is unusual in that it does not begin with the word "the").

7. **arthr-opath-y**
   - a disease of a joint
8. **arthr-opath-ic**
   - p.t. a disease of a joint
   - *or* p.t. disease**s** of a joint
   - *or* p.t. **the** disease**s** of a joint

For the vast majority of Diagnostic and Therapeutic suffixes whose translation does begin with the word "the," a useful trick is to think of there being two forms involved, not one. Thus, for example, x-ogenet- (no matter what follows) means the same thing as x-ogenesis: "**the** production **of** x." Hence the following sequences.

9. **onych-omalac-ia**
   - the softening of the nails
10. **onych-omalac-ic**
   - p.t. onychomalacia (preliminary answer)
     = p.t. the softening of the nails (correct answer)
   - *not* p.t. **a** softening of the nails
   - *not* p.t. the softening**s** of the nails
11. **cardi-omegal-y**
   - the enlargement of the heart
12. **cardi-omegal-ic**
   - p.t. cardiomegaly (preliminary answer)
     = p.t. the enlargement of the heart (correct answer)
   - *not* p.t. **an** enlargement of the heart
   - *not* p.t. the enlargement**s** of the heart
13. **cyt-opath-olog-y**
   - the study of diseases of cells
     (= the study of cytopathy)

14. **cyt-opath-olog-ist**
    - one who studies diseases of cells

      (= one who specializes in cytopathology)

      (= one who studies cytopathy)

As the following translation illustrates, -genet- can *not* be rendered "**a** production of" or "**the** production**s** of".

15. **cyt-ogenet-ics**
    - the science of the production of cells

      = the science of cytogenesis

As a fairly mechanical explanation of how we have been proceeding here, the answer to the exasperated question "pertaining to what?" is found by removing the adjectival (or other "extra") ending, then reconstructing the simple noun represented by whatever is left over.

2

GENERAL ANATOMY

PART A. COMBINING FORMS

[For the significance of various conventions followed in lists of combining forms, see the Introduction.]

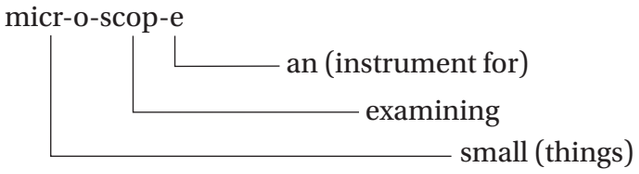
	COMBINING FORM	EXAMPLE	TRANSLATION	LATIN FORM
1.	**anthrop-o**	(**anthrop**ology)	man, human	
2.	**som(at)-o**	(psycho**somat**ic)	body	
3.	**derm(at)-o**	(**derma**tology)	skin	**derma, derm-is**
4.	**epi-derm(at)-o**	("upon [the] dermis")	**epiderm**is	**epi-derm-is**
5.	**cyt-o** **x-o-cyt-e**	(**cyt**ology) (erythro**cyte**)	cell a cell of x	
6.	**arthr-o**	(**arthr**itis)	joint	
7.	**acr-o**	(**Acro**polis)	extremities	
8.	**mel-o**		limb	
9.	**cephal-o**	(en**cephal**itis)	head	
10.	**trich-o**	(**trich**inosis)	hair	
11.	**blephar-o**	("[that which] looks")	eyelid	
12.	**ophthalm-o**	(**ophthalm**ology)	eye	
13.	**ot-o**	(**ot**olaryngology)	ear	
14.	**rhin-o**	(**rhin**oceros)	nose	
15.	**pros-op-o**	(Cycl**op**s)	face	
16.	**faci-o**	(**faci**al)	**face**	

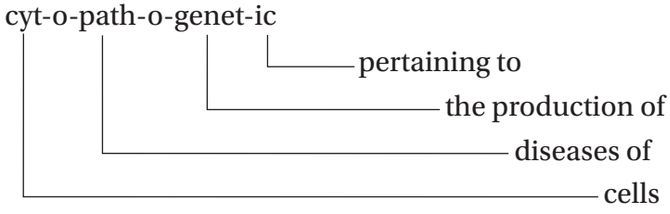
17. **cervic-o**	(**cervic**al)	neck	**cervix**
18. **trachel-o**	("throat")	neck	
19. **om-o**		shoulder	
20. **brachi-o**	(**brac**elet)	arm	**brachi-um**
21. **ancon-o**	(**ang**le)	elbow	
22. **cheir-o, chir-o**	(**chir**opractor)	hand	
23. **dactyl-o**	(ptero**dactyl**)	**digit**	
24. **onych-o**	(**onyx**)	nail	
25. **thorac-o**	(**thorax**)	chest	**thorax**
26. **steth-o**	(**steth**oscope)	chest	
27. **mast-o**	(**mast**ectomy)	breast	
28. **mamm-o**	(**mamm**al)	breast	**mamm-a**
29. **thel-e**	(**fe**male)	nipple	
30. **omphal-o**	(**umbil**ical)	**navel**	
31. **umbil(ic)-o**	(**umbilic**al cord)	**navel**	**umbilic-us**
32. **glut(e)-o**	("rump")	buttock	
33. **gon-o, gony-o**	(penta**gon**)	**kn**ee	
34. **pod-o**	(octo**pod**es)	**foot**	
35. **ped-o**	(**ped**al)	**foot**	**pes**

PART B. NOTES

SUBORDINATION

Medical terms are usually analyzed from right to left, as the following examples indicate.



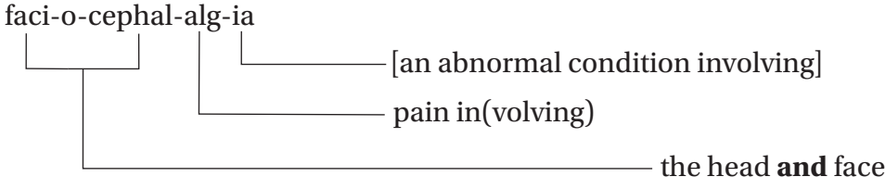


Words like these can be called "subordinating" because each non-final element presents an idea which is **subordinate** in meaning to the element to its right, in that it modifies the meaning of that element.

Thus a microscope is most importantly "an instrument." At another level of meaning, it is more specifically "an instrument **for examining things**" (as is a telescope), while at a third level it is "an instrument for examining **small** things" (whereas a **tele**scope is "an instrument for examining **distant** things").

COORDINATION

Some words contain two bases which are on the **same** level of meaning.



Words like these can be called "coordinating," because two elements are on the same level of meaning and their translations can (in this case) therefore be joined by the **coordinat**ing conjunction "and;" neither is **sub**ordinate in meaning to the other. Thus "faci-o-cephal-alg-ia" could equally well be translated "pain in the face and head" (that is, with the coordinate elements in reverse order). Nevertheless, because the majority of medical words contain one or more **sub**ordinated parts, you should always translate even **co**ordinating words from right to left. Some exceptions to this rule are described in the following Notes, and others will be encountered in Chapters 7 and 13.

COMMON SENSE

Very occasionally, in a term of three or more parts, the first two will seem to occur in reverse order. Common sense will usually determine if this is the case. For example, translated by the pattern given above, "acr-o-mast-it-is" would be "the inflammation of the breasts of the extremities." As this makes little sense, intuition would suggest "the inflammation of the extremities of the breasts," but in keeping with the principles being discussed here, we prefer that you translate this as "the inflammation of the breasts, **involving** the extremities."

Such words are rare, and they follow the general principle that in Medical Terminology rules are usually broken **only** when no ambiguity will result. Note that in the example above, "acr-o" is functioning as if it were a prefix (see further Chapter 13).

Generally speaking, in compound words only concrete suffixes and inflectional endings can be translated with certainty as to number and degree of specificity. Thus, by its ending, "microscop-**e**" must denote "**an** instrument" (not "**several** instruments"). But it is common sense, not any element in the word itself, which tells us that "microscope" means "**an** instrument for examining small thing**s**" (as opposed to "**the** instrument for examining **a** small thing"). Similarly, "faci-o-cephal-alg-ia" will not mean "pain in (several) heads and faces," but nothing in the word itself implies that it does not. To put this another way, several slightly different translations of many of the words in this book will be, common sense permitting, equally acceptable. One example should suffice.

trich-o-path-ic pertaining to **a** disease of **the** hair
= pertaining to disease**s** of **the** hair
= pertaining to **the** disease**s** of **the** hair

= pertaining to **a** disease of hair
= pertaining to disease**s** of hair
= pertaining to **the** disease**s** of hair

= pertaining to **a** disease of hair**s**
= pertaining to disease**s** of hair**s**
= pertaining to **the** disease**s** of hair**s**

The phrase "pertaining to" is usually abbreviated to "p.t."

THE COMBINING VOWEL

RULES

In Chapter 1, it was stated that the combining vowel must be inserted between a base and a termination unless the latter begins with a vowel, in which case it will be omitted.

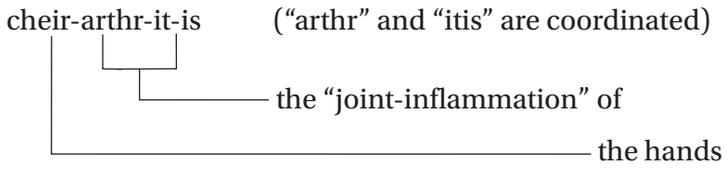
Between two bases, however, the combining vowel is regularly used even when the second begins with a vowel.

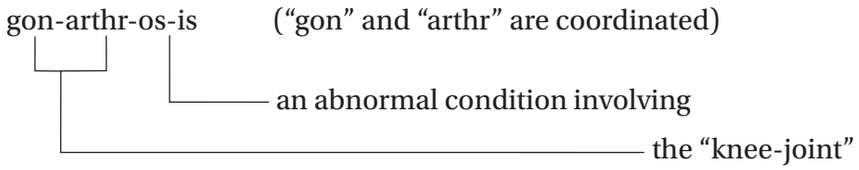
EXCEPTIONS

Some forms which consist of a base and a derived suffix exist as words in their own right, and when combined with yet another base are sometimes treated as new derived suffixes. For example, the rules above would predict that the correct medical word for "the inflammation of the joints of the hand" would be "cheir-o-arthr-it-is." In fact "cheir-arthr-it-is" is found, because "arthritis" is being treated as a derived suffix in its own right.

In some forms containing two bases without a combining vowel between them, the combination of bases is treated as if it were a single base. Thus the predicted medical word for "an abnormal condition involving the joints of the knee" would be "gon-o-arthr-os-is," but "gon-arthr-os-is" is found because the "knee-joint" is being treated as one element rather than as a combination of two.

Note that the concepts of subordination and coordination can be applied to the analysis of the examples given above.





Notice finally that these word types are rare and that you will always be safer if you stick to the simple principles already illustrated when making your translations.

cheir-arthr-itis	the inflammation of the joints of the hand
gon-arthr-osis	an abnormal condition involving the joint of the knee

COALESCENCE

If asked to generate a medical word for "an instrument for cutting the body," you would generate either "somat-o-tom-e" or (less probably) "som-o-tom-e." In fact, the term is "somatome." This is because the similar-sounding "-at-o" and "-o-to" have phonetically **coalesced**, as the following diagram shows.

som-**at-o**
+ **o-to**-me = som-**ato**-me

Thus, when you encounter a word which seems impossible to divide according to what you have learned, you should consider the possibility that coalescence has occurred. Remember, though, that such words are quite rare. In the *Workbook* Answer Keys, beginning with Chapter 3, any that do occur will be presented in such a way that the coalescence will be obvious; the word "somatome," for example, would be broken down as "som-at-o-tom-e."

APPARENTLY IRREGULAR INFLECTIONAL ENDINGS

The nominative singular noun ending "-is," seen for example in "derm-**is**" and "epiderm-**is**" (3 and 4 above), indicates that a word is **probably** feminine, although some words of this type are masculine. The two words in question are ultimately Greek, and when they were borrowed into Latin the native Latin ending "-is" replaced the original Greek nominative. (For the form of "derma," transliterating the original Greek ending, see the Notes in Chapter 4.)

The other apparently irregular endings in this chapter are all formed by the addition of "-s" to the combining forms involved, although various kinds of assimilation of contiguous letters or sounds have made this less than obvious.

Two types can be distinguished here. First, "x" in "cervi**x**" and "thora**x**" (17 and 25 above) is merely a way of representing by means of one symbol the two sounds "ks" (as, "cervi**c-s**" and "thora**c-s**;" see also the Notes in Chapter 3).

Second, in the case of "pes" (35 above), phonetic assimilation has caused the "d" of an original "pe**d-s**" to drop out. Like "-is," the ending "-s" usually denotes a feminine word; note, however, that the word "pes" is in fact masculine.

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-2

X-IST: ONE WHO DOES WHAT, TO WHAT?

You have already been dealing with words having more than one termination. You may find it useful to make up your own table of multiple terminations, with translations. For example:

x-opoiet-ometr-ist

- one who measures the formation of x

You may have difficulty with words of the form x-ist (1.12).

x-ist

- (Plan A) one who (does the action of) x
- (Plan B) one who specializes in x

Plan A requires you to interpret the phrase "does the action of" by examining what precedes it. Work through the following examples, then (as always) check your answers against ours and make a fuller list of your own if you must. Note that one such multiple termination, not previously mentioned, *must* be learned specially.

x-ic-ist

- one specializes in x-ics (preliminary answer)
- one who specializes in the science of x (correct answer)

1. **cytotherapy**_____
2. **cytotherapist** _____
3. **dermatorrhaphy** _____
4. **dermatorrhaphist** _____
5. **optometry** (x = opto = eye) _____
6. **optometrist** _____

7. **biology** (x = bi = life) _____

8. **biologist** _____

9. **dentist** (x = dent = tooth) _____

10. **somatotrophicist** _____

ANSWERS AND EXPLANATIONS

1. **cyt-otherap-y**
   - treatment by means of cells (the action is "treating")
2. **cyt-otherap-ist**
   - one who treats by means of cells
3. **dermat-orrhaph-y**
   - the suturing of skin
4. **dermat-orrhaph-ist**
   - one who sutures skin
5. **opt-ometr-y**
   - the measurement of the eye
6. **opt-ometr-ist**
   - one who measures the eye
7. **bi-olog-y**
   - the study of life
8. **bi-olog-ist**
   - one who studies life

If Plan A works, go with it; you will have the correct answer. But if there is no "action" implied by the form preceding "-ist", then Plan B kicks in.

9. **dent-ist**
   - (no action is implied; a dentist is *not* "one who teeths")
   - one who specializes in teeth

You may have noticed that multiple terminations usually show subordination. The concept of levels of meaning can be useful here, as you work through intermediary translations to get the fullest, best (and correct) answer.

10. **somat-otroph-ic-ist**
    - one who specializes in somatotrophics (level 1)
    - somatotroph-ics = the science of somatotrophy (level 2)
    - somat-otroph-y = the growth/nourishment of the body (level 3)

By putting this all together, you reach the correct answer.

somat-otroph-ic-ist
- one who specializes in the science of the growth/nourishment of the body

So, who does what, and to what? Remember the simple rule, that words in Medical Terminology are translated from right to left. The specialist (or whatever is designated by the termination at the extreme right-hand end of the word) does its thing to whatever is denoted by the element to its immediate left, and so on and so forth.

TERMINATIONS IN -IA AND -OSIS: AN ABNORMAL CONDITION, OR JUST PLAIN DEATH?

Review the Notes in Chapter 1 before translating the following words.

1. **dermia** _____
2. **dermosis** _____
3. **dermotic** _____
4. **dermopenia** _____
5. **dermopenic** _____
6. **dermonecrosis** _____
7. **dermonecrotic** _____

ANSWERS AND EXPLANATIONS

1. **derm-ia**
   - an abnormal condition involving skin
2. **derm-os-is**
   - an abnormal condition involving skin
3. **derm-ot-ic**
   - p.t. an abnormal condition involving skin
4. **derm-open-ia**
   - a deficiency of skin
   - *not* an abnormal condition involving a deficiency of skin
5. **derm-open-ic**
   - p.t. a deficiency of skin
6. **derm-onecr-os-is**
   - the death of skin
   - *not* an abnormal condition involving the death of skin
7. **derm-onecr-ot-ic**
   - p.t. the death of skin
   - *not* p.t. an abnormal condition involving the death of skin

There are several ways to explain the anomaly represented by these terminations (1.26-35). The real reason is that the word pieces "-ia" and "-osis" have no more meaning in and of themselves than English "-ness" does; even in combination their *real* meanings are more or less, respectively, "-ness" and "-ingness." Thus, for example, the word-piece "-alg-ia" is literally "-pain-ness" while the word-piece "-sten-osis" is literally "-narrow-ingness." It is only by convention that whole words of the shape x-alg-ia mean "pain in x" and words of the shape x-osten-osis mean "the narrowing of x." A further convention makes x-ia and x-osis (literally x-ness and x-ingness) mean "an abnormal condition involving x."

A general rule that is far simpler and that works for now (but not always) is, if the immediate "x" in any word x-ia or x-osis does *not* denote a tangible physical object (an organ, part, tissue or substance, for example), then think before translating "an abnormal condition involving…."

If both these explanations fail you for whatever reason, try the common-sense approach suggested in Chapter 1: medically regarded (the patient is on a table, you are examining symptoms) death (like narrowing, hardening, softening, etc.) is *already* an abnormal condition.

derm-onecr-ot-ic

- p.t. the death of skin (which is abnormal enough)
- *not* p.t. **an abnormal condition involving** the death of skin

In other words, if you seem to be faced with a choice between an abnormal condition involving death, on the one hand, and just plain old death on the other, go with good old garden-variety death every time.

TERMINATIONS WITH TWO TRANSLATIONS: THE FLOWING OF EYES?

You will have noticed that when a termination is given with two possible translations (x-ist, for example), your job is to pick the best one when translating a compound word. A general rule is to try the shortest of two possible answers first; if that yields a plausible result, then you generally have the right answer. If not, try the second. Remember that words in Medical Terminology are usually designed carefully, so if you seem to have a toss-up between two possibilities, then always pick the most specific one. Examples follow.

1. **cytalgia** _____

2. **trachelalgia** _____

3. **dermotomalgia** _____

4. **ophthalmorrhea** _____

ANSWERS AND EXPLANATIONS

1. **cyt-alg-ia**
   - pain involving cells
   - *not* pain **in** the cell (cells don't feel pain)
2. **trachel-alg-ia**
   - pain in the neck
   - *not* pain involving the neck (plausible, but too vague)
3. **derm-otom-alg-ia**
   - pain involving dermotomy (preliminary answer)
   - pain involving the cutting of skin (correct answer)
   - *not* pain **in** the cutting of skin
4. **ophthalm-orrh-ea**
   - the flowing of **something from** the eye
   - *not* the flowing of eyes

CONFUSABLES 1: WHAT'S THAT LETTER DOING THERE?

You will have already noticed, perhaps to your cost, that you need to divide each word very carefully before you try to define it – there are no "extra letters," let alone "extra syllables!" Here are some word groups to practice on.

1. **cytatrophy** _____
2. **cytotrophy**_____
3. **cytotrophic** _____
4. **cytatrophic** _____
5. **cytotropic** _____
6. **cytotropism**_____

7. **blepharotomy** _____

8. **blepharostomy**_____

9. **blepharectomy**_____

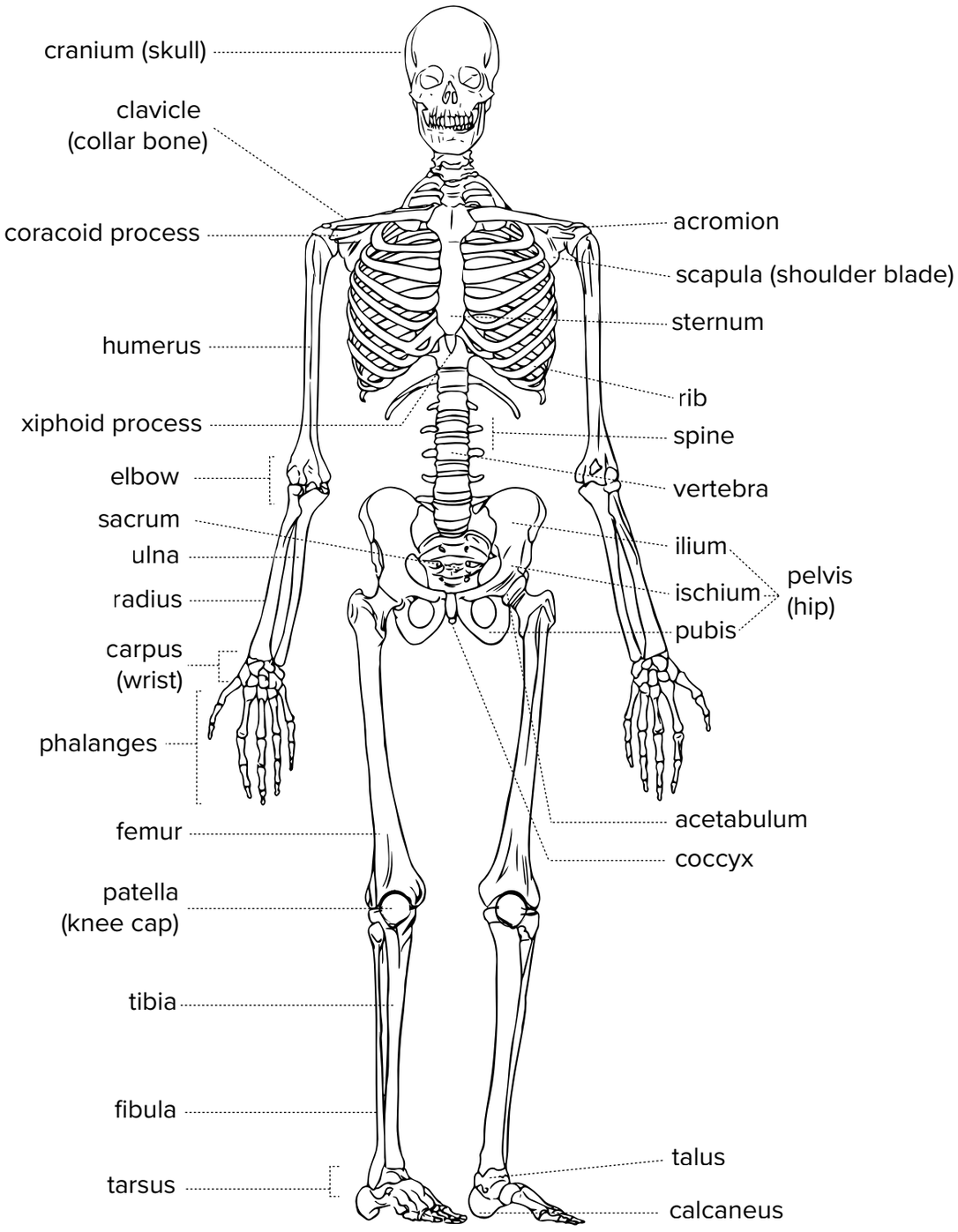
ANSWERS AND EXPLANATIONS

1. **cyt-a-troph-y**
   - the lack of growth of cells
2. **cyt-o-troph-y**
   - the growth/nourishment of cells
3. **cyt-o-troph-ic**
   - pertaining to the growth/nourishment of cells
4. **cyt-a-troph-ic**
   - p.t. the lack of growth of cells
5. **cyt-o-trop-ic**
   - preferentially affecting cells
6. **cyt-o-trop-ism**
   - the tendency to preferentially affect cells
7. **blephar-o-tom-y**
   - the cutting of the eyelids
8. **blephar-o-stom-y**
   - the making of an opening in an eyelid
9. **blephar-ec-tom-y**
   - the cutting out of the eyelid

So the short answer to the question "what's that extra letter doing there?" might well be that it is indicating that the form you are looking at is not what you think it is.

3

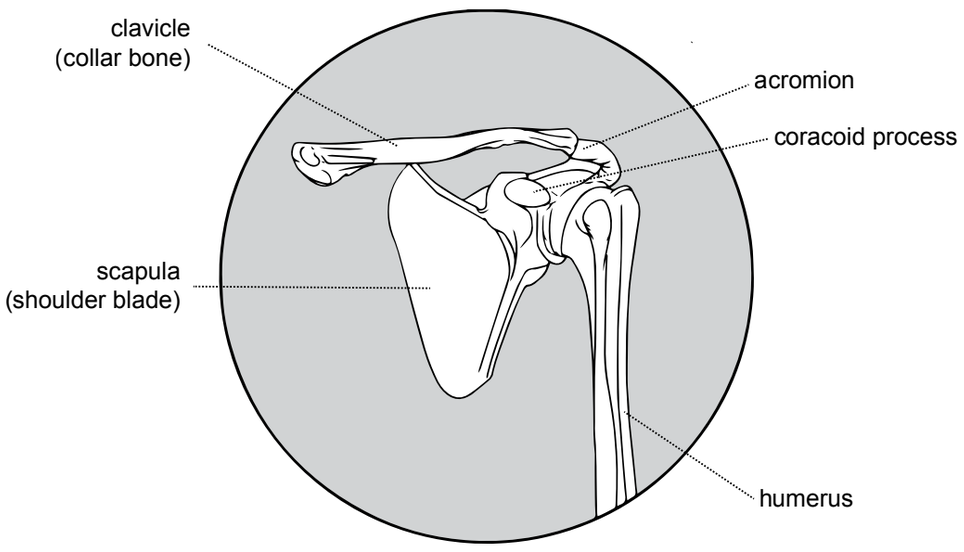
MUSCULOSKELETAL SYSTEM


cranium (skull)
clavicle (collar bone)
coracoid process
humerus
xiphoid process
elbow
sacrum
ulna
radius
carpus (wrist)
phalanges
femur
patella (knee cap)
tibia
fibula
tarsus
acromion
scapula (shoulder blade)
sternum
rib
spine
vertebra
ilium
ischium
pubis
pelvis (hip)
acetabulum
coccyx
talus
calcaneus

PART A. COMBINING FORMS

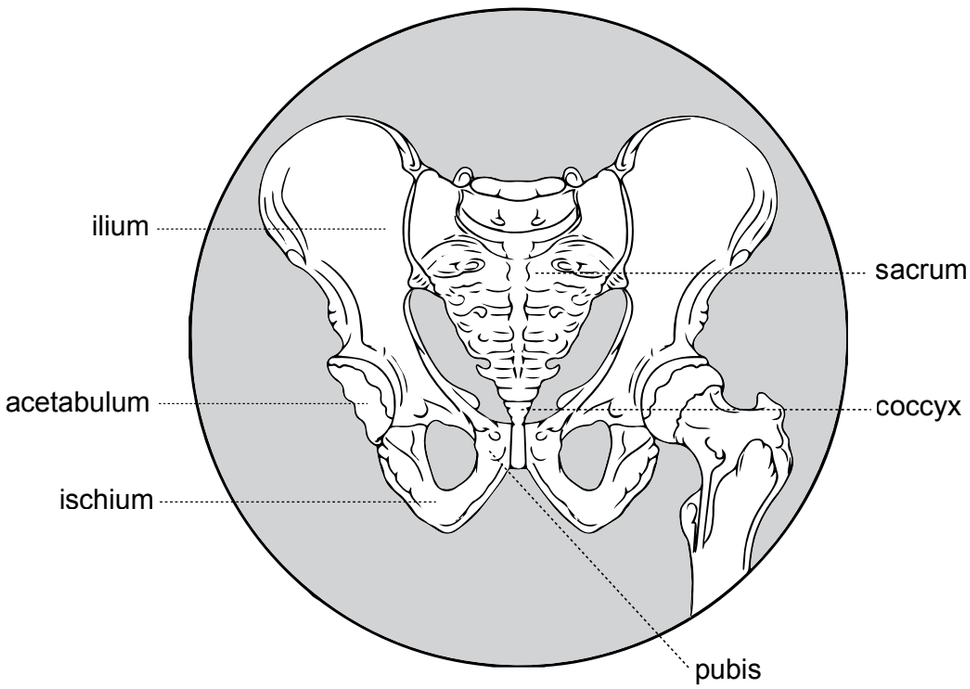
BONES

1.	**oste-o**	(**os**sify)	bone	
	x-ost-os-is	(x-**osis**)	the **oss**ification of x	
2.	**oss(e)-o**	(**oss**ify)	bone	**os**
3.	**skelet-o**	(“dried up”)	**skelet**on	
4.	**crani-o**	(**crani**al)	skull	**crani-um**
5.	**cleid-o**	(**cl**avicle)	collar bone	
6.	**clav-i-cul-o, clav(ic)-i**	(**clavi**chord)	collar bone	**clav-i-cul-a**
7.	**acr-om-i-o**	(**acr-om**-o)	**acromi**on	**acr-om-i-on**
8.	**corac-o, corac-oid-o**	(“raven”)	**coracoid** process	
9.	**humer-o**	(“shoulder”)	**humer**us	**humer-us**



10.	**cubit-o**	(**cubit**)	elbow	**cubit-us**
11.	**uln-o**	(**el**bow)	**uln**a	**uln-a**
12.	**radi-o**	(**radi**al)	**radi**us	**radi-us**
13.	**carp-o**	(carpal)	wrist	**carp-us**
14.	**phalang-o**	(**phalanx**)	**phalang**es	**phalang-es**
15.	**scapul-o**	(“shoulder”)	shoulder blade	**scapul-a**
16.	**rachi-o, rachi-, rhachi-o, rhachi-**	(**rick**ets)	spine	
17.	**spin-o**	(“thorn”)	**spin**e	**spin-a**
18.	**myel-o**	(“core”)	spinal cord; bone marrow	
19.	**spondyl-o**	(“round thing”)	vertebra	
20.	**vertebr-o**	(in**vertebr**ate)	**vertebr**a	**vertebr-a**
21.	**cost-o, cost-i**	(**coast**)	rib	**cost-a**
22.	**stern-o**	(“chest”)	**stern**um	**stern-um**
23.	**xiph-o, xiph-oid-o**	(“sword”)	**xiphoid** process	
24.	**cox-o**		hip	**cox-a**
25.	**pelv-i, pelv(i)-o**	(“basin”)	**pelv**is	**pelv-is**
26.	**ili-o**	(“flank”)	**ili**um	**ili-um**
27.	**ischi-o**	(“hip-joint”)	**ischi**um	**ischi-um**
28.	**pub-o, pub-i**	(**pub**erty)	**pub**is	**pub-is**
29.	**sacr-o**	(**sacr**ed)	**sacr**um	**sacr-um**
30.	**coccyg-o**	(**cuck**oo)	**coccyx**	**coccyx**

31. **acetab-ul-o**	(**acet**ic acid)	**acetabul**um	**acetab-ul-um**
32. **femor-o**	(“thigh”)	**fem**ur	**femur**
33. **pat-ell-o**	(**pat**ent)	knee-cap	**pat-ell-a**
34. **tibi-o**	(“shin”)	**tibi**a	**tibi-a**
35. **fib-ul-o**	(**fi**xer)	**fibul**a	**fib-ul-a**
36. **tars-o**	(“ankle”)	**tars**us	**tars-us**
37. **calcane-o**	(“heel”)	**calcane**us	**calcane-us**
38. **tal-o**	(**tal**on)	**tal**us	**tal-us**
39. **astragal-o**	(“ankle-bone”)	talus	**astragal-us**



CONNECTORS

40.	**chondr-o**	(hypo**chondr**iac)	cartilage	
41.	**cartilag(in)-o**	(“gristle”)	**cartilag**e	**cartilago**
42.	**my-o, my-os-o**	(**mous**e)	**mus**cle	
43.	**mus-cul-o**	(**muscul**ar)	**muscl**e	**mus-cul-us**
44.	**ten-o, tenon(t)-o**	(dis**ten**d)	**ten**don	
45.	**tend-o, tendin-o**	(ex**tend**)	**tend**on	**tendo**
46.	**desm-o**	(“binder”)	ligament	
47.	**syn-desm-o, syn-desm-os-o**	(“binder with”)	ligament	**syn-desm-os-is**
48.	**ligament-o**	(“binder”)	ligament	**ligament-um**
49.	**apo-neur-o, apo-neur-os-o**	(“muscle-sheath”)	**aponeuros**is	**apo-neur-os-is**
50.	**achill-o**		**Achill**es’ tendon	

PART B. NOTES

PHONETICS

Medical Terminology is by and large pronounced as it is written, but some special features should be noticed.

“C” AND “G”

- “**c**” and “**g**” before back vowels (a, o, u) are pronounced “hard” as in “**ca**r” and “**go**.”
- Before front vowels (e, i, y), “**c**” and “**g**” are pronounced “soft” as in “**ci**nder” and “a**ge**;” however, these sounds were always “hard” in Latin and Greek.
- When “hard” “**c**” or “**g**” is followed by “s,” the resulting sound is usually written “**x**.”

"C" AND "K"

Because "**c**" was originally always "hard," "**c**" and "**k**" have sometimes been used interchangeably. Thus, for example, "-**c**inesis" is occasionally found as an alternative form for "-**k**inesis" (1.25).

INTRUSIVE LETTERS

Occasionally an "**e**" (a front vowel) will "intrude" after a "c" or "g" and before a back vowel, where it serves to "soften" the consonant, as in "coccyg-**e**-al." Even more occasionally, this "intrusive e" will appear after other consonants. In Latin words, this vowel is the "-e-" of 1.86, and is used to form adjectives from nouns.

"Glut**e**-o" (2.32), for example, is more accurately divided "glut-**e**-o," as its alternate form "glut-o" indicates.

Sometimes this extra letter is so consistently found with a particular combining form as to be best treated as part of it. The "e" is originally intrusive in "ost**e**-o" (1 above), for example, as analysis of "x-ost-osis" and comparison with "oss(**e**)-o" (2 above) and "oss-i-fy" suggest.

Sometimes an initial "r-" will be doubled after another combining form. For example, "x-o-**rr**hea" (1.37) is from the root "-**r**hea."

COMMON SENSE

Some translations which you will generate will not seem very logical at first glance, and often these will require a word (or words) to be added.

The following examples illustrate some fairly common patterns wherein the formulaic translations should be expanded by the application of common sense. (Added words are in bold face.)

derm-oid-ec-tom-y	the cutting out of **something** resembling the skin
crani-ec-tom-y	the cutting out of **part of** the skull
rhin-o-necr-os-is	the death of the **tissues of the** nose
pelv-i-cephal-o-metr-y	the measurement of the head **of a fetus** and the pelvis **of a pregnant woman**

In the following examples, the added words are not as necessary, but they do improve the logic of the definitions. Note that the material given in **boldface** in these notes is for illustration only; when you are translating and feel the need to add something for sense or clarification, you should always use the "catchall" phrase "something involving." Do **not** attempt to second guess the dictionary and give the kinds of specific wordings given in these notes.

ophthalm-o-graph	an instrument for recording **the movements** of the eye
ot-o-scler-ot-ic	p.t. the hardening of **tissues of** the ear
dactyl-o-graph-y	the recording of the **characteristic patterns found on** the digits
mamm-o-gen	a substance which produces **or enhances the development of** the breast

Notice that the derived suffix given under 1 in Part A above (x-ost-os-is) contains a suffix you already know. Analyzed in this way, it means "an abnormal condition, involving bone, of x." But since in practice the "abnormal condition involving bone" will almost always be "ossification," the form should be treated as a **new** derived suffix and translated as such.

Three other combining forms (42, 47 and 49 above) contain "-os-," but in their cases the syllable is best considered as a meaningless part of the combining forms involved. Etymologically, it represents Greek inflectional endings whose meanings were ignored when the words in question were borrowed from Greek into Latin.

The skull (4 above) actually consists of a number of separate bones joined closely together; for these, see Chapter 8.

As "clav(ic)-**i**," "cost-**i**," "pelv-**i**" and "pub-**i**" (6, 21, 25 and 28 above) indicate, "-**i**-" is occasionally found as a combining vowel.

NOMINA ANATOMICA

"*Nomina Anatomica*" is Latin for "anatomical names," and the term refers to an internationally accepted system of designating parts of the body, using Latin words and phrases. Many of the words involved consist of Latin inflectional endings (see the Notes in Chapters 1 and 2) added to combining forms presented in this book. (Note that where a *Nomina Anatomica* form is in use, it will be presented in the extreme right column in the lists of combining forms.) Some rules of Latin usage must be learned.

In the phrases of the *Nomina Anatomica*, adjectives **follow** the nouns they modify.

Adjectives **agree** with the nouns they modify in **gender** and **number** (as in French) and also in **case**.

- The **genders** are three: masculine, feminine and neuter.
- The **numbers** are two: singular and plural.
- The **cases** are six; of these only two are regularly used in Medical Terminology: nominative and possessive (and only nominatives are presented in this book).

Masculine singular nominatives are presented below, feminine singular nominatives in Chapter 4, neuter singular nominatives in Chapter 5, and plurals (all genders) in Chapter 6.

Latin has no articles, which therefore must be supplied in translation.

MASCULINE SINGULAR NOMINATIVES

Most masculine singular nouns are formed by adding the **inflectional ending** "-us" (1.82 above) to a base. "Muscul-**us**" (the Latin word for "muscle"), for example, is thus made from the combining form "muscul-o" (43 above).

Masculine singular adjective endings are those in Chapter 1. 2-10 and 1.86, which terminate in "-**us**" (like the nouns) and "-**is**."

The following Latin phrases, exhibiting masculine nouns and adjectives in the nominative singular, are occasionally used in English.

ann-**us** mir-abil-**is**	wonderful year
ann-**us** horr-ibil-**is**	horrible year
ign-**is** fat-u-**us**	foolish fire (= "will-o-th'-wisp")
ris-**us** sardon-ic-**us**	sardonic grin (= "an involuntary spasmodic grin")
loc-**us** class-ic-**us**	classical location (= "standard, or best exemplary, passage")

Study the following medical terms and their definitions carefully.

muscul-**us** ancon-**e**-**us**	the muscle p.t. the elbow
muscul-**us** sacr-o-coccyg-**e**-**us**	the muscle p.t. the coccyx and sacrum
muscul-**us** uln-**ar**-**is**	the muscle p.t. the ulna
muscul-**us** ili-o-cost-**al**-**is**	the muscle p.t. the ribs and ilium

Note that "pertaining to" in the above examples cannot be replaced by the word "of." Possessive endings are not presented in this book; for now, notice the difference between the following phrases, with their translations, and their counterparts in the preceding examples.

muscul-**us** uln-**ae**	the muscle **of** the ulna
muscul-**us** ili-**i** cost-**al**-**is**	the muscle, p.t. the ribs, **of** the ilium
muscul-**us** cost-**ae** ili-**ac**-**us**	the muscle, p.t. the ilium, **of** a rib

In translating a *Nomina Anatomica* form, it is useful to go through an intermediate stage, in Medical English. Study the following examples.

muscul-**us** uln-**ar**-**is**	(Latin)
= the uln-**ar** muscle	(Medical English)
= the muscle p.t. the ulna	(Literal English)
muscul-**us** ili-o-cost-**al**-**is**	(Latin)
= the ili-o-cost-**al** muscle	(Medical English)
= the muscle p.t. the ribs and ilium	(Literal English)

APPARENTLY IRREGULAR INFLECTIONAL ENDINGS

"Coccy**x**" (30 above) is like "thora**x**" and "cervi**x**," explained in Chapter 2, and "phalang-**es**" (14) is the nominative plural of "phalan**x**," which follows the same pattern.

In the case of combining forms that end with "-in" or "-on," that final syllable regularly drops off and is replaced by "o" in the nominative singular. Hence "cartilag**o**," from "cartilag**in**-o" (41 above) and "tend**o**," from "tend**in**-o" (45 above). Although "tendo" happens to be masculine, nearly all words of this type are feminine.

Some Latin nominative singulars consist of the combining form without an ending, but sometimes with a change of the final vowel, as "fem**ur**" from "fem**or**-o" (32 above); most such words are neuter.

A very few Latin nominative singulars, like "os" (2 above), are actually irregular. In this case, the form is probably the result of the phonetic coalescence of an initial group of three separate "s" sounds into one, so that the original form may have been "oss-s" ("os" is neuter).

For nouns whose nominative singulars end in "-is" (25, 28, 47 and 49 above), see the Note on "Apparently Irregular Endings" in Chapter 2.

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-3

Do your best to translate the following groups of words before checking your answers against ours and studying the comments in our answer sections. Always divide each word carefully into meaningful parts before translating it, and when you have made a translation, then give it a "reality check" before you commit to it.

TERMINATIONS IN -ORRH-: CONFUSED YET?

The members of some groups of forms look superficially similar. Four famously difficult ones follow, which are misleadingly (**and wrongly**) divided here.

1. **cephal-orrha-phy** _____
2. **cephal-orrha-gia** _____
3. **cephal-orrha-phic** _____
4. **cephal-orrhe-a** _____
5. **cephal-orrhe-xis** _____
6. **cephal-orrhe-ic** _____
7. **cephal-orrhe-ctic** _____

ANSWERS AND EXPLANATIONS

Correct division of these (mostly made-up words) generates the correct answers.

1. **cephal-orrhaph-y**
   - the suturing of the head
2. **cephal-orrhag-ia**
   - the rapid flowing of something from the head

3. **cephal-orrhaph-ic**
   - p.t. the suturing of the head
4. **cephal-orrhe-a**
   - the flowing of something from the head
5. **cephal-orrhex-is**
   - the rupturing of the head
6. **cephal-orrhe-ic**
   - p.t. the flowing of something from the head
7. **cephal-orrhect-ic**
   - p.t. the rupturing of the head

WHEN ONE ADJECTIVE REFERS TO TWO NOUNS: PERTAINING TO WHICH THINGS?

Translate the following words; if more than one translation seems possible, try to decide which one is more likely to describe something in the real world.

1. **otoplasty** _____
2. **otoplasia** _____
3. **otoplastic** _____
4. **cytophagy** _____
5. **cytophage** _____
6. **cytophagic** _____
7. **cytoplastic** _____
8. **prosopoplastic** _____
9. **anthropophagic** _____
10. **dermotomic** _____

11. **onychectomic** _____

12. **omphaloscopic** _____

13. **osteoclastic** _____

14. **hemostatic** (hem = blood) _____

15. **omopathic** _____

16. **anconographic** _____

17. **podometric** _____

ANSWERS AND EXPLANATIONS

1. **oto-plast-y**
   - the surgical repairing of the ear
2. **oto-plas-ia**
   - the formation of the ear
3. **oto-plast-ic**
   - p.t. the surgical repairing of the ear (= p.t. otoplasty)
   - *or* p.t. the formation of the ear (= p.t. otoplasia)
4. **cyto-phag-y**
   - the ingestion of cells
5. **cyto-phag-e**
   - something which ingests cells
6. **cyto-phag-ic**
   - p.t. something which ingests cells (= p.t. cytophage)
   - *or* p.t. the ingestion of cells (= p.t. cytophagy)

In these cases, neither of the two translations for each adjective is inherently better than the other. Compare the following group.

7. **cyto-plast-ic**
   - p.t. the formation of cells
     - (probably) *not* p.t. the surgical repairing of cells
8. **prosopo-plast-ic**
   - p.t. the surgical repairing of the face
     - (probably) *not* p.t. the formation of the face
9. **anthropo-phag-ic**
   - p.t. the ingestion of humans
     - (probably) *not* p.t. something which ingests humans

In these cases, the second answer probably would not be marked wrong, but you should choose the first as inherently more likely. In the following pairs, each with two correct answers, you should choose the first, not because the second is necessarily wrong but, again, because the first is inherently more likely. Why?

10. **derm-otom-ic**
    - p.t. the cutting of the skin (dermotomy)
    - *or* p.t. an instrument for cutting skin (dermotome)
11. **onych-ectom-ic**
    - p.t. the cutting out of a nail (onychectomy)
    - *or* p.t. an instrument for cutting out nails (onychectome)
12. **omphal-oscop-ic**
    - p.t. the examination of the navel (omphaloscopy)
    - *or* p.t. an instrument for examining navels (omphaloscope)
13. **osteo-clast-ic**
    - p.t. the breaking of a bone (osteoclasis)
    - *or* p.t. something which breaks bones (osteoclast)
14. **hemo-stat-ic**
    - p.t. the stopping of blood (hemostasis)
    - *or* p.t. something which stops blood (hemostat)

15. **omo-path-ic**
    - p.t. a disease of the shoulder (omopathy)
    - *or* p.t. one with a disease of the shoulder (omopath)
16. **ancono-graph-ic**
    - p.t. the recording of the elbow (anconography)
    - *or* p.t. an instrument for recording the elbow (anconograph)
    - *or* p.t. a record of the elbow (anconogram)
17. **podo-metr-ic**
    - p.t. the measurement of the foot (podometry)
    - *or* p.t. an instrument for measuring the foot (podometer)

Why is the first answer here the best one to go with in each case? The reason is simply that, in the real world, you are much more likely to be using the adjective in reference to the abstract noun rather than to the concrete one – "a hemostatic crisis," for example, is not very likely to a be a problem with an instrument.

MULTIPLE COMBINING FORMS 1: THE HEAD OF THE NOSE, OR THE NOSE OF THE HEAD?

PLAN A

When translating terms with multiple non-terminal elements, a good rule of thumb is to try subordination (see the Note in Chapter 2); if the result makes sense, then your answer is probably correct. Practice on the following sequence of made-up words.

1. **dermatocyte** _____
2. **dactylodermatocyte** _____
3. **pododactylodermatocyte** _____

ANSWERS AND EXPLANATIONS

1. **dermato-cyt-e**
   - a cell of the skin
2. **dactylo-dermato-cyt-e**
   - a cell of the skin of a digit
   - *not* a cell of the skin of the digit**s** (one cell cannot be owned by several digits)
3. **podo-dactylo-dermato-cyt-e**
   - a cell of the skin of a digit of the foot

You might find it useful to make up increasingly unlikely words by adding terminations to the right and non-terminal elements to the left. Imagine you have been given a Martian to work on, and that your Martian typically has feet on his noses, and noses on each arm as well as on each head (and of course each nosefoothead also has noses and hairs and so forth...). The linguistic principle here is called recursion.

PLANS B AND C

Often the "level of meaning" approach (involving subordination, or recursion) will not seem to work. If so, try Plan B, in which you replace "of" with "involving." Only if all else fails should you default to Plan C, which is to use plain old "and."

1. **cephalorhinoplasty**_____
2. **faciocephalalgia** _____
3. **podocheiredema**_____
4. **chiropodoplegia** _____

ANSWERS AND EXPLANATIONS

1. **cephalo-rhino-plast-y**
   - the surgical repairing of the nose, involving the head
   - *not* the surgical repairing of the nose of the head

This may not seem obvious until you turn the exercise around: if we asked you to generate a medical term for the surgical repairing of the nose of the head we would expect you to realize that the last phrase is redundant (only heads have noses; we lack them elsewhere) and give the correct term: rhinoplasty.

The solution is to modify your answer: the word cephalorhinoplasty denotes an operation done to the nose, and it also tells us that the head is somehow involved in that operation.

Note that the comma in your correct answer shows your understanding of the fact that the operation is not done to the particular nose (as if we had more than one) that involves the head (versus a hypothetical nose perhaps involving the belly button). That is, it is the operation (the surgical repairing), not the body part (the nose), which our word shows as involving the head.

In these cases you should always try Plan A first; if that doesn't make sense, try Plan B. Thus, a better translation for the example word given in the Note on "Subordination" in Chapter 2 is the following.

2. **facio-cephal-alg-ia**
   - *not* pain in the head of the face (Plan A)
   - pain in the head, involving the face
     - (If Plan B works, go with it; it's probably the correct answer)
   - (probably) *not* pain in the head and face (Plan C)

For podocheiredema Plan A would suggest "the swelling of the hand of the foot," which is clearly wrong; but Plan B, "the swelling of the hand, involving the foot," doesn't sound much better. The solution is to remember that a (relatively small) number of words can truly be called coordinating. Two made-up examples follow.

3. **podo-cheir-edema**
   - *not* the swelling of the hand of the foot (Plan A)
   - (probably) *not* the swelling of the hand, involving the foot (Plan B)
   - the swelling of the hands and feet (correct answer)
   - *or* the swelling of a hand and a foot
   - (*or* the swelling of the hands and a foot....)

That is, your choice of Plan C here reveals your understanding of the fact that the swelling is happening equally to two things, neither of which is in any way subordinated to, or privileged over, the other.

Note that in words containing two terms that really are coordinating, the action denoted by the termination is applied equally to the two parts, considered as if they were only one united part. The distributive principle (in Mathematics) may be helpful here.

2(a +b) = 2(b+a) = 2a + 2b

- For example, 2(3+4) = 2(4+3) = 2x4 + 2x3 = 8+6 = 14 = 2x7 = 2(3+4)

To put this another way, in a truly correlative word, the termination applies equally to both combining forms, as if they were the numbers within brackets in the formula above.

4. **chiro-podo-pleg-ia**
   - the paralysis of the foot and hand
     = the paralysis of the hand and foot

Two more correct answers (which would never be used in the real world) further illustrate this principle.

- the paralysis of the foot and the paralysis of the hand
  = the paralysis of the hand and the paralysis of the foot

In summary, if you generate a phrase like “the nose of the head” or “the head of the nose,” think again.

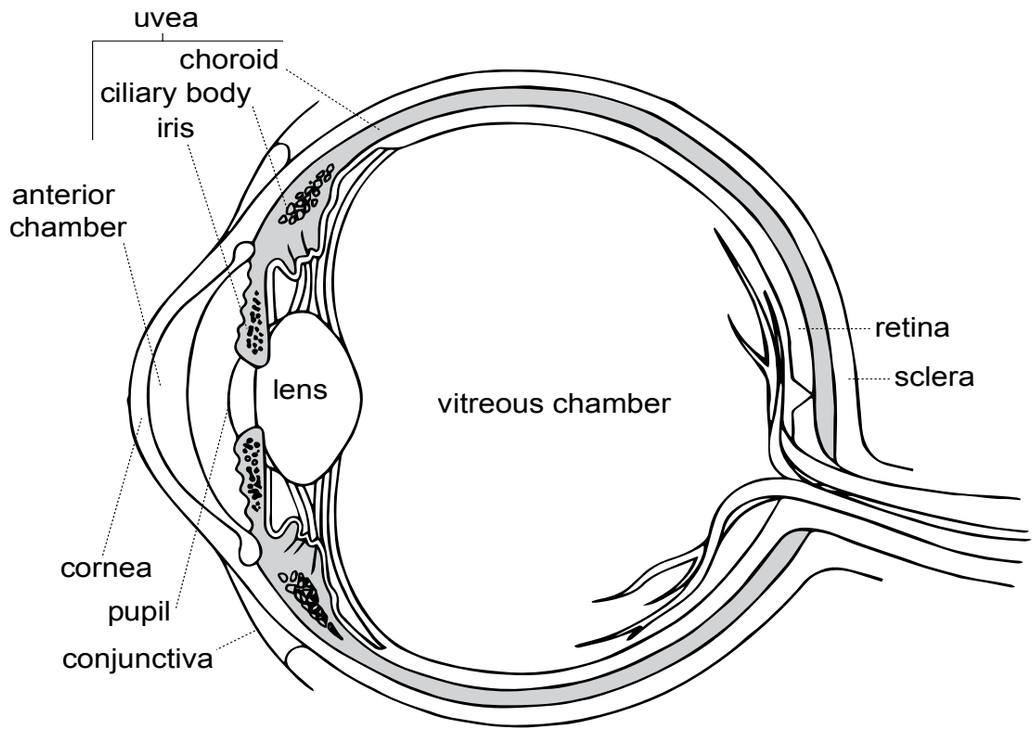
4

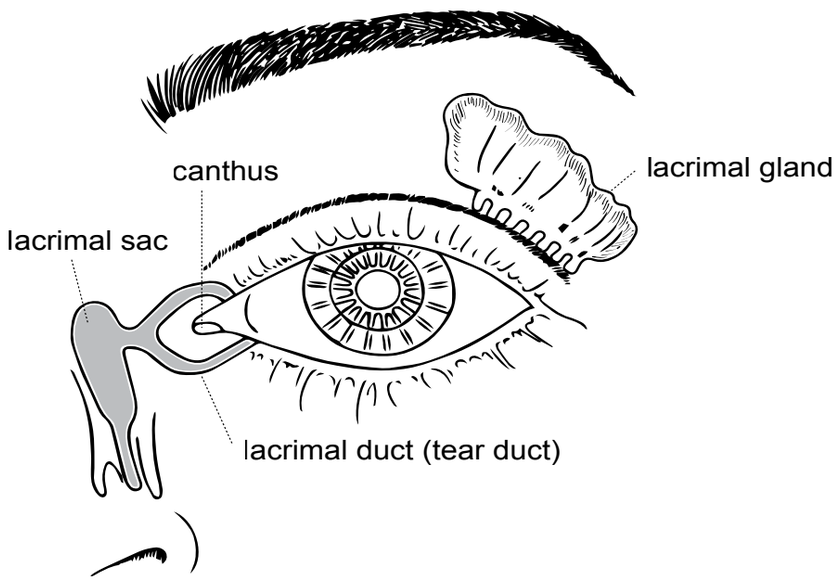
NERVOUS SYSTEM
EYE & EAR

PART A. COMBINING FORMS

NERVOUS SYSTEM

1.	**en-cephal-o**	(**cephal**-o)	brain	**en-cephal-on**
2.	**cerebr-o**	(**cerebr**al)	**cerebr**um; brain	**cerebr-um**
3.	**cereb-ell-o**	(**cereb**ral)	**cerebell**um	**cereb-ell-um**
4.	**membran-o**	("skin")	**membran**e	**membran-a**
5.	**mening-o**	(**mening**itis)	**mening**es	**meninx**
6.	**ep-en-dym-o**	("put on over")	**ependym**a	**ep-en-dyma**
7.	**neur-o**	(**neur**osis)	**ner**ve	
8.	**nerv-i**	(**nerv**ous)	**nerv**e	**nerv-us**
9.	**gangli(on)-o**	("knot")	**ganglion**	**gangli-on**
10.	**neuron-o**	(**neuron**)	**ner**ve cell	
11.	**(neur-o)gli-o**	(**gl**ue)	**neurogli**a	**neur-o-gli-a**
12.	**rad-i-cul-o**	(**root**)	**radicl**e	**rad-i-cul-a**
13.	**sym-path(et)-o, sym-path-ic-o**		**sympathet**ic nerves	
14.	**vag-o**	(**vag**abond)	**vag**us nerve	

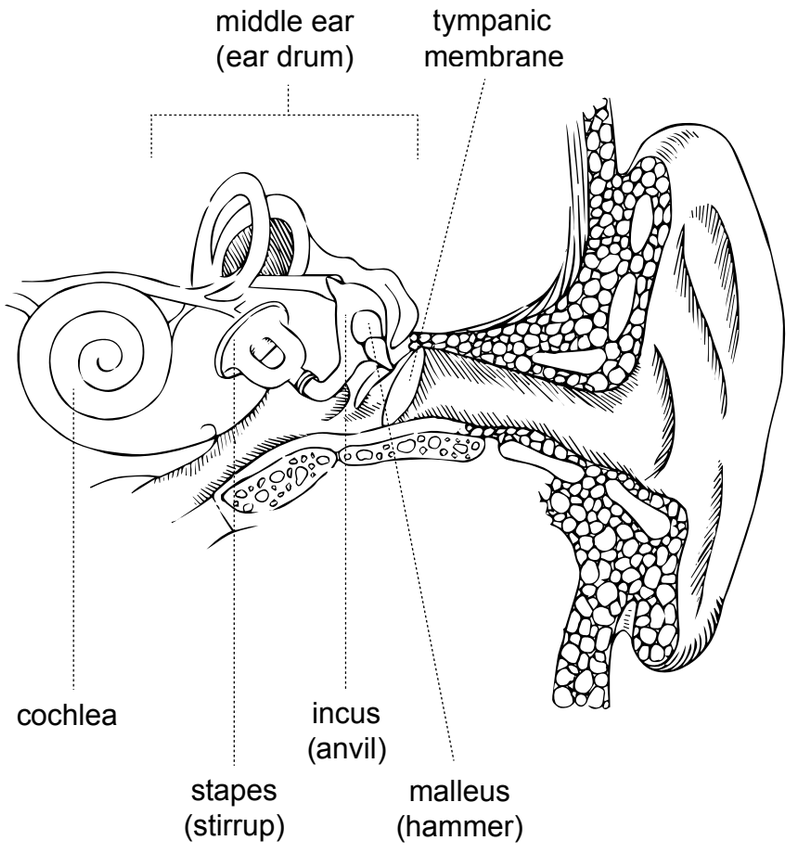

uvea
choroid
ciliary body
iris
anterior chamber
lens
vitreous chamber
retina
sclera
cornea
pupil
conjunctiva


canthus
lacrimal gland
lacrimal sac
lacrimal duct (tear duct)

THE EYE

15. **ophthalm-o**	(=2.12)	eye	
16. **opt(ic)-o**	(**optic**al)	eye	
17. **ocul-o**	(bin**ocul**ar)	eye	**ocul-us**
18. **cor-e, cor(e)-o**	(“girl”)	pupil	
19. **pup-ill-o**	(“little girl”)	**pupil**	**pup-ill-a**
20. **ker(at)-o**	(**hor**n)	**cor**nea	
21. **corne-o**	(**horn**)	**cor**nea	**corne-a**
22. **scler-o**	(x-o-**scler**osis)	**scler**a	**scler-a**
23. **retin-o**	(“net”)	**retin**a	**retin-a**
24. **uve-o**	(“grape”)	**uve**a	**uve-a**
25. **ir(id)-o**	(**irid**escent)	**iris**	**iris**
26. **cycl-o**	(bi**cycl**e)	ciliary body	
27. **cili-o, cili-ar-o**	(**cili**a)	**ciliary** body	
28. **chor-oid-o, chori-o**	(“afterbirth”)	**choroid**	
29. **con-junct-iv-o**	(**conjunct**ion)	**conjunctiv**a	**con-junct-iv-a**
30. **canth-o**	(**cant**on)	**canth**us	**canth-us**
31. **phac-o**	(“bean”)	lens	
32. **dacry-o**	(**lacri**mose)	**tear**	
33. **lacrim-o**	(**lacrim**ose)	**tear**	
34. **dacry-o-cyst-o**	(**cyst**)	**tear** sac	

THE EAR



35. **tympan-o**	(**timpani**)	middle ear	**tympan-um**
36. **malle-o**	(**malle**able)	hammer	**malle-us**
37. **incud-o**		anvil	**incus**
38. **sta-ped(i)-o**	(**sta**nd, **foot**)	stirrup	**sta-pes**
39. **myring-o**		tympanic membrane	**myrinx**

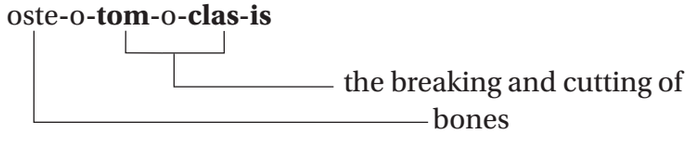
PART B. NOTES

COMMON SENSE

A few words end with double terminations. In some of these the terminations are coordinated, while in others one idea is subordinated to the other (see the Notes in Chapter 2). Common sense will usually determine which type you are dealing with. Study the following examples.

SUBORDINATED

COORDINATED



You will have already noticed that words like cerebell**um** (3), gangli**on** (9), corne**a** (21) and malle**us** (36) consist of a base and one of the nominative singular endings listed in Chapter 1 (82-5). Some words are formed of **two** bases plus a nominative ending and require expanded translations, as indicated by the following examples. (Added words are in bold face.)

rhin-encephal-on	**the part of** the brain **involving** the nose
ot-o-crani-um	**the part of** the skull **involving** the ear
ot-o-gangli-on	a ganglion **of** the ear

"Dacry-o" (32) and "lacrim-o" (33) both mean "tear." Sometimes a word containing one of these forms will not seem logical. Study the following example.

dacryocele	the protrusion of **something involving** tears

In practice, "something involving tears" will almost always be "the tear sac."

For the combining vowel in "nerv-i" (8 above), see the Notes to Chapter 3; "cor-e" (18 above) shows that "-e-" (even more rarely) can also be a combining vowel.

NOMINA ANATOMICA

The Notes on the *Nomina Anatomica* in Chapter 3 should be reviewed.

FEMININE SINGULAR NOMINATIVES

- Most feminine singular nouns are formed by adding the inflectional ending "-a" (1.83 above) to a base. "Vertebr-**a**," for example (the form is the same in both English and Latin), is thus made from the combining form "vertebr-o" (3.20).
- Feminine singular adjective endings are those in Chapter 1 (1.2-10 and 1.86) which terminate in "-**a**" (like the nouns) and "-**is**."

The following Latin phrases, exhibiting feminine nouns and adjectives in the nominative singular are occasionally used in English.

person-**a** non grat-**a**	person not welcome
tabul-**a** ras-**a**	erased (= "blank") tablet
terr-**a** firm-**a**	firm earth (= "solid ground")
terr-**a** in-cognit-**a**	unknown earth (= "unexplored lands")
vi-**a** medi-**a**	middle way

Study the following Medical terms and their definitions carefully.

vertebr-**a** coccyg-**e-a**	a vertebra p.t. the coccyx
vertebr-**a** thorac-**ic-a**	a vertebra p.t. the chest
vertebr-**a** cervic-**al-is**	a vertebra p.t. the neck

Study the following examples, in which *Nomina Anatomica* forms are translated by means of an intermediate stage.

vertebr-a cervic-**al-is**	(Latin)
= a cervic-**al** vertebra	(Medical English)
= a vertebra p.t. the neck	(Literal English)
vertebr-a thorac-**ic-a**	(Latin)
= a thorac-**ic** vertebra	(Medical English)
= a vertebra p.t. the chest	(Literal English)

APPARENTLY IRREGULAR INFLECTONAL ENDINGS

For "meninx" and "myrinx" (5 and 39 above), see the Notes on "Apparently Irregular Endings" in Chapter 3; the English form "mening**es**" is plural.

"Iris" (25), "incus" (37) and "stapes" (38) are formed by the addition of the nominative ending "s" to the stem, with coalescence of the "d" and the "s" resulting in loss of the former sound; see the Notes on "Apparently Irregular Endings" in Chapter 2. In the case of "iris," the short combining form "ir-o" exists because of confusion between the result of this coalescence ("ir**is**") and the nominative singular ending "-is" (see again the Notes on "Apparently Irregular Endings" in Chapter 2).

"Ependyma" (6) is a Greek nominative singular formed by the loss of the final "t" of the stem, which is actually "ependym**at-**." Words of this form are neuter. The combining form "ependym-" results from confusion with the Latin nominative singular ending "-a."

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-4

ABSTRACT VERSUS CONCRETE NOUNS: CAN I TOUCH THAT?

In each of the following words (some of which are made-up), pay close attention to the degree of tangibility of each meaningful part.

1. **pododactylitis** _____
2. **brachiometry** _____
3. **ophthalmograph** _____
4. **ophthalmogram** _____
5. **ophthalmography** _____
6. **cytogenesis** _____
7. **cytogenetic** _____
8. **dermatomegaly** _____
9. **dermatomegalic** _____
10. **cephalocentesis** _____
11. **cephalocentetic** _____
12. **cytoscopy** _____
13. **cytoscopics** _____
14. **arthrolith** _____
15. **arthrolithiasis** _____

16. **anconospasm** _____

17. **anconospastic** _____

18. **trichopathy** _____

19. **trichopathic** _____

20. **trichopathologist** _____

21. **brachiokinesis** _____

22. **brachiokinetic** _____

23. **brachiokinetics** _____

24. **cytophagometric** _____

ANSWERS AND EXPLANATIONS

1. **podo-dactyl-it-is**
   - the inflammation of a digit of the foot

If your patient presented you with an inflamed toe, you could certainly touch that toe. But if the patient complained of "**an** inflammation of the toe," could you touch that? Probably you could; in fact you might take that inflammation, lance it, and squeeze the pus out. This would depend upon (among other things) how you interpret the phrase "an inflammation," which is at best ambiguous. But the name of the patient's condition, pododactylitis, is not ambiguous. This word means "**the** inflammation **of** a digit of the foot," and is a useful shorthand for a real mouthful like, "a distressing condition characterized by the fact that the toe is all swollen and full of pus" ("causing the patient to moan and complain and stink so badly that his companions have to abandon him on the abandoned island of Lemnos because they can't stand being around him" – ask your professor!). This you cannot touch; the noun here is abstract rather than concrete.

The next example might make this clearer.

2. **brachio-metr-y**
   - the measurement of the arm

This is an abstract term again, the name of a process or procedure, and is not touchable; it is short for something like "the action of measuring the arm." "Two cubits," or "one yard," or "one metre" could each be described as "**a** measurement of the arm," but note how these measurements are each the *result* of the process denoted by "brachiometry."

Another set of clarifying examples follow; note that you can touch the first two things (which are concrete objects) but not the third thing (which is the abstract name of a procedure).

3. **ophthalmo-graph**
   - an instrument for recording the eye (perhaps a camera)
4. **ophthalmo-gram**
   - a record of the eye (perhaps a written description of it)
5. **ophthalmo-graph-y**
   - **the** recording **of** the eye (the name of a process or procedure)

Unfortunately, most terminations don't have variants (x-ography, x-ograph, x-ogram) that help keep these distinctions clear. It is up to you to consistently reflect in your translations the fact that most of the diagnostic and therapeutic terminations you have learned denote abstractions: processes and conditions, procedures and other actions. This is another way of explaining why the translation of these forms does not change when other terminations follow them.

6. **cyto-genes-is**
   - the production of cells (a process)
7. **cyto-genet-ic**
   - p.t. the production of cells
8. **dermato-megal-y**
   - the enlargement of the skin (a condition)

9. **dermato-megal-ic**
   - p.t. the enlargement of the skin
10. **cephalo-centes-is**
   - the surgical puncturing of the head (a procedure)
11. **cephalo-centet-ic**
   - p.t. the surgical puncturing of the head
12. **cyto-scop-y**
   - the examination of cells (an action)
13. **cyto-scop-ics**
   - the science of the examination of cells

But a few terminations do specify physical objects that you can touch, notably the Concrete Nouns (1.68-78). Four others require special attention.

14. **arthro-lith**
   - a calculus in a joint
15. **arthro-lith-ias-is**
   - the abnormal presence of a calculus in a joint
   - *or* the abnormal presence of calculi (or calculuses) in a joint

This variability is because a calculus is unquestionably a physical object.

16. **ancono-spasm**
   - a spasm of the elbow
17. **ancono-spast-ic**
   - p.t. a spasm of the elbow
   - *or* p.t. spasms of the elbow
   - *or* p.t. the spasms of the elbow

Although a spasm is not exactly a physical object, it is closer to being one than is, for example, "an abnormal condition involving spasms." Perhaps more importantly, English uses the word "spasm" as a stand-alone (unlike, say, "iasis" or "metry") and thus it is natural to pluralize it. Something analogous must be the case with the last two terminations in this group.

18. **tricho-path-y**
    - a disease of the hair
19. **tricho-path-ic**
    - p.t. a disease of the hair
    - *or* p.t. diseases of the hair
    - *or* p.t. the diseases of the hair (see also the Note in Chapter 2)

This is harder to explain, but is probably because the combining form "path" is felt as if it were a stand-alone word, meaning not "a disease of x" (which it means only in words of the form x-opathy), but "disease" – which, again, somehow seems "more concrete" than most of the other words denoting conditions. Note the existence of words like path-ology "the study of disease**s**," which may further influence these cases.

20. **tricho-path-olog-ist**
    - one who studies **the** disease**s** of the hair
    - (probably) *not* one who studies **a** disease of the hair

The fourth exceptional ending probably shows the variance it does because of the independent existence of words like kinetic, and especially kinet-ics ("the science of movement" *or* "the science of movement**s**").

21. **brachio-kines-is**
    - the movement of the arms
22. **brachio-kinet-ic**
    - p.t. the movement of the arms
    - *or* p.t. the movement**s** of the arm
23. **brachio-kinet-ics**
    - the science of the movement of the arm
    - *or* the science of the movement**s** of the arms

Remember that these four endings are exceptional. The general rule holds that the diagnostic and therapeutic terminations have invariable translations. It is worth recalling that for any given termination, the point is that the invariable formulaic translation derives from context, not merely from the meaning of the root term.

For example, -metr- means “measure” and -phag- means “ingest;” but because x-ometric = p.t. the measurement of x, and x-ophag- = x-ophagy = the ingestion of x, then…

24. **cyto-phago-metr-ic**
    - = p.t. cytophagometry
        - cytophago-metry = the measurement of cytophagy
        - cyto-phagy = the ingestion of cells
    - (putting this all together) = p.t. the measurement of the ingestion of cells

And the only part of all this that you (or whatever is doing the ingesting, or whoever is measuring the ingesting) can touch is the cells.

5

CIRCULATORY & LYMPHATIC SYSTEMS GLANDS

PART A. COMBINING FORMS

CARDIOVASCULAR SYSTEM

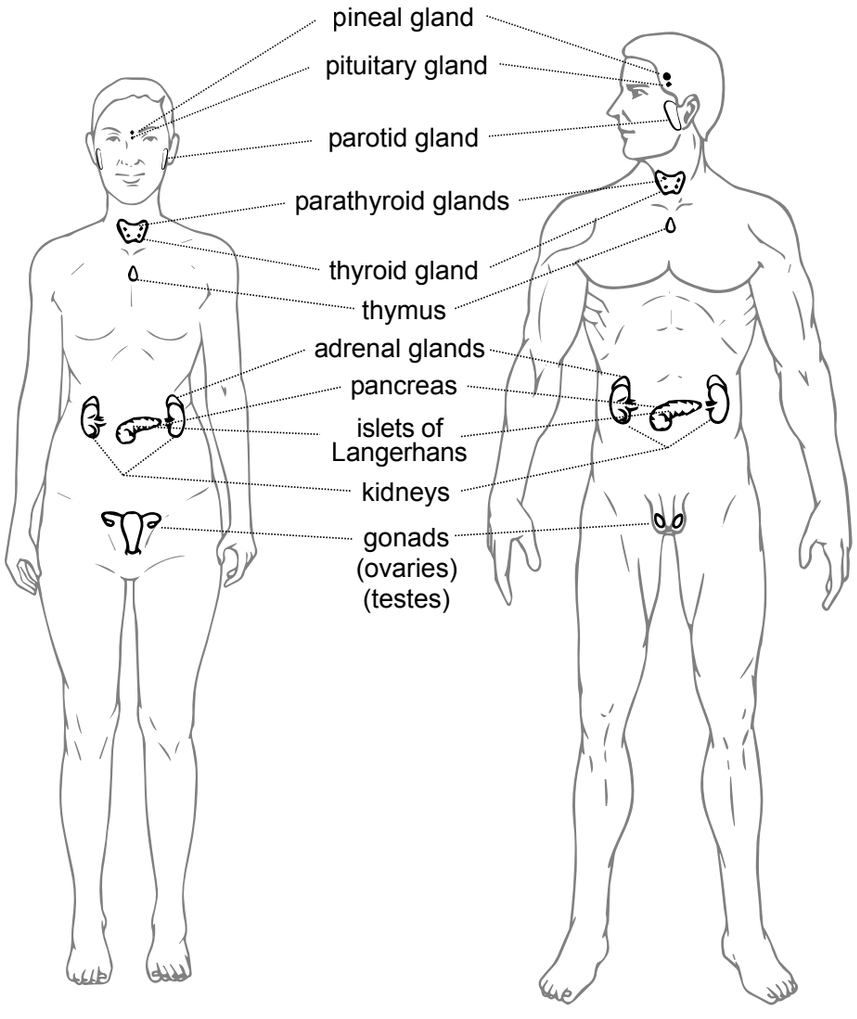
1.	**hem(at)-o (haem-)** **x-(h)em-ia**	(**hem**orrhage)	blood the abnormal presence of blood in x	
2.	**sangu-in-o, sangu-i**	(**sanguin**e)	blood	
3.	**hem-o-glob-in-o**	(**glob**e)	**hemoglobin**	
4.	**plasm(at)-o, plasm-a**	(**plas**tic)	**plasma**	
5.	**thromb-o**	(**thromb**oid)	clot	**thromb-us**
6.	**thromb-o-cyt-o**	(“clot cell”)	platelet	
7.	**sphygm-o**	(**sphygm**ometer)	pulse	
8.	**card(i)-o**	(**cardi**ac)	**heart**	
9.	**aort-o, aort-ic-o**	(“hanger”)	**aort**a	**aort-a**
10.	**valv(-ul)-o**	(“door-leaf”)	**valv**e	**valv(-ul)-a**
11.	**ventr-i-cul-o**	(“little belly”)	**ventricl**e	**ventr-i-cul-us**
12.	**peri-card(i)-o**	(**peri**meter)	**pericardi**um	**peri-cardi-um**
13.	**my-o-card(i)-o**	(**heart mus**cle)	**myocardi**um	**my-o-cardi-um**
14.	**angi-o (angei-)**	(**angi**ogram)	vessel	
15.	**vas-o, vas-cul-o**	(**vas**e)	**vess**el	**vas**
16.	**arter(i)-o**	(“**air**-pipe”)	**arter**y	**arteri-a**
17.	**phleb-o**	(**phleb**itis)	vein	
18.	**ven-o**	(**veh**icle)	**vein**	**ven-a**
19.	**cap-ill-ar-o**	(“hair”)	**capillar**y	
20.	**varic-o**	(**varic**ose)	**varix**	**varix**
21.	**cirs-o**		varix	

LYMPHATIC SYSTEM

22. **lymph-o, lymphat-o**	(**limp**id)	**lymph**	**lympha**
23. **lymph-angi-o**	(**angi-o**)	**lymph** vessel	
24. **lymph-aden-o**	(**aden-o**)	**lymph** node	
25. **splen-o**	(**splen**etic)	**spleen**	
26. **lien-o**	("milt")	sp**leen**	**lien**

GLANDS

27. **(endo)crin-o**	(**endocrin**e)	sec**r**etion	
28. **hormon-o**	("urger")	**hormon**e	
29. **aden-o**	(**aden**oid)	gland	
30. **gland-ul-o**	("little acorn")	**gland**	**gland-ul-a**
31. **pine-al-o**	(**pin**econe)	**pineal** gland	
32. **hypo-phys(e)-o**	(**phys**iology)	pituitary gland	**hypo-phys-is**
33. **par-ot(id)-o**	(**ot-o**)	**parotid** gland	
34. **thyr(oid)-o**	("shield-like")	**thyroid** gland	
35. **para-thyr(oid)-o**		**parathyroid** gland	
36. **thym-o**	(**thym**e [?])	**thymus**	**thym-us**.
37. **ad-ren(al)-o**	(**ren**al)	**adrenal** gland	
38. **supra-ren(al)-o**		ad**renal** gland	
39. **insul-o**	(**insul**ar)	**isl**ets of Langerhans	**insul-ae**
40. **gonad-o**	(**gen**esis)	gonad	


pineal gland
pituitary gland
parotid gland
parathyroid glands
thyroid gland
thymus
adrenal glands
pancreas
islets of Langerhans
kidneys
gonads
(ovaries)
(testes)

PART B. NOTES

SUBSTANCES

Consider the word "hematocele." The two possible translations you might generate ("the protrusion of blood" and "the protrusion of something through the blood") do not make sense. In fact the translation is "the protrusion of **something, involving** blood." Two formulas should be learned, which are applicable where "S" is a substance.

S-o-cele	the protrusion of something, involving S
S-o-x-o-cele	the protrusion of (something through) x, involving S

Other combinations involving a verbal termination and a substance should be examined carefully, as they can often be translated in similar ways.

On the analogy of words like "rhinencephalon" (see the Note in Chapter 4), you would translate "hemat-encephal-on" as "the part of the brain involving blood." In fact, the correct translation is "**a collection** of blood **in** the brain." The following formula applies to compounds consisting of a substance (S), an organ or part (x) and a nominative ending (N).

S-o-x-N	a collection of S in x

On apparent exceptions to this rule, see the Introduction.

GLANDS

In the case of glands, the normally unpredictable noun ending "-ism" functions in a predictable way, according to the following formula, wherein "G" is a gland.

G-ism	a condition caused by the malfunction of G

When a base denoting a gland is followed by a termination with a **verbal** idea in it, the word so formed usually refers to **secretion** or **secretions** from the gland in question. Study the following examples.

thyropenia	a deficiency (= a lack) of **secretion from** the thyroid gland
adrenostatic	p.t. the stopping of **secretions from** the adrenal gland

COMMON SENSE

At one level of meaning, "x-(h)em-ia" (1 above) means "an abnormal condition involving blood and x." In practice the condition described will **usually** be, more specifically, "the abnormal presence of blood in x."

Words like "thrombocyt-hem-ia" are exceptions. "The abnormal presence of blood in platelets" does not make sense, because platelets are themselves a component of blood; a better translation therefore is "the abnormal presence of platelets in the blood." Such exceptions are easy to determine, according to the following formula.

x-(h)em-ia	the abnormal presence of blood in x (where blood **can** be in x)
	the abnormal presence of x in the blood (where blood **cannot** be in x)

Note that "x-(h)em-ic" is regularly translated to show that it means "pertaining to x-(h)em-ia."

The form "x-o-plast-ic" is usually translated "pertaining to the surgical repairing of x," as if it meant "pertaining to x-o-plast-y" (1.54), but you should remember that it can also mean "pertaining to x-o-plas-ia" (1.45). Thus common sense will tell you that, for example, "hemat-o-plast-ic" is "pertaining to the **formation** [plas-ia] of blood" and not "pertaining to the **surgical repairing** [plast-y] of blood."

Notice the translations of the following terms, in which additions must be made for the sake of sense.

rhinodacryolith	a calculus involving tears, **involving** the nose
hemolysoid	resembling **something which** disintegrates blood

Because platelets are **normally** found in the blood, the translation given above might be better if the following addition were made.

thrombocyt-hem-ia	the abnormal presence of **something involving** platelets in the blood

"Conjunctivodacryostomy," which you would expect to translate as "the making of an opening in the tear sac and conjunctiva," is more precisely "the making of an opening **between** the tear sac and conjunctiva." In fact, the following formula applies when "x" and "z" are both organs or bodily parts capable of being connected.

x-o-z-ostomy	the making of an opening **between** z and x

Occasionally in Medical Terminology words will persist despite advances in knowledge that make them illogical. "Lymph-aden" (24 above), for example, could be translated as "a **gland** [29 above] pertaining to lymph," presumably because what we now call "lymph **nodes**" were originally (but erroneously) thought to be **glands**.

The word "capill-**ar-y**" (19 above), as its ending shows, is actually an adjective even though it is used as a noun. Such words, very rare in Medical Terminology, are discussed in Chapter 11.

"Haem-" and "angei-" (1 and 14 above) are variant spellings, rarely found.

THE COMBINING VOWEL

For the absence of a combining vowel between the two bases in the forms "lymph-angi-o" and "lymph-aden-o" (23 and 24 above), see the Note in Chapter 2.

Notice that the combining vowel is sometimes omitted before a combining form beginning with the letter "o." This is really a special case of coalescence, as the following example shows.

hemat-**o**			
\+	**o**ste-on	=	hemat**o**steon

For the combining vowel in "sangu-i" (2 above), see the Note in Chapter 3; an extremely rare use of "-a-" as a combining vowel is seen in "plasm-a" (4 above).

COALESCENCE

The addition of "-ize" (1.1) to "-lysis" (1.66) gives a coalesced suffix "-lyze". Thus "hemolyze" ("to disintegrate blood") can be ana**lyze**d as follows.

hem-o-l**ys**-
+ **iz**-e = hemol**yze**

NOMINA ANATOMICA

The Notes on the *Nomina Anatomica* in Chapters 3 and 4 should be reviewed.

NEUTER SINGULAR NOMINATIVES

- Many neuter singular nouns are formed by adding the inflectional ending "-um" (1.84) to a base. "Ligament-**um**," for example, is the Latin word for "ligament" and is thus made from the combining form "ligament-o" (3.48). Neuters made by adding "-on" (1.85) are originally Greek words, borrowed into Latin.
- Neuter singular adjective endings are those in Chapter 1 (2-10 and 86) which terminate in "-**um**" (like the nouns) and "-**e**."

The following Latin phrases, exhibiting neuter nouns and adjectives in the nominative singular, are occasionally used in English.

punct-**um** caec-**um**	blind point (= "blind spot")
membr-**um** vir-il-**e**	male member (= "penis")
magn-**um** mysteri-**um**	great mystery
summ-**um** bon-**um**	highest good

Study the following Medical terms and their definitions carefully.

ligament-**um** cost-o-xiphoid-**e**-**um**	a ligament p.t. the xiphoid process and a rib
ligament-**um** calcane-o-fibul-**ar**-**e**	a ligament p.t. the fibula and calcaneus
ligament-**um** umbilic-**al**-**e**	a ligament p.t. the navel
gangli-**on** cervic-o-thorac-**ic**-**um**	a ganglion p.t. the chest and neck
gangli-**on** cili-**ar**-**e**	a ganglion p.t. the ciliary body

The phrases in the following chart should be memorized.

GRAMMATICAL CATEGORIES	EXAMPLE WORDS AND PHRASES		
	NOUNS	ADJECTIVES	
GENDER & NUMBER		1.3-5, 7-10 (-us type)	1.2, 6 (-is type)
Masculine singular:	nerv-**us**	cardi-ac-**us**	cervic-al-**is**
Feminine singular:	arteri-**a**	cardi-ac-**a**	cervic-al-**is**
Neuter singular:	gangli-**on**	cardi-ac-**um**	cervic-al-**e**

APPARENTLY IRREGULAR NOMINATIVE SINGULARS

Some nominative singulars consist of the base with no ending added to it. Examples in this chapter are “vas” (15), “lymphaden” (24) and “lien” (26); such words are usually neuter.

“Plasma” (4) and “lympha” (22) are Greek nouns; see the Note in Chapter 4.

Since the islets of Langerhans are rarely, if ever, referred to individually, “insul-**ae**” (39) is actually a nominative **plural** (the forms of which are presented in Chapter 6).

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-5

As always, do your best at translating the words below before checking your answers against ours and studying the comments in our answer sections. Remember that each word must be carefully divided up before you translate it, and that your translation needs a "reality check" before you commit to it.

"SOMETHING INVOLVING:" THE SPLITTING OF MILK?

Watch out for any "extra" elements in the following groups of words (some of which are made-up), and make sure that you understand the distinctions between their translations.

1. **cephalotomy**_____
2. **cephalic** _____
3. **cephalicotomy** _____
4. **galacticoschisis** (galact- = milk) _____
5. **dermotome** _____
6. **dermalotome** _____
7. **brachioid** _____
8. **brachialoid** _____
9. **cervicosis**_____
10. **cervicalosis** _____
11. **onychalgia**_____

12. **onychalalgia** _____

13. **mammorrhea** _____

14. **mammalorrhea** _____

15. **cytotropism** _____

16. **cyticotropism** _____

17. **dermatogenous** _____

18. **dermaticogenous** _____

(If you are a little confused, study through the answers up to this point before continuing.)

19. **omphalicotherapy** _____

(From here on, also concentrate on giving your translation a "reality check.")

20. **omphalotherapy** _____

21. **umbilicotherapy** _____

22. **umbilicalotherapy** _____

23. **dermoidectomy** _____

24. **cranialectomy** _____

25. **craniectomy** _____

26. **rhinonecrosis** _____

27. **anthropophagy** _____

28. **cytostatic** _____

29. **ophthalmograph** _____

30. **otosclerotic** _____

31. **dactylography** _____

32. **onychophagist** _____

33. **mammogen** _____

34. **encephaloclastic** _____

35. **tarsotarsal** _____

36. **cephalocephaloclasis** _____

37. **oculo-oculitis** _____

38. **galactoschisis** (galact = milk) _____

ANSWERS AND EXPLANATIONS

1. **cephal-otomy**
   - the cutting of the head
2. **cephal-ic**
   - p.t. the head

3. **cephal-ic-otomy**
   - the cutting of **something** cephalic (preliminary answer)
   - the cutting of **something p.t.** the head (correct answer)
   - *not* a cutting p.t. the head
   - *not* the cutting p.t. the head
   - *not* the cutting of p.t. the head (which is not English)

This analysis shows your careful observation of the fact that x-o-tomy = **the** cutting **of** x. The translations you generate by omitting or confusing the "little words" are not even close, since they both denote physical objects ("a cut", or "one of several cuttings") rather than an abstract process (the surgical operation called "x-otomy").

Notice further that translations of nearly all of the Diagnostic and Therapeutic terminations in Chapter 1 require a noun (e.g., "**something p.t.**"), as opposed to an adjective, to complete them. To take an extreme example, "the splitting of milk" might be nonsense, but it is at least English nonsense. If a word (for example, galact-ic-oschisis) seemed to need to be translated "the splitting of milk-**y**" or "the splitting of milk-**ish**," you would not even have English. The solution here, of course, is "the splitting of **something** milk-**ish**;" that is...

4. **galact-ic-oschisis**
   - the splitting of **something** galactic (preliminary answer)
   - the splitting of **something p.t.** milk (correct answer)

Words of this sort, in fact, demonstrate in yet another way why extreme care must be taken with the formulaic terminations given in Chapter 1. For starters, if the formulaic translation ends with the word "of" (the inflammation **of**, the movement **of**, a disease **of**, etc.), then the next word in your translation needs to be a noun. Other terminations must be studied carefully to see if they need to be similarly dealt with.

5. **derm-otome**
   - an instrument for cutting the skin

6. **derm-al-otome**
   - (an instrument for cutting **something** dermal)
   - an instrument for cutting **something p.t.** the skin
   - *not* an instrument for cutting, p.t. the skin

7. **brachi-oid**
   - resembling the arm
8. **brachi-al-oid**
   - resembling **something p.t.** an arm
9. **cervic-osis**
   - an abnormal condition involving the neck
10. **cervic-al-osis**
    - an abnormal condition involving **something p.t.** the neck
    - *not* an abnormal condition **p.t.** the neck (this would be more or less the same as "an abnormal condition **involving** the neck," or cervic-osis)
11. **onych-algia**
    - pain involving the nails (*not* pain in the nails)
12. **onych-al-algia**
    - pain involving **something p.t.** the nails
    - *or* pain in **something p.t.** the nails
    - *not* pain p.t. the nails (again, this would be more or less the same as "pain **involving** the nails," or onych-algia)
13. **mamm-orrhea**
    - the flowing of something from the breast
    - *not* the flowing of breasts
14. **mamm-al-orrhea**
    - the flowing of something from **something p.t.** the breast (perhaps from the mammary gland)
    - *or* the flowing of **something p.t.** the breast (perhaps the flowing of milk)
15. **cyt-otropism**
    - the tendency to preferentially affect cells
16. **cyt-ic-otropism**
    - the tendency to preferentially affect **something p.t.** cells
17. **dermat-ogenous**
    - produced by the skin

18. **dermat-ic-ogenous**
    - produced by **something p.t.** the skin

Finally we are ready to deal with phrases like "the splitting of milk." For example, omphalotherapy should mean "treatment by means of the navel," which (although perfectly good English) doesn't actually make much sense in the real world. We solve this problem on the analogy of omphal-ic-otherapy, by adding a phrase to our translation that is merely implied by the medical word itself.

19. **omphal-ic-otherapy**
    - (treatment by means of **something** omphalic)
    - treatment by means of **something p.t.** the navel
20. **omphal-otherapy**
    - treatment by means of **something involving** the navel ("something involving" is implied by the rest of the word)

In practice, the hormone or chemical or tissue designated by our two phrases might be the same. The point here is that you need to examine your word carefully, first to see if there is anything "extra" that needs to be accounted for in translation (omphal-**ic**-otherapy); second (and this is always the case, as with "omphal-otherapy"), you need to give your translation a "reality check."

Note in this connection that (as always) the division of words into meaningful parts must be very carefully done.

21. **umbilic-otherapy**
    - treatment by means of **something involving** the navel
22. **umbilic-al-otherapy**
    - treatment by means of **something p.t.** the navel

That is, of the combining forms denoting "navel," the terminal "al" of "omph**al**-" is part of the form (and has nothing to do with adjectival "-al"), while the terminal "ic" of "umbil**ic**-" is part of the form which is an alternative to "umbil-." Thus umbilotherapy means the same thing as umbilicotherapy, but umbilicalotherapy means something very slightly different.

As you move forward through the book, note carefully all combining forms that contain in one of their alternates something that may be mistaken for an adjectival ending (opt- and opt**ic**- = eye, e.g.).

For the following group of words, observe that, while you could never predict their precise definitions (added in brackets), you can now generate perfectly accurate translations in every case.

23. **derm-oid-ectomy**
    - the cutting out of **something** resembling skin
    - (the cutting out of a skin-like growth)
24. **crani-al-ectomy**
    - the cutting out of **something p.t.** the skull
    - (the cutting out of part of the skull)
25. **crani-ectomy**
    - the cutting out of **something involving** the skull
    - *not* the cutting out of the skull (unless we are thinking of an autopsy....)
    - (the cutting out of part of the skull)
26. **rhin-onecrosis**
    - the death of **something involving** the nose
    - (the death of the tissues of the nose)
27. **anthrop-ophagy**
    - the ingestion of humans
    - *or* the ingestion of **something involving** humans
    - (the ingestion of the flesh of humans)
28. **cyt-ostatic**
    - p.t. the stopping of cells
    - *or* p.t. the stopping of **something involving** cells
    - (p.t. the stopping of the movement of cells)
29. **ophthalm-ograph**
    - an instrument for recording the eye
    - *or* an instrument for recording **something involving** the eye
    - (an instrument for recording the movements of the eye)

30. **ot-osclerotic**
    - p.t. the hardening of the ear
    - *or* p.t. the hardening of **something involving** the ear
    - (p.t. the hardening of tissues of the ear)

31. **dactyl-ography**
    - the recording of the digits
    - *or* the recording of **something involving** the digits
    - (the recording of the characteristic patterns found on the digits)

32. **onych-ophag-ist**
    - one who ingests nails
    - *or* one who specializes in **something involving** the ingestion of nails
    - (one who bites and eats his/her nails)

33. **mamm-ogen**
    - a substance which produces **something involving** the breast
    - (a substance which produces or enhances the development of the breast)

If some of the exercises above (with their literal definitions) seem familiar, it is because you have seen some of them in the Notes to Chapter 3. Note that the translations given here, containing the words **something** or **something involving** represent the types of translations you are expected to give in any exercise or test; the literal definitions are for illustration only.

34. **encephal-oclastic**
    - p.t. the breaking of **something involving** the brain

An important rule to use is, when you are translating words and phrases for exercises and tests in this course, do *not* add in the phrase "something involving" unless your translation does not make sense without it.

On the other hand, predictable and more specific translations will continue to be presented in this book. For example, the duplication of a combining form regularly suggests two translations, depending upon plausibility.

35. **tars-o-tars-al**
    - p.t. two parts of the tarsus
    - *or* p.t. two tarsi (or tarsuses)

36. **cephalocephaloclasis**
    - the breaking of two parts of the head
    - *not* the breaking of two heads

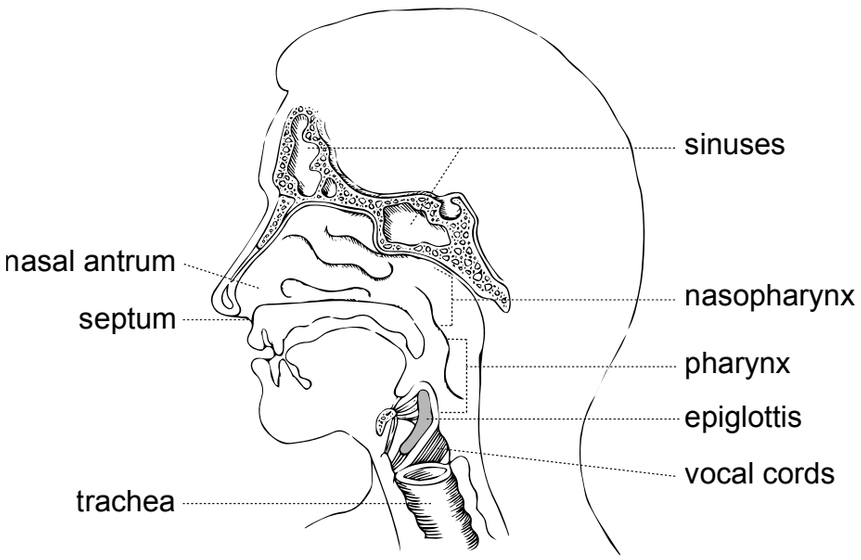
37. **oculo-oculitis**
    - the inflammation of both eyes
    - (probably) *not* the inflammation of two parts of the eye

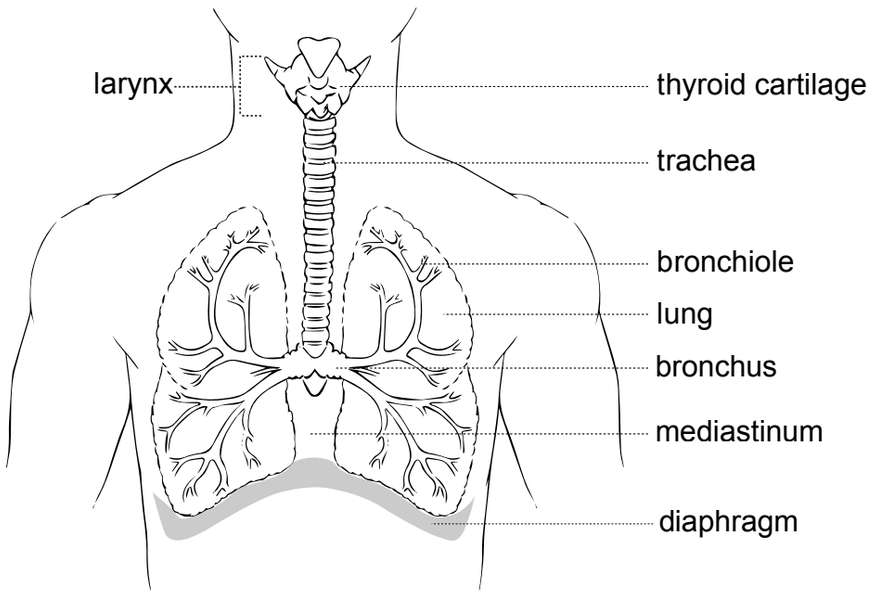
By the way, when you learn in Chapter 12 the combining form galacto-, you will now have no trouble at all generating an accurate translation for "galact-oschisis."

38. **galacto-schisis**
    - the splitting of **something involving** milk

6

RESPIRATORY SYSTEM PLURALS AND DIMINUTIVES


sinuses
nasal antrum
septum
nasopharynx
pharynx
epiglottis
vocal cords
trachea


larynx
thyroid cartilage
trachea
bronchiole
lung
bronchus
mediastinum
diaphragm

PART A. COMBINING FORMS

RESPIRATORY SYSTEM

1.	**rhin-o**	(2.14)	nose	
2.	**nas-o**	(**nas**al)	**nos**e	**nas-us**
3.	**sin(us)-o**	(**sin**e)	**sinus**	**sinus**
4.	**sept-o**	(“wall”)	**sept**um	**sept-um**
5.	**antr-o**	(“cave”)	**antr**um	**antr-um**
6.	**pharyng-o**	(“throat”)	**pharynx**	**pharynx**
7.	**nas-o-pharyng-o, rhin-o-pharyng-o**		**nasopharynx**	**nas-o-pharynx**
8.	**epi-glott(id)-o**	(**glott**al)	**epiglott**is	**epi-glott-is**
9.	**laryng-o**	(**laryng**itis)	**larynx**	**larynx**
10.	**trach-e-o**	(“rough [air pipe]”)	**trache**a	**trach-e-a**
11.	**bronch-o, bronch-i**	(**bronch**itis)	**bronch**us	**bronch-us**
12.	**pne-um(on)-o**	(**pneumon**ia)	lung; air	
13.	**pulm(on)-o**	(**pulmon**ary)	lung	**pulmo**
14.	**pleur-o**	(**pleur**isy)	**pleur**a	**pleur-a**
15.	**phren-o**	(**fren**zy)	diaphragm	
16.	**dia-phragm(at)-o**	(“across-fence”)	**diaphragm**	**dia-phragma**
17.	**medi-ast-in-o**	(**medi**an)	**mediastin**um	**medi-ast-in-um**
18.	**spir-o**	(re**spir**atory)	breathing	
19.	**pne-o**	(s**nee**ze)	breathing	
20.	**pne-um(at)-o**	(**pneumat**ic)	air; lung	

NOMINATIVE PLURALS

PLURAL	GENDER	TRANSLATION	SINGULAR FORM		EXAMPLES	
					SINGULAR	PLURAL
21. x-**i**	Masculine	(several) x-es	x-**us**	(1.82)	muscul-**us**	muscul-**i**
		[adjectival]	x-**us**	(1.3 etc.)	x-ic-**us**	x-ic-**i**
22. x-**ae**	Feminine	(several) x-es	x-**a**	(1.83)	ven-**a**	ven-**ae**
		[adjectival]	x-**a**	(1.3 etc.)	x-ic-**a**	x-ic-**ae**
23. x-**a**	Neuter	(several) x-es	x-**um**	(1.84)	crani-**um**	crani-**a**
			x-**on**	(1.85)	gangli-**on**	gangli-**a**
		[various endings]		(3.2)	os	oss-**a**
				(3.32)	femur	femor-**a**
				(5.15)	vas	vas-**a**
		[adjectival]	x-**um**	(1.3 etc.)	x-ic-**um**	x-ic-**a**
24. x-**es**	Masc.-Fem.	(several) x-es	x-**s**	(2.17)	cervi**x**	cervic-**es**
				(3.14)	phalan**x**	phalang-**es**
			x-**is**		neur-os-**is**	neuros-**es**
		[various endings]		(2.35)	pes	ped-**es**
				(3.41)	cartilago	cartilagin-**es**
				(3.45)	tendo	tendin-**es**
				(4.25)	iris	irid-**es**
		[adjectival]	x-**is**	(1.2)	x-al-**is**	x-al-**es**
				(1.6)	x-ar-**is**	x-ar-**es**
25. x-**ia**	Neuter	[adjectival]	x-**e**	(1.2)	x-al-**e**	x-al-**ia**
				(1.6)	x-ar-**e**	x-ar-**ia**

DIMINUTIVES

	MASCULINE	FEMININE	NEUTER		
26.	**x-ul-us**	**x-ul-a**	**x-ul-um**	(valv**ul**e)	a little x
27.	**x(i)-cul-us**	**x(i)-cul-a**	**x(i)-cul-um**	(minis**cul**e)	a little x
28.	**x-ell-us**	**x-ell-a**	**x-ell-um**	(umbr**ell**a)	a little x
29.	**x-ill-us**	**x-ill-a**	**x-ill-um**	(pup**ill**a)	a little x
30.	**x-ol-us**	**x-ol-a**	**x-ol-um**	(cabri**ol**et)	a little x

PART B. NOTES

SUBSTANCES

Review the Note on "Substances" in Chapter 5; the formulas given there apply also to the substance **air**.

Some substances are put into the body in order to facilitate examination.

Study the following word and its definition.

pneumocardiography — the recording of the heart, **involving** air

The following formula applies where "x" is an organ or bodily part and "S" is a substance not normally considered part of the body.

S-o-**x**-o-graphy — the recording of **x**, involving **S**

COMMON SENSE

"Pne-um(on)-o" (12) almost always means "lung" rather than "air;" on the other hand, "pne-um(at)-o" (20) almost always means "air" rather than "lung." The derivatives given for them above should always be kept in mind, as they offer a convenient way to remember the distinction.

pneum**oni**a (12) — an abnormal condition involving the **lungs**

pneum**at**ic (20) — pertaining to **air**

Thus, when the **long** forms of the bases occur, there is little room for confusion. But the **short** form of both is "pneum-o." When this occurs, context within the word will usually resolve the ambiguity. In those rare cases where one choice is not clearly more logical than the other, it is often safe to assume that "lung" is meant. Study the following examples (and the ones given above), and satisfy yourself that "pneum-o" is logically translated in each case.

pneumohemothorax	a collection of blood and air in the chest
pneumorachicentesis	the surgical puncturing of the spine, involving air
pneumopleuritis	the inflammation of the pleura and lungs
pneumoarthrosis	an abnormal condition involving the joints, involving air
pneumotropic	preferentially affecting the lungs
pneumocardial	pertaining to the heart and lungs

You will have noticed that plurals instead of singulars are regularly used to denote some parts of the body. We usually refer to "the phalang**es**" (3.14), for example, instead of "**a** phalanx," and "the cerebral mening**es**" (4.5) rather than "a menin**x**" and the "islet**s** (Latin insul**ae**) of Langerhans" (5.39). In this chapter, "the bronch**i**" (11 above) are usually considered together, so that we rarely refer to "**a** bronch**us**."

NOMINA ANATOMICA

The Notes on the *Nomina Anatomica* in Chapters 3, 4 and 5 should be reviewed. Notice especially that Latin adjectives agree with the nouns they modify in **number** as well as in gender.

Plural nouns and adjectives, like most singular nouns and all singular adjectives, are formed by adding nominative endings to combining forms. As the examples labelled "various" (under 23 and 24 above) indicate, the plural noun forms are actually more regular than their singular counterparts.

Where two combining forms exist, the plural ending is regularly added to the longer form. Study the following examples.

SINGULAR	COMBINING FORM	PLURAL
cartilago (3.41)	cartilag(in)-o	cartilag**in**-es
tendo (3.45)	tend-o, tendin-o	tend**in**-es
iris (4.25)	ir(id)-o	ir**id**-es
pulmo (6.13)	pulm(on)-o	pulm**on**-es

An exception to this rule occurs occasionally when the longer combining form is actually a diminutive (26-30 above), as the following example indicates.

SINGULAR	COMBINING FORM	PLURAL
vas (5.15)	vas-o, vas-**cul**-o	vas-a

A very rare exception occurs when the longer combining form contains an adjectival element, as the following example indicates.

SINGULAR	COMBINING FORM	PLURAL
aorta (5.9)	aort-o, aort-**ic**-o	aort-ae

The information given at 21-5 above, and in the preceding Notes, can be presented in terms of the following rules, which apply to both nouns and adjectives.

- Masculine singulars ending in "-us" form plurals by replacing that ending with "-i" (21 above).
- Feminine singulars ending in "-a" form plurals by replacing that ending with "-ae" (22 above).
- Neuter plurals are formed by the addition of "-a" (23 above) to the (long) combining form, **except** that Neuter singulars ending in "-e" form plurals by replacing that ending with "-ia" (25 above).
- Most Masculine and Feminine singulars not covered by the rules above form plurals by adding "-es" (24 above) to the (long) combining form.

The following Latin phrases, exhibiting nouns and adjectives in the nominative plural, are occasionally used in English.

et ceter-**a**	and other (thing)s	(neuter)
et ali-**a**	and other (thing)s	(neuter)
et ali-**i**	and other (human)s	(masculine)
et sequ-ent-**es**	and those following	(masculine-feminine)
et sequ-ent-**ia**	and those following	(neuter)
dis-ject-**a** membr-**a**	apart-thrown members	(= "scattered remains")
part-**es** aequ-al-**es**	equal parts	
nomin-**a** ana-tom-ic-**a**	names p.t. anatomy	
o tempor-**a**, o mor-**es**	o the times, o the manners	

The phrases in the following chart, incorporating the one in Chapter 5, should be memorized.

GRAMMATICAL CATEGORIES		EXAMPLE WORDS AND PHRASES		
GENDER & NUMBER		NOUNS	ADJECTIVES	
			1.3-5, 7-10 (-us type)	1.2, 6 (-is type)
Masculine	singular:	nerv-**us**	cardi-ac-**us**	cervic-al-**is**
	plural:	nerv-**i**	cardi-ac-**i**	cervic-al-**es**
Feminine	singular:	arteri-**a**	cardi-ac-**a**	cervic-al-**is**
	plural:	arteri-**ae**	cardi-ac-**ae**	cervic-al-**es**
Neuter	singular:	gangli-**on**	cardi-ac-**um**	cervic-al-**e**
	plural:	gangli-**a**	cardi-ac-**a**	cervic-al-**ia**

DIMINUTIVES

The following words, familiar to you from previous chapters, are in fact Latin nouns with diminutive terminations which provide examples of many of the endings presented above. (Notice that the translations given at the extreme right are literal, and that they should not be used.)

DIMINUTIVE	LATIN	MEDICAL ENGLISH	LITERAL ENGLISH
-ul- (26)	fib-**ul-a** (3.35)	fibula	a little pin
	acetab-**ul-um** (3.31)	acetabulum	a little vinegar (cup)
	valv-**ul-a** (5.10)	(valv**ul**e) valve	a little valve
-cul- (27)	clav-i-**cul-a** (3.6)	clavi**cl**e	a little key
	mus-**cul-us** (3.43)	mus**cl**e	a little mouse
	ventr-i-**cul-us** (5.11)	ventri**cl**e	a little belly
-ell- (28)	pat-**ell-a** (3.33)	kneecap	a little open (dish)
	cereb-**ell-um** (4.3)	cerebellum	a little brain
-ill- (29)	pup-**ill-a** (4.19)	pup**il**	a little doll

Other words with diminutive endings will appear in later chapters.

APPARENTLY IRREGULAR INFLECTIONAL ENDINGS

A very few Latin nouns used in Medical Terminology and ending in "-us" are formed by adding the nominative ending "-s" to a stem ending in "-u;" the Latin plural of such nouns is indistinguishable from the singular, and therefore, in the case of "sinus" (3 above), the "Anglicized" plural "sinus**es**" (formed on the analogy of 24 above) is frequently used.

"Pulmo" (13 above) is formed from the stem "pulm**on**-;" see the Notes in Chapter 3.

For "diaphragma" (16 above), see the Notes in Chapter 4. Words of this form are Greek neuter nouns, and the plural is made by adding the characteristic neuter plural ending "-a" to the long version of the combining form.

For "pharynx" (6 above) and "larynx" (9 above), see the Notes in Chapter 3.

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-6

CONFUSABLES 2: WHAT'S THAT BIT DOING THERE?

Review "Confusables 1" (in Part C of Chapter 2), and "Terminations in -orrh-" (in Part C of Chapter 3). Other kinds of somewhat predictable confusion will continue to crop up as you study this material. Do your best with the following groups of words, and carefully distinguish the borders of combining forms.

1. **cephalography** _____
2. **cephalogram** _____
3. **cephalograph** _____
4. **dermogenesis** _____
5. **dermogen** _____
6. **dermogenic** _____
7. **dermogenous** _____
8. **dermogenetic** _____
9. **dermatic** _____
10. **dermitic** _____
11. **dermotic** _____
12. **brachial** _____
13. **cephalic** _____

14. **omphalic** _____

15. **omphalicocele** _____

16. **umbilocele** _____

17. **umbilicocele** _____

ANSWERS AND EXPLANATIONS

Some similar word-parts, while related to each other, have significant differences in both form and meaning. You will have already noticed groups like the following.

1. **cephalograph-y**
   - the recording of the head
2. **cephalogram**
   - a record of the head
3. **cephalograph**
   - an instrument for recording the head
4. **dermogen-esis**
   - the production of the skin
5. **dermogen**
   - a substance which produces skin
6. **dermogen-ic**
   - producing the skin
7. **dermogen-ous**
   - produced by the skin
8. **dermogen-etic**
   - p.t. the production of skin

Many more confusions arise due to mistakes of division. For example, both derm- and dermat- mean "skin" (or "the skin"). Note that many other combining forms show the same variation: in Chapter 2 alone, compare som(at)- and epiderm(at)-. Such differences in form (but not in meaning) can contribute to many errors of translation.

9. **dermat-ic**
   - p.t. the skin
10. **derm-itic**
   - p.t. the inflammation of the skin (= p.t. dermitis)
11. **derm-otic**
   - p.t. an abnormal condition involving the skin (= p.t. dermosis)

Similar confusions can arise in the following forms.

12. **brachi-al**
   - p.t. the arm
13. **cephal-ic**
   - p.t. the head (*not* ceph-al-)
14. **omphal-ic**
   - p.t. the navel (*not* omph-al-)
15. **omphal-ic-ocele**
   - the protrusion of something p.t. the navel
16. **umbil-ocele**
   - the protrusion of the navel
17. **umbilic-ocele**
   - the protrusion of the navel
   - *not* the protrusion of something p.t. the navel (both umbilic- and umbil- = navel)

Always remember, if you have divided your word correctly, there will be no "extra bits."

CONFUSABLES 3: AND WHAT'S THAT BIT DOING THERE?

If necessary, review the previous section. It is easy to become confused about the boundaries of combining forms. Do your best with the following words.

1. **blepharitis** _____
2. **mammaritis** _____
3. **mammary** _____
4. **cardiac** _____
5. **cardiacectomy** _____
6. **thoracectomy** _____
7. **chondrin** _____
8. **cartilagotomy** _____
9. **cartilaginous** _____
10. **ostein** _____
11. **tenditis** _____
12. **tendinitis** _____
13. **myosis** _____
14. **myosic** _____
15. **myotic** _____

16. **sternoid** _____

17. **xiphoidia** _____

18. **coracoiditic** _____

19. **chondrosseal** _____

20. **chondrostosis** _____

21. **chondrosteosis** _____

22. **vagalotomy** _____

23. **sympathicotomic** _____

24. **optic** _____

25. **opticosis** _____

26. **ocular** _____

27. **ocularosis** _____

28. **ciliary** _____

29. **ciliaritis** _____

30. **cilioidosis** _____

31. **choriotic** _____

32. **choroiditis** _____

33. **malleanostasis** _____

34. **membranotomy** _____

35. **tympanoscopy** _____

36. **nervous** _____

37. **nervosus** _____

38. **nervosoid** _____

39. **myosoid** _____

ANSWERS AND EXPLANATIONS

1. **blephar-itis**
   - the inflammation of the eyelid (*not* bleph-ar-)
2. **mamm-ar-itis**
   - the inflammation of something p.t. the breast (*not* mammar-)
   - (but "something p.t. the breast" could = a mamm-ary gland)
3. **mamm-ary**
   - p.t. a breast
4. **cardi-ac**
   - p.t. the heart
5. **cardi-ac-ectomy**
   - the cutting out of something p.t. the heart
6. **thorac-ectomy**
   - *not* thor-ac-; so *not* the cutting out of something p.t. the chest
   - *not* the cutting out of the chest
   - the cutting out of **something involving** the chest

If you are still confused, see "The Splitting of Milk" in Part C of Chapter 5.

Chapter 3 features more types of combining forms that must be carefully learned because they contain what look like meaningful parts. In addition to clav- and clavic-, watch out for forms like the following.

7. **chondr-in**
   - a substance of cartilage
8. **cartilag-otomy**
   - the cutting of a cartilage
9. **cartilagin-ous**
   - p.t. cartilage
   - (cartilag- and cartilagin- both = cartilage)
10. **oste-in**
    - a substance of bone
11. **tend-itis**
    - the inflammation of a tendon
12. **tendin-itis**
    - the inflammation of a tendon
    - (both tend- and tendin- = tendon)
13. **my-osis**
    - an abnormal condition involving a muscle
14. **myos-ic**
    - p.t. the muscles
15. **my-ot-ic**
    - p.t. an abnormal condition involving muscle
    - (both my- and myos- = muscle)

A special case of this category of potentially ambiguous word parts are those in which -oid- is part of the combining form.

16. **stern-oid**
    - resembling the sternum
    - *not* a thing called the sternoid or sternoid process
17. **xiphoid-ia**
    - an abnormal condition involving the xiphoid process
    - (both xiph- and xiphoid- = xiphoid process)
18. **coracoid-it-ic**
    - p.t. the inflammation of the coracoid process

Another type of special case is the termination -ostosis. Work through the following examples.

19. **chondr-osse-al**
    - p.t. bone, involving cartilage
20. **chondr-ostosis**
    - the ossification of cartilage (x-ostosis)
    - (the combining forms meaning "bone" are oss-, osse- and oste-, *not* ost-)
21. **chondr-oste-osis**
    - an abnormal condition involving bone, involving cartilage

Chapter 4 features several potentially confusing forms like those you are familiar with.

22. **vag-al-otomy**
    - the cutting of something p.t. the vagus nerve (*not* vagal-)
23. **sympathic-otomic**
    - p.t. the cutting of the sympathetic nerves (sympathic- = sympath-)
24. **opt-ic**
    - p.t. the eye
25. **optic-osis**
    - an abnormal condition involving the eye (both optic- and opt- = eye)
26. **ocul-ar**
    - p.t. the eyes

27. **ocul-ar-osis**
    - an abnormal condition involving something p.t. the eyes (*not* ocular-)
28. **cili-ary**
    - p.t. the ciliary body
29. **ciliar-itis**
    - the inflammation of the ciliary body (cili- = ciliar-)
30. **cili-oid-osis**
    - an abnormal condition involving something resembling the ciliary body
31. **chori-otic**
    - p.t. an abnormal condition involving the choroid
32. **choroid-itis**
    - the inflammation of the choroid (choroid- = chori-)

Finally, a few combining forms end in -an, which is not to be confused with the termination -an, and the -os- of forms like syndesmos- is not to be confused with forms of the termination -ous (-os-us, -os-a, -os-um) (1.4 and 1.7).

33. **malle-an-ostasis**
    - the stopping of something p.t. the hammer
34. **membran-otom-y**
    - the cutting of a membrane (*not* membr-)
35. **tympan-oscopy**
    - the examination of the middle ear (*not* tymp-)
36. **nerv-ous**
    - p.t. the nerves (*or* p.t. nerves, *or*...)
37. **nerv-osus**
    - p.t. nerves (*or* p.t. a nerve, *or*...)
38. **nerv-os-oid**
    - resembling something p.t. a nerve
39. **myos-oid**
    - resembling muscle (myos- = my-)

7

ORAL-DENTAL SYSTEMS

PART A. COMBINING FORMS

ORAL

1.	**gnath-o**	(**chin**)	jaw	
2.	**max-ill-o**	(**ma**n**g**er)	upper jaw	**max-ill-a**
3.	**mand-i-bul-o**	(**max**illa)	lower jaw	**mand-i-bul-a**
4.	**geni-o**	(**gn**ath-o)	**chin**	
5.	**ment-o**	(**mount**ain)	chin	**ment-um**
6.	**stom(at)-o**	(x-o-**stom**y)	mouth	**stoma**
7.	**or-o**	(**or**al)	mouth	**os**
8.	**cheil-o**	(“edge”)	lip	
9.	**labi-o**	(**labi**al)	**lip**	**labi-um**
10.	**bucc-o**	(**bucc**al cavity)	cheek	**bucc-a**
11.	**gloss-o**	(**gloss**ary)	tongue	**gloss-a**
12.	**lingu-o**	(**langu**age)	**tongu**e	**lingu-a**
13.	**palat-o**	(**palat**able)	**palat**e	**palat-um**
14.	**uran(isc)-o**	(**Uran**us)	palate	
15.	**staphyl-o**	(“grape-cluster”)	uvula	
16.	**uv-ul-o**	(**uv**ea [4.24])	**uvul**a	**uv-ul-a**
17.	**cion-o**	(“pillar”)	uvula	

DENTAL

18. **odont-o**	(orth**odont**ist)	**tooth**	
19. **dent-o, dent-i**	(**dent**ist)	**tooth**	**dens**
20. **peri-odont-o**	(**peric**ardium)	**periodont**ium	**peri-odont-i-um**
21. **gingiv-o**	(**gingiv**itis)	gums	**gingiv-ae**
22. **ul-o**		gums	
23. **dent-in-o**	(**dent**-o)	**dentin**	**dent-in-um**
24. **(en)amel-o**		**enamel**	**en-amel-um**
25. **a-damant(in)-o**	(**adamant**)	enamel	
26. **pulp-o**	("flesh")	**pulp**	**pulp-a**
27. **cement-o**	(**cement**)	**cement**um	**cement-um**

LOCATIVE

28. **axi-o**	(**axi**s)	**axi**al
29. **dist-o**	(**dist**ant)	**dist**al
30. **mesi-o**	(**midd**le)	**mesi**al
31. **incis-o**	(**incis**ion)	**incis**al
32. **occlus-o**	(**occlus**ion)	**occlus**al
33. **-cervic-o**	(**cervix**)	**cervic**al
34. **labi-o**	(9 above)	**labi**al
35. **bucc-o**	(10 above)	**bucc**al
36. **lingu-o**	(12 above)	**lingu**al
37. **gingiv-o**	(21 above)	**gingiv**al
38. **pulp-o**	(26 above)	**pulp**al

PART B. NOTES

LOCATIVES

Dental locatives are **adjectival** in meaning, and so their English equivalents must (with one exception; see below) be adjectives rather than nouns.

The following combining forms refer normally to parts of the mouth. But in combination with "true" locatives (28-32), or "-cervic-o" (33) or "pulp-o" (38) they function as locatives themselves, and must be translated accordingly. Words consisting **only** of these forms (plus an adjectival ending) will usually have two meanings, one anatomic, the other locative.

	ANATOMIC	LOCATIVE
labi-o	(9) lip	(34) **labi**al
bucc-o	(10) cheek	(35) **bucc**al
lingu-o	(12) tongue	(36) **lingu**al
gingiv-o	(21) gums	(37) **gingiv**al
pulp-o	(26) pulp	(38) **pulp**al

Words made by the combination of dental locative bases describe angles, formed by the junction of two or more surfaces of a tooth ("tooth angles") or of two or more walls of a tooth cavity ("cavity angles"), in terms of the surfaces or walls participating in the formation of those angles. Those formed by the junction of two surfaces or walls are called "line angles," while those formed by the junction of three surfaces or walls are "point angles."

Where "x" and "z" are locatives, the following formula applies.

x-o-z-al pertaining to or formed by the x-al and z-al surfaces of a tooth **or** pertaining to or formed by the x-al and z-al walls of a tooth cavity

Notice carefully the **order** of translation, which with dental locatives is always from left to right.

Most combinations of locative bases describe tooth angles. But when one of the elements is "**pulp**-o," "**axi**-o" or "**gingiv**-o" the compound will refer to cavity angles (with one exception; see below).

There are three classes of exceptions to the preceding rules.

1) "Axi-o-x-o-lingual" **should** mean "pertaining to or formed by the axial, x-al and lingual walls of a tooth cavity." In fact, this configuration of bases will always mean "pertaining to or formed by the axial, x-al and lingual **surfaces of a tooth**."

2) When "-cervical" appears at the end of a word designating a tooth angle (that is, in any word not containing the bases specified above), the following formula usually applies.

x-o-cervical	pertaining to the x-al surface **of the cervix** of a tooth

3) "Dist-o" and "mesi-o," in combination with "bucc-o," "lingu-o," "labi-o," and "occlus-o" to form words describing line angles, produce terms which each have two meanings, as they refer to **both** tooth angles **and** cavity angles. A list of the words involved follows.

distobuccal (and buccodistal)	mesiobuccal (and buccomesial)
distolingual (and linguodistal)	mesiolingual (and linguomesial)
distolabial	mesiolabial
disto-occlusal	mesio-occlusal

Study the following examples, and satisfy yourself that they conform to the rules given above.

buccolingual	p.t. the tongue and cheek **or** p.t. or formed by the buccal and lingual surfaces of a tooth
buccopulpal	p.t. or formed by the buccal and pulpal walls of a tooth cavity

axiomesioincisal	p.t. or formed by the axial, mesial and incisal walls of a tooth cavity
buccomesial	p.t. or formed by the buccal and mesial surfaces of a tooth **or** p.t. or formed by the buccal and mesial walls of a tooth cavity

COMMON SENSE

The termination "x-it-is" (1.14) is occasionally found in the plural. The form, "x-it**id**-es," shows that a (very rare) longer alternative base exists; compare "ir-o" and "ir**id**-o" (4.25).

You would expect the translation of "x-itid-es" to be "(several) inflammation**s** of x." Because of the nature of the condition called "inflammation," however, a more specific formula applies.

x-itid-es	several conditions involving the inflammation of x

NOMINA ANATOMICA: APPARENTLY IRREGULAR INFLECTIONAL ENDINGS

For "stoma**a**" (6 above) from "stom**at-**," see the Notes in Chapter 4. The plural is "stomat-a."

"Os" (7 above), which must be distinguished from the Latin word for "bone" (3.2), is the result of phonetic assimilation having caused the "-r-" of an original "o**r-s**" to drop out; the plural is "or-a."

Similarly, "den**s**" (19 above) is from an original "den**t-s**;" the plural is "den**t-es**."

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-7

MULTIPLE COMBINING FORMS 2: NOSEBRAINS OR SKINCELLS?

How would you "translate" the compound word "nosebrain" into normal English? What about "skincell?" Play with these questions a minute, noticing that both terms denote physical objects, and that while "nosebrain" must be specifying something about the brain and "skincell" must specify a kind of cell, the translations cannot have identical structures. Remember that when dealing with a word containing two combining forms, "Plan A" is to try connecting them with the word "of;" if that doesn't work, then try "Plan B" (which is to use the word "involving" – review "Multiple Combining Forms 1" in Part C of Chapter 3 if this concept is confusing).

skin-cell

- a cell of the skin (Plan A works, so look no further)

nose-brain

- *not* the brain of the nose (Try Plan B)
- the brain involving the nose (–?)

But what would "the brain involving the nose" actually be in the real world? The correct translation here requires another expansion of the word "involving".

nose-brain

- *the part of* the brain involving the nose

In light of these examples, translate the following medical words. Notice that (unlike most of the words in "Abstract Versus Concrete Nouns" in Part C of Chapter 4), the terminations of the nouns in this group indicate that they are all touchable objects.

1. **dermocytic** _____

2. **dermatocyte** _____

3. **rhinencephalic**_____

4. **rhinencephalon** _____

5. **otoganglionic** _____

6. **otoganglion** _____

ANSWERS AND EXPLANATIONS

1. **dermo-cyt-ic**
   - p.t. a cell of the skin
2. **dermato-cyt-e**
   - a cell of the skin
3. **rhin-encephal-ic**
   - p.t. the brain, involving the nose
4. **rhin-encephal-on**
   - the part of the brain involving the nose
5. **oto-ganglion-ic**
   - p.t. a ganglion of the ear
6. **oto-gangli-on**
   - a ganglion of the ear (gangli- = ganglion-)

CONCRETE NOUNS WITH TWO COMBINING FORMS: THE BRAIN OF THE EYE?

If you have not already reviewed the Note on words like "rhinencephalon" in Chapter 4, do so now.

Here are some more words of the same two types, each at least plausible as a descriptor of an object in the real world. Remember to go with Plan A if that works.

1. **ophthalmencephalon** _____

2. **myelencephalon** _____

3. **trichocranium** _____
4. **cephalomusculus** _____
5. **brachionervus** _____
6. **neurobrachium** _____
7. **thoracomusculus** _____
8. **myringomalleus** _____
9. **malleomyrinx**_____
10. **sternothorax**_____

ANSWERS AND EXPLANATIONS

1. **ophthalm-encephal-on**
   - the part of the brain involving the eye (*not* the brain of the eye)
2. **myel-encephal-on**
   - the part of the brain involving the spinal cord
3. **tricho-crani-um**
   - the part of the skull involving hair (*not* the skull of the hair)
4. **cephalo-muscul-us**
   - a muscle of the head
5. **brachio-nerv-us**
   - a nerve of the arm
6. **neuro-brachi-um**
   - the part of the arm involving nerves (*not* the arm of a nerve)
7. **thoraco-muscul-us**
   - a muscle of the chest

8. **myringo-malle-us**
   - the part of the hammer involving the tympanic membrane
9. **malleo-myrinx**
   - the part of the tympanic membrane involving the hammer
10. **sterno-thorax**
   - the part of the chest involving the sternum (*not* the chest of the sternum)

Note that your success in translating the last two words above depends upon your recognizing that the terminal letter "x" is a kind of "shorthand" for the nominative singular ending "-s" (see the Note in Chapter 2).

- **thorac-** + nominative singular ending "**-s**" = **thorac-s** = "**thorax**"
- **myring-** + nominative singular ending "**-s**" = **myring-s** = "**myrinx**"

This means, of course, that your malleomyringes and your sternothoraces (for the plurals, see Chapter 6) are a whole lot more like your nosebrains than they are like your skincells.

CONFUSABLES 4: AMBIGUOUS EARS?

Try to divide and define the following words, keeping in mind that coalescence (see the Note in Chapter 2), although rare, may be invoked if all else fails. Note that, while many of these are made-up words, all of them are theoretically possible. If a word can be divided in more than one way, or defined in more than one way, try all of the possibilities. If you have generated two possible translations, consider whether one is intrinsically more likely than the other.

1. **otoneuric** _____
2. **neurotic** _____
3. **otocephalic** _____
4. **cephalotic** _____
5. **cephalotomic** _____

6. **cephalomotic** _____

7. **omotocephalic** _____

8. **omocephalotic** _____

9. **otomocephalic** _____

10. **otocephalomic** _____

11. **cranioplastic** _____

12. **craniopoietic** _____

13. **hematoplastic** _____

ANSWERS AND EXPLANATIONS

In the following word-divisions, "(o)" indicates the occurrence of a hypothetical letter "o" which has been lost by coalescence.

1. **oto-neur-ic**
   - p.t. a nerve of the ear
2. **neur(o)-ot-ic**
   - *not* p.t. the ear and a nerve
   - p.t. an abnormal condition involving a nerve (= p.t. neur-osis)
3. **oto-cephal-ic**
   - p.t. the head and ear
4. **cephal(o)-ot-ic**
   - *not* p.t. the ear and head
   - p.t. an abnormal condition involving the head (= p.t. cephal-osis)

5. **cephal(o)-ot(o)-om-ic**
   - *not* p.t. the shoulder, ear and head
   - *not* p.t. the shoulder and an abnormal condition involving the head
   - p.t. the cutting of the head (= p.t. cephal-otomy)
6. **cephal(o)-om(o)-ot-ic**
   - *not* p.t. the ear, the shoulder and the head
   - p.t. an abnormal condition involving the shoulder and the head (= p.t. cephal(o)-om-osis)
7. **om(o)-ot(o)o-cephal-ic**
   - *not* p.t. the head, ear and shoulder
   - p.t. the head and an abnormal condition involving the shoulder (= p.t. the head and p.t. om-osis)
8. **omo-cephal(o)-ot-ic**
   - *not* p.t. the ear, the head and the shoulder
   - p.t. an abnormal condition involving the head and shoulder (= p.t. omocephal-osis)

Take from these examples that, if an ambiguity is only apparent – that is, if it relies on an assumption of coalescence and/or an interpretation which could be easily expressed unambiguously in a different medical word – you need to keep it simple. If that idea is too complex, a simple and helpful rule covering many (but not all) cases is that -ot- is guaranteed to mean "ear" *only* when it comes first in its word. Note that the following two words require the assumption of coalescence, but that there is no ambiguity.

9. **ot(o)-omo-cephal-ic**
   - p.t. the head, shoulder and ear
10. **oto-cephal(o)-om-ic**
   - p.t. the shoulder, head and ear

Other apparent ambiguities can be similarly resolved.

11. **cranio-plast-ic**
    - p.t. the surgical repairing of the skull
    - (probably) *not* p.t. the formation of the skull (see the next term)
12. **cranio-poiet-ic**
    - p.t. the formation of the skull

That is, the easy availability of "x-o-poietic" means that in practice, "x-o-plastic" can usually be taken as referring to "x-o-plasty." Note also that another way of explaining why cephalotic does *not* mean "p.t. the ears and head" is that the word otocephalic, meaning the same thing, is easily accessible and would be chosen by anyone wanting to use an unambiguous term.

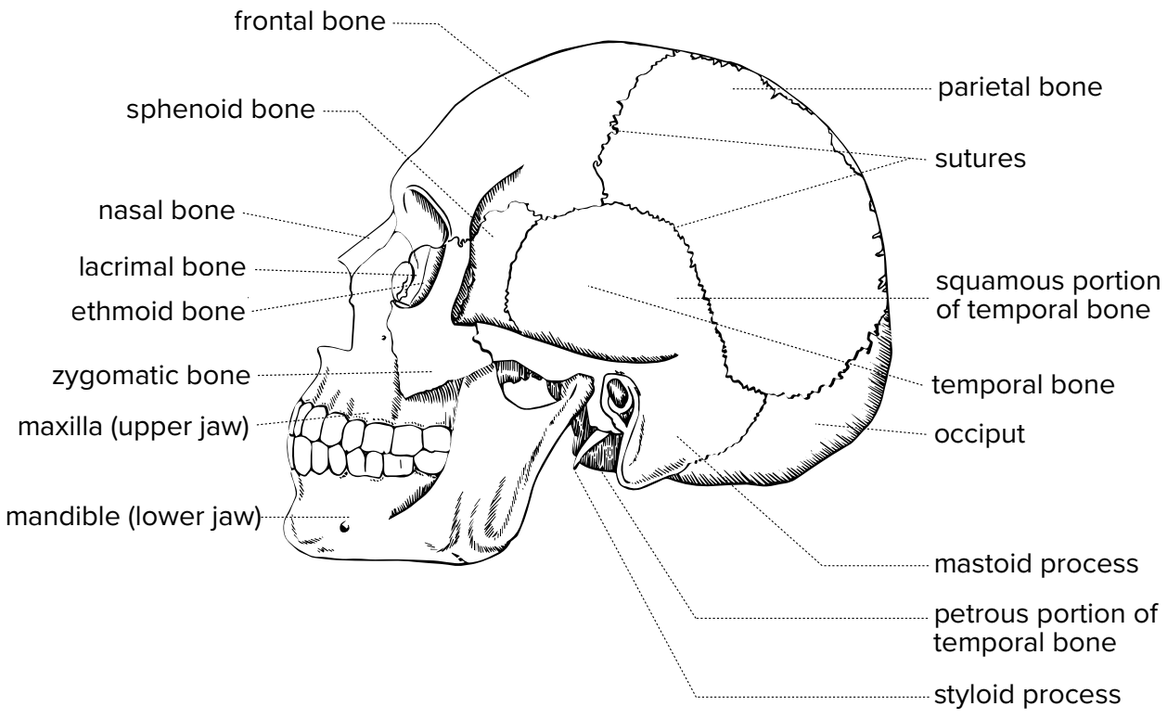
Remember that the "apparent ambiguity" rule only applies when two or more translations *do* seem possible.

13. **hemato-plast-ic**
    - p.t. the formation of blood
    - *not* p.t. the surgical repairing of blood

Finally, the theoretical desire to avoid ambiguity explains why most medical words, no matter how ambiguous they may seem at first glance, are (like the apparently ambiguous ears in this section) not really ambiguous at all.

8

BONES OF THE HEAD
MORE TERMINATIONS


frontal bone
sphenoid bone
nasal bone
lacrimal bone
ethmoid bone
zygomatic bone
maxilla (upper jaw)
mandible (lower jaw)
parietal bone
sutures
squamous portion of temporal bone
temporal bone
occiput
mastoid process
petrous portion of temporal bone
styloid process

PART A. COMBINING FORMS

BONES OF THE HEAD

1.	**front-o**	(**front**)	**front**al bone	**os front-al-e**
2.	**pariet-o**	(“wall”)	**pariet**al bone	**os pariet-al-e**
3.	**oc-cipit-o**	(**capit**al)	**occiput**	**os oc-cipit-al-e**
4.	**atl(ant)-o**	(**Atlant**ic)	**atlas**	**atlas**
5.	**tempor-o**	(**temp**le)	**tempor**al bone	**os tempor-al-e**
6.	**mast(oid)-o**	(**mast-o**)	**mastoid** process	
7.	**styl-o, styl-oid-o**	(**styl**us)	**styloid** process	
8.	**petr-o, petr-os-o**	(**petr**ify)	**petrous** part of the temporal bone	
9.	**squam-o, squam-os-o**	(“scale”)	**squamous** part of the temporal bone	
10.	**sphen-o, sphen-oid-o**	(“wedge-like”)	**sphenoid** bone	**os sphen-oid-al-e**
11.	**zygomat(ic)-o**	(**yok**e)	**zygomatic** bone	**os zygomat-ic-um**
12.	**ethm(oid)-o**	(“sieve-like”)	**ethmoid** bone	**os ethm-oid-al-e**
13.	**lacrim-o**	(4.33 above)	**lacrim**al bone	**os lacrim-al-e**
14.	**nas-o**	(6.2 above)	**nas**al bone	**os nas-al-e**
15.	**max-ill-o**	(7.2 above)	**maxill**a	**max-ill-a**
16.	**mand-i-bul-o**	(7.3 above)	**mandibl**e	**mand-i-bul-a**
17.	**sut-ur-**	(“seam”)	**sutur**e	**sutur-a**
18.	**hy-o**	(“U-shaped”)	**hy**oid bone	**os hy-oid-e-um**

TERMINATIONS

DIAGNOSTIC

19.	**x-aux-is**	(**aux**iliary)	the enlargement of x
20.	**x-o-cirrh-os-is**	(**cirrhosis**)	the hardening of x
21.	**x-o-cleis-is**	(**clos**ing)	the **clos**ure of x
22.	**x-(h)elc-os-is**	(**ulc**er)	the **ulc**eration of x
23.	**x-i-fer-ous**	(con**iferous**)	**bear**ing x
24.	**x-o-tox-ic-os-is**	(**toxic**)	the poisoning of x
25.	**x-o-tox-ic**		poisonous to x
26.	**x-o-tox-in**		a substance poisonous to x
27.	**x-o-tox-ic-ity**		the ability to poison x

THERAPEUTIC

28.	**x-ap-her-es-is**	(plasm**apheresis**)	the removal of x
29.	**x-(en-)chys-is**	(["in"]-"flood")	the injection of fluid into x
30.	**x-o-camps-ia**	("curve")	the bending of x (therapeutic) the curvature of x (diagnostic)
31.	**x-o-camp**		an instrument for bending x
32.	**x-o-trips-y**	("rubbing")	the crushing or rubbing of x
33.	**x-o-trib-e**	(**trib**ulation)	an instrument for crushing or rubbing x

PART B. NOTES

TERMINATIONS

Some of the terminations presented above have alternate forms. Two of these are unpredictable and should be carefully learned.

x-o-**k**leis-is = x-o-**c**leis-is (21) [see the Note in Chapter 3]

x-aux-**e** = x-aux-**is** (19) [compare 1.21]

Two translations are given for "x-o-camps-ia" (30 above) because the action described by the termination can be either a surgical procedure or a medical problem. "x-o-trips-y" (32 above) can also refer to either diagnosis or treatment, but no distinction in translation needs to be made.

COMMON SENSE

Where "x-oid" appears in terms such as "hy**oid** bone," "thyr**oid** gland" and "mast**oid** process," and where "z" is any other base, the form "z-o-x-oid" means "**pertaining to** x and z," and not "**resembling** x and z." See also the Note on "Latin Phrases" below.

The short form "mast-o" (6 above) regularly means "breast" (2.27), and only refers to the mastoid process when another element in the compound designates part of the head. Study the following examples.

mastoparietal	pertaining to the parietal bone and the mastoid process
mastectomy	the cutting out of the breast
mastoidectomy	the cutting out of the mastoid process

The syllable "-os-" in "petr-os-o" and "squam-os-o" (8 and 9 above) is the base of the adjectival ending "-os-us" (1.4) and is unrelated to "-os-is" (1.19). Adjectival bases occasionally appear in other combining forms ("aort-**ic**-o" [5.9] and "cili-**ar**-o" [4.27], for example), also without affecting the translation.

NOMINA ANATOMICA

LATIN PHRASES

You would expect to define "os pariet-al-e" (2) as "a bone pertaining to the parietal bone." In fact, however, the phrase designates "the parietal bone" itself. This is a problem of "level of translation" which may be understood by considering the fact that "pariet-" actually **means** "wall." Study the following sequence (and compare the examples given in Chapters 3 and 4).

os ethm-oid-al-e	(Latin)
= the "ethm-oid-al" bone	(Awkward Medical English)
= **the ethm-oid bone**	(**Correct Medical English**)
= a bone resembling a sieve	(Literal English; not to be used)

You would expect to translate "sutura frontolacrimalis" as "a suture p.t. the lacrimal and frontal bones," but a more accurate rendition is expressed by the following formula (wherein "x" and "z" are bones of the head, and "-al" is any adjectival ending).

sutura x-o-z-al	the suture **between** z and x

APPARENTLY IRREGULAR INFLECTIONAL ENDINGS

"Atlas" (4 above) is the result of phonetic assimilation from an original nominative singular, "atla**nt-s**."

For "os" (found in many of the Latin phrases above), see the Note in Chapter 3.

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-8

CONFUSABLES 5: WHAT'S THAT BIT DOING?

As you have noticed by now, Chapter 5 offers a few more potentially confusing combining forms. Try your luck with the following words.

1. **hematinic** _____
2. **sanguinous** _____
3. **plasmatinopenia** _____
4. **hemoglobinopenic** _____
5. **aortic** _____
6. **aorticoschisis** _____
7. **varicectomy** _____
8. **valvularitis** _____
9. **capillaritis** _____
10. **pinealoidectomy** _____
11. **thyroidectomy** _____
12. **adrenism** _____
13. **adrenalism** _____

14. **adenalism** _____

15. **lymphitic** _____

16. **lymphotic** _____

17. **lymphatic** _____

ANSWERS AND EXPLANATIONS

1. **hemat-in-ic**
   - p.t. a substance of blood
2. **sanguin-ous**
   - p.t. blood (sanguin- = sangu-)
3. **plasmat-in-openia**
   - a deficiency of a substance of plasma
4. **hemoglobin-openic**
   - p.t. a deficiency of hemoglobin (hemoglobin- = hemoglob-)
5. **aort-ic**
   - p.t. the aorta
6. **aortic-oschisis**
   - the splitting of the aorta (aortic- = aort-)
7. **varic-ectomy**
   - the cutting out of a varix
8. **valvul-ar-itis**
   - the inflammation of something p.t. a valve
9. **capillar-itis**
   - the inflammation of a capillary
10. **pineal-oid-ectomy**
    - the cutting out of something resembling the pineal gland

11. **thyroid-ectomy**
    - the cutting out of the thyroid gland (thyroid- = thyr-)
12. **adren-ism**
    - a condition caused by the malfunction of the adrenal glands
13. **adrenal-ism**
    - a condition caused by the malfunction of the adrenal glands (adrenal- = adren-)
14. **aden-al-ism**
    - a condition caused by the malfunction of something p.t. a gland

And just to keep you on your toes.

15. **lymph-it-ic**
    - p.t. the inflammation of something involving lymph
16. **lymph-ot-ic**
    - p.t. an abnormal condition involving lymph
17. **lymphat-ic**
    - p.t. lymph (lymphat- = lymph-)

X-EMIA: PRESENCES, ABNORMAL OR NORMAL?

Blood, obviously, is an extremely important medical substance. From the point of view of terminology, blood is remarkable in that so many conditions, processes, disorders and objects are named partly because of the involvement in them of this substance. Do your best with the following words (if you are confused, review the Notes in Chapter 5).

1. **hematosis** _____
2. **hemia** _____
3. **hemiasis**_____
4. **opticemia** _____

5. **dacryocysthemic** _____
6. **lacrimemia** _____
7. **iridemia** _____
8. **encephalemic** _____
9. **plasmatemia** _____
10. **thrombocythemic** _____
11. **hematinemia** _____
12. **hematocythemia** _____
13. **thyroidemic** _____
14. **pinealemia** _____
15. **optemic** _____

ANSWERS AND EXPLANATIONS

1. **hemat-osis**
   - an abnormal condition involving blood
2. **hem-ia**
   - an abnormal condition involving blood
3. **hem-iasis**
   - the abnormal presence of blood
4. **optic-emia**
   - the abnormal presence of blood in the eye
   - *not* an abnormal condition involving blood and the eye

5. **dacryocyst-hem-ic**
   - p.t. dacryocyst-hemia (preliminary answer)
   - p.t. the abnormal presence of blood in the tear sac
   - *not* p.t. blood involving the tear sac
6. **lacrim-emia**
   - the abnormal presence of blood in tears
7. **irid-emia**
   - the abnormal presence of blood in the iris
8. **encephal-em-ic**
   - p.t. the abnormal presence of blood in the brain

In the case of the last word, you might object that since blood *normally* is present in the brain our translation doesn't make sense. But this is to miss an important matter of emphasis. The termination x-emia names a *disorder* rather than a simple fact about the body. Thus the emphasis is always upon the "abnormality" rather than upon the mere "presence." In the real world, "the abnormal presence of blood in the brain" could name any of a number of conditions; here is an incomplete list of possibilities.

- the fact that more (or less) blood than normal is present;
- the fact that the blood present is itself in some way abnormal, perhaps lacking (or possessing an excess of) some normal component or chemical or nutrient;
- the fact that blood has pooled somewhere in the brain, perhaps due to a broken vessel.

This emphasis on "abnormality" is key to your understanding of the following terms (remember that the first rule is to reverse the order if your first try at a translation of any given x-emia doesn't make sense).

9. **plasmat-emia**
   - *not* the abnormal presence of blood in plasma (because plasma is a component of blood)
   - the abnormal presence of plasma in the blood
10. **thrombocyt-hem-ic**
   - p.t. the abnormal presence of platelets in the blood

Thus the type of expansion suggested in the Note on "thrombocythemia" in Chapter 5 is not strictly necessary. But note how the addition improves the following two translations.

11. **hemat-in-emia**
    - the abnormal presence of **something involving** a substance of blood in the blood
12. **hemato-cyt-hemia**
    - the abnormal presence of **something involving** cells of blood in the blood

Given that glandular secretions are also a regular component of blood, the following pairs of answers might be equally acceptable.

13. **thyroid-em-ic**
    - p.t. the abnormal presence of secretions from the thyroid gland in the blood
    - *or* p.t. the abnormal presence of something involving secretions....
14. **pineal-emia**
    - the abnormal presence of secretions from the pineal gland in the blood
    - *or* the abnormal presence of something involving secretions....

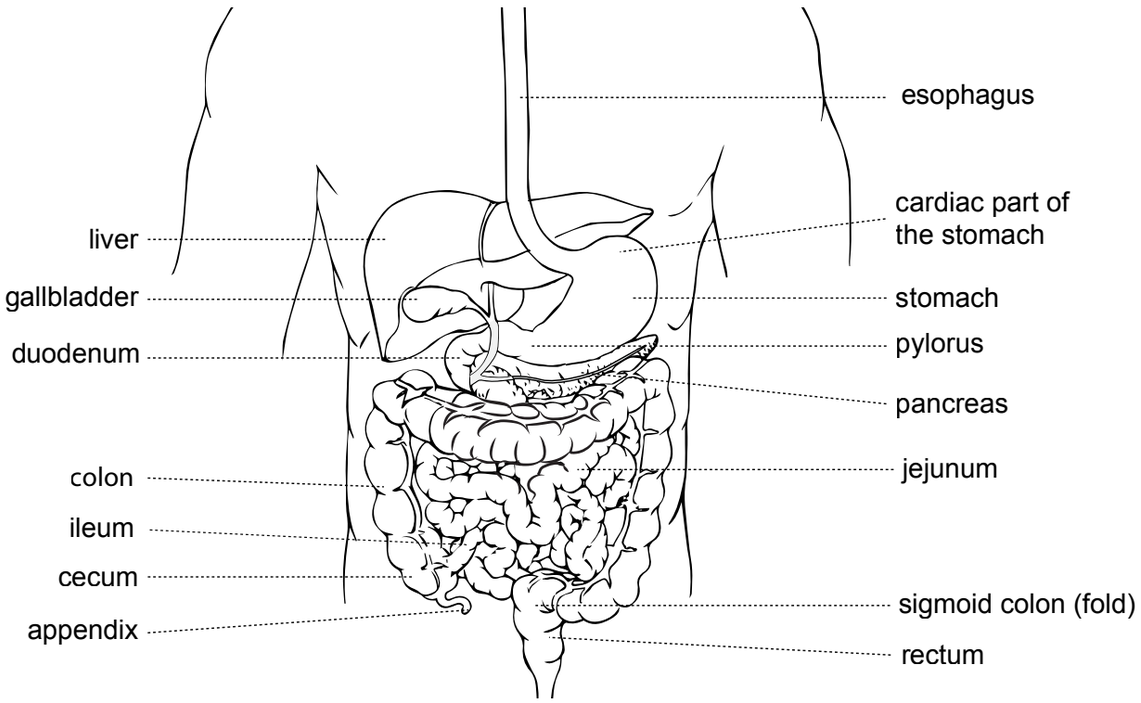
For imaginary bonus points, generate yet another correct translation for these two words (hint: this has nothing to do with the alternation, "blood/the blood"). Stumped? The following example should make this clear.

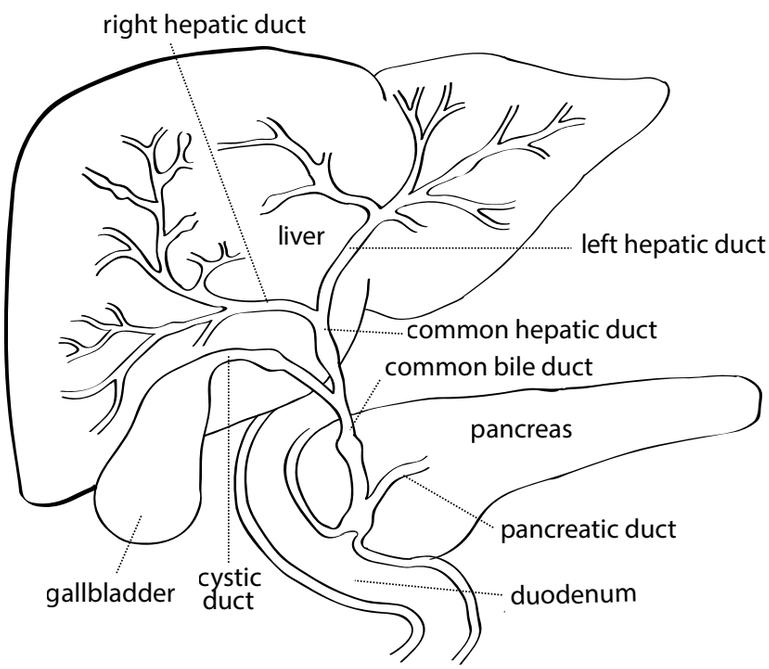
15. **opt-em-ic**
    - p.t. the abnormal presence of blood in the eye
    - *or* p.t. the abnormal presence in the eye of blood

In some cases this second formulation, while correct, should probably be avoided as sounding a bit awkward. In others, does it make the translation *less* awkward? For extremely advanced (and extremely imaginary) bonus points: why would substituting "the blood" for "blood" in many (but not all) of the above translations (of both types) result in a potentially misleading shift of emphasis? If the answers to these questions are unclear, remember you are dealing with the word part called a Termination, and stick with Plan A: use the formulaic translations provided in the text, and don't mess with the "the" (or the "of" or anything else).

9

DIGESTIVE SYSTEM


esophagus
cardiac part of the stomach
liver
gallbladder
stomach
duodenum
pylorus
pancreas
jejunum
colon
ileum
cecum
appendix
sigmoid colon (fold)
rectum


right hepatic duct
liver
left hepatic duct
common hepatic duct
common bile duct
pancreas
pancreatic duct
gallbladder
cystic duct
duodenum

PART A. COMBINING FORMS

1.	**celi-o**	(**holl**ow)	abdomen; abdominal wall	
2.	**abdomin-o**	("lower belly")	**abdomen**	**abdomen**
3.	**ventr-o**	(**ventr**iloquist)	abdomen	
4.	**lapar-o**	("loose [part]")	abdominal wall	
5.	**peri-ton(e)-o**	("stretched around")	**peritone**um	**peri-ton-e-um**
6.	**mes-enter(i)-o**	(**mes**ial)	**mesentery**	**mes-enter-i-um**
7.	**splanchn-o**	("inner parts")	viscera	
8.	**viscer-o**	(**visc**osity)	**viscer**a	**viscus**
9.	**es-o-phag-o**	(x-o-**phag**y)	**esophag**us	**es-o-phag-us**
10.	**gastr-o**	(**gastr**ic)	stomach	
11.	**stomach-o**	(**stoma**)	**stomach**	
12.	**cardi-o**	(**heart**)	**cardi**ac part of the stomach	
13.	**pyl-or-o**	(Thermo**pyl**ae)	**pylor**us	**pyl-or-us**
14.	**oment-o**	("fat skin")	**oment**um	**oment-um**
15.	**epi-pl-o**		omentum	
16.	**du-o-den-o**	(**two** & **ten**)	**duoden**um	**du-o-den-um**
17.	**chol-e-cyst-o**	(dacryo**cyst**)	gallbladder	
18.	**chol-e-doch-o**	(**duc**t)	common bile **duc**t	
19.	**chol-angi-o**	(**angi-o**)	bile duct	
20.	**hepat-o**	(**hepat**itis)	liver	**hepar**
21.	**pan-cre(at)-o**	(**pan**theism)	**pancreas**	**pan-creas**

22.	**enter-o**	(**inner**)	(small) intestine	
23.	**jejun-o**	("empty [part]")	**jejun**um	**jejun-um**
24.	**ile-o**	("twisted [part]")	**ile**um	**ile-um**
25.	**col-o, col-on-o**		**colon**	**col-on**
26.	**cec-o**	("blind [gut]")	**cec**um	**cec-um**
27.	**typhl-o**	("blind [gut]")	cecum	
28.	**ap-pend(ic)-o**	(**append**age)	**appendix**	**ap-pend-ix**
29.	**sigm-oid-o**	(**sigm**a)	**sigmoid** fold	
30.	**proct-o**		rectum or anus	
31.	**rect-o**	(d**irect**)	**rect**um	**rect-um**
32.	**an-o**	("ring")	**an**us	**an-us**
33.	**sphincter-o**	(**sphinx**)	(anal) **sphincter**	musculus **sphincter**
34.	**sial-o**	(**spit**tle)	saliva	
35.	**ptyal-o**	(**spit**tle)	saliva	
36.	**chym-o**	(**chem**istry)	**chym**e	**chym-us**
37.	**chyl-o**	(**gall**)	**chyl**e	**chyl-us**
38.	**chol-e, chol-o**	(**gall**)	bile	
39.	**bil-i-**	(**bili**ous)	**bil**e	
40.	**copr-o**		feces	
41.	**fec-**	(**fec**al)	**fec**es	
42.	**sterc(or)-o**		feces	
43.	**scat-o**	(**scat**ological)	excrement	

44. **-doch-o**	(**duk**e)	**duct**	**duct-us**
45. **x-o-stom-a**	(**x-ostomy**)	an opening made in x	

PART B. NOTES

DUCTS

You would expect "hepat**ic**otomy" to mean "the cutting of **something pertaining to** the liver," and at a very literal level of translation this would be a correct definition. But the "something pertaining to the liver" is in practice "the hepatic duct." A similar pattern occurs with the form "pancreat**ic**-o," and the consistency with which these patterns are found gives rise to two new combining forms.

hepat-ic-o	the hepatic duct
pancreat-ic-o	the pancreatic duct

"Cholangi-o" (19 above; literally, "a vessel [5.14] of bile [38]"), which refers to **any** bile duct (as opposed to "choledoch-o" [18], which designates the "**common** bile duct"), combines with "hepat-o" to designate the particular bile duct which serves the liver. Thus "**hepatocholangi-o**" and "**hepatic-o**" are synonymous.

Study the following examples carefully.

hepaticogastrostomy	the making of an opening between the stomach and the hepatic duct
pancreaticoduodenostomy	the making of an opening between the duodenum and the pancreatic duct
hepatocholangiostomy	the making of an opening in the hepatic duct
hepaticocholangiostomy	the making of an opening between a bile duct and the hepatic duct

COMMON SENSE

"**x-o-lithotomy**" does not mean "the cutting of a calculus involving x", as you might expect, presumably because the mere "cutting" of a stone would not be a useful operation. Thus the term is consistently translated as follows.

x-o-lithotomy	the cutting **out** of a calculus involving x

Similarly, "celioenterotomy" does not mean "the cutting of the intestine and abdomen," because "intestine," referring to a specific organ, belongs to a different level of meaning than "abdomen," which designates a general region of the body. The solution to this problem can be expressed by the following formulas, where "x" is an organ or specific bodily part.

celi-o-x - { -ostomy = the making of an opening in / -ectomy = the cutting out of / -otomy = the cutting of } - x **through** the abdominal wall

lapar-o-x - { -ostomy = the making of an opening in / -ectomy = the cutting out of / -otomy = the cutting of } - x **through** the abdominal wall

The form "x-ostomy" has two meanings in many cases where "x" designates a digestive organ.

x-ostomy	the making of an opening in x **or**
	an opening made in x

Remember, however, that the first definition is the preferred and regular one, and that the preferred medical term answering to the second definition is "x-ostom**a**" (45 above).

Finally, "hepatotoxemia" does not mean "the abnormal presence in the blood of something poisonous to the liver." Rather, the form "**x-o-tox-emia**" usually means "the abnormal presence in the blood of a poison **caused by (secretions from)** x."

NOMINA ANATOMICA

LATIN PHRASES

The second word in the phrase "muscul-us sphincter" (33 above) is actually a noun, used anomalously as if it were an adjective; the plural is not found. Such usage is extremely rare in *Nomina Anatomica* forms, though common in standard English.

APPARENTLY IRREGULAR INFLECTIONAL ENDINGS

"Abdomen" (2 above), from "abdomin-o," is an exception to the rule given in the Note on "cartilago" in Chapter 3.

The neuter singular "viscus" (8 above), from "viscer-o," is rarely used. For the preferential usage of the plural ("viscer-a"), compare English "gut**s**."

"Hepar" (20 above) from "hepat-o" is irregular.

"Pancreas" (21 above), from "pancreat-o," is the result of phonetic assimilation having caused the "-t-" of an original "pancreat-s" to drop out. This is relatively common; see also the Note on "dens" in Chapter 7.

For "appendix" (28 above), see the Note on "coccyx" in Chapter 3.

A very few Latin words ending in "-us" are the same in both the singular and the plural; "ductus" (44 above) is one such. See also the Note on "sinuses" in Chapter 6.

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-9

CONCRETE NOUNS INVOLVING SUBSTANCES: POOLS OF, OR THE POOLING OF?

Because blood is a *substance* rather than an organ or part of the body, there are further peculiarities associated with words denoting it. Work through the following words (perhaps with one eye on the Note on "Substances" in Chapter 5).

1. **cerebrosanguiniasis** _____
2. **hemencephalia** _____
3. **encephalemia** _____
4. **cerebrohematorrhea** _____
5. **hematencephalon** _____
6. **hematocranium** _____
7. **sanguinocephalon** _____
8. **sanguicerebellum** _____
9. **dacryorhinon** _____
10. **pneumatothorax** _____

ANSWERS AND EXPLANATIONS

1. **cerebro-sanguin-iasis**
   - the abnormal presence of blood, involving the cerebrum
   - *not* ...blood **of** the cerebrum; *not* ...blood **in** the cerebrum

2. **hem(o)-encephal-ia**
   - an abnormal condition involving the brain, involving blood
3. **encephal-emia**
   - the abnormal presence of blood in the brain
4. **cerebro-hemat-orrhea**
   - the flowing of blood, involving the cerebrum

Notice that the above words all involve conditions, not physical objects. But the nominative endings on the following words all denote touchable, physical things. The English word "bloodblister" may serve as a productive example here: there is nothing abstract about it – poke a bloodblister and (like any blister) it might dramatically explode; you can certainly squeeze it. Technically speaking, the blister is the stretched skin that contains the blood (or other fluid, in the case of other blisters), so that a "translation" of the word "blood-blister" could be "a collection of blood in a blister." This reasoning serves as a model for the translation of the following words (and hundreds of others in Medical Terminology which follow the same pattern).

5. **hemat(o)-encephal-on**
   - a bloodbrain (very preliminary answer)
     - *not* a brain of blood
     - *not* the part of the brain involving blood (which part doesn't?)
   - a collection of blood in the brain (correct answer)

Note again that, as with a bloodblister, a hematencephalon is a physical object, not a condition or process. The same holds for the following objects.

6. **hemato-crani-um**
   - a collection of blood in the skull
7. **sanguino-cephal-on**
   - a collection of blood in the head
8. **sangui-cerebell-um**
   - a collection of blood in the cerebellum
9. **dacryo-rhin-on**
   - a collection of tears in the nose

10. **pneumato-thorax**
    - a collection of air in the chest

And so we can answer the question we began with: Pools of, or the pooling of? Words of the type we are discussing here have nominative endings and therefore denote touchable objects; in this case, pools or puddles. "**The** pooling **of**" a substance is a different thing altogether, an abstract thing, **un**touchable. In fact, the first four words in this section, being abstract condition-names, come pretty close to describing "**the** puddl**ing of** blood in the brain," while the remaining words denote various actual puddles.

CONFUSABLES 6: WHAT'S THAT BIT?

Chapter 6, as usual, presents a few combining forms that are inherently subject to confusion. For once, though, two meaningless parts of problematic combining forms *usually* behave as if they do have meaning (see the Notes on "pneum-" in Chapter 6), as the following words show.

1. **pneumatothorax** _____
2. **pneumonothorax** _____
3. **pneumatopleuritic** _____
4. **pneumonopleurotic** _____
5. **pneumatoarthrosis** _____
6. **pneumonoarthritic** _____

ANSWERS AND EXPLANATIONS

1. **pneum-ato-thorax**
    - a collection of air in the chest

2. **pneum-ono-thorax**
   - the part of the chest involving the lungs
3. **pneum-ato-pleur-it-ic**
   - p.t. the inflammation of the pleura, involving air
4. **pneum-ono-pleur-ot-ic**
   - p.t. an abnormal condition involving the pleura and lungs
5. **pneum-ato-arthr-osis**
   - an abnormal condition involving joints and air
6. **pneum-ono-arthr-it-ic**
   - p.t. the inflammation of a joint, involving a lung
   - (note that this unlikely word *cannot* mean, "p.t. ...a joint **of** the lung")

In reviewing the examples given in Chapter 6, notice that all of the uses of the short combining form "pneum-" are inherently ambiguous.

DIMINUTIVES: THE WHOLE THING, OR JUST A LITTLE?

The fact that a few combining forms contain syllables that are formally diminutives but without diminutive meaning offers further opportunity for error (see the Notes in Chapter 6).

1. **venulostasis** _____
2. **vasculostasis** _____
3. **valval** _____
4. **valvular** _____
5. **glandular** _____
6. **adenular** _____

ANSWERS AND EXPLANATIONS

1. **ven-ul-ostasis**
   - the stopping of little veins
2. **vascul-ostasis**
   - the stopping of vessels (vascul- = vas-)
3. **valv-al**
   - p.t. valves
4. **valvul-ar**
   - p.t. valves (vavul- = valv-)
5. **glandul-ar**
   - p.t. the glands
6. **aden-ul-ar**
   - p.t. little glands

MORE CONCRETE NOUNS: NOSES, BLISTERS, BRAINS, NOSEBRAINS, OR BLOODBLISTERS?

So far you have encountered several types of nouns with nominative endings, each of which is guaranteed to denote a physical object (rather than a condition or process or treatment). By way of review, translate the following pairs or groups of words.

1. **tracheoscopy** _____
2. **tracheoscopes** _____
3. **sphygmometry** _____
4. **sphygmometers** _____
5. **spirostatic** (2 translations) _____

_____

6. **dermatocytes** _____

7. **dermocytosis** _____

8. **musculopenia** _____

9. **musculus** _____

10. **musculi** _____

11. **arterial** _____

12. **arteria** _____

13. **arteriae** _____

14. **iritis** _____

15. **iris** _____

16. **irides** _____

17. **vasoplasty** _____

18. **vas** _____

19. **vasa** _____

20. **ophthalmencephala** _____

21. **hematocerebra** _____

22. **hemencephalons** _____

23. **pneumonothoraces** _____

ANSWERS AND EXPLANATIONS

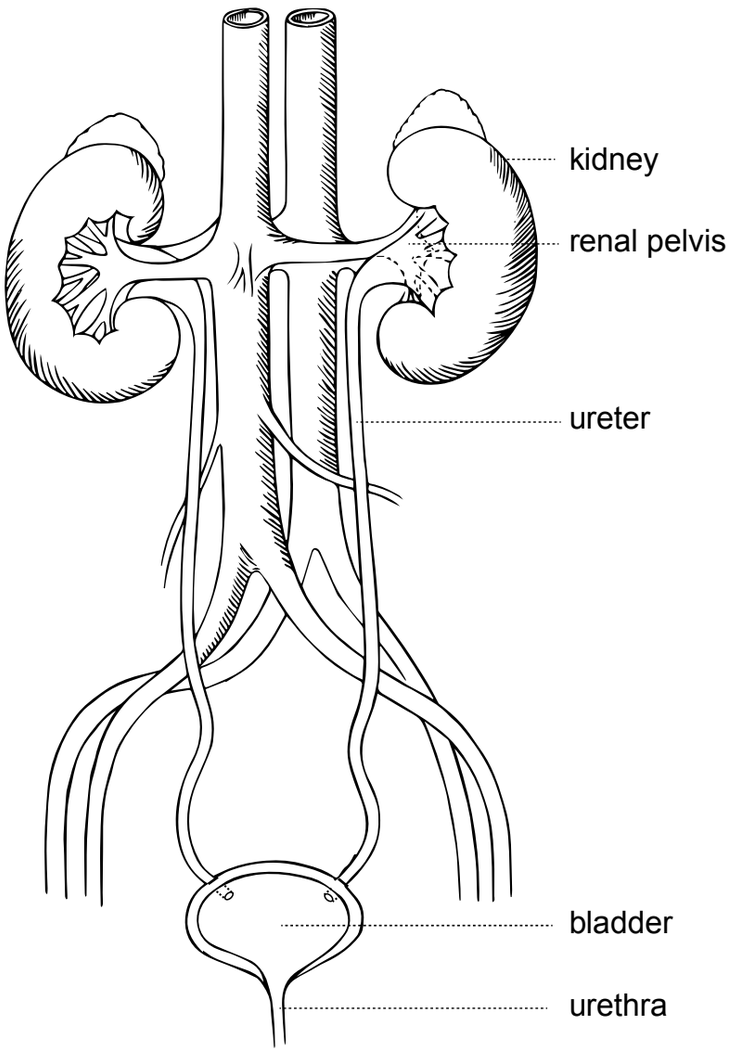
1. **tracheo-scop-y**
   - the examination of the trachea (process)
2. **tracheo-scop-es**
   - instruments for examining the trachea (objects)
3. **sphygmo-metr-y**
   - the measurement of the pulse (process)
4. **sphygmo-meter-s**
   - instruments for measuring the pulse (objects)
5. **spiro-stat-ic**
   - p.t. the stopping of the breathing (spirostasis, a process)
   - *or* p.t. an instrument for stopping the breathing (spirostat, an object)
6. **dermato-cyt-es**
   - cells of the skin (objects)
7. **dermo-cyt-osis**
   - an abnormal condition involving the cells of the skin (condition)
8. **musculo-penia**
   - a deficiency of muscle (condition)
9. **muscul-us**
   - a muscle *or* the muscle (object)
10. **muscul-i**
    - muscles *or* the muscles (objects)
11. **arteri-al**
    - p.t. the arteries (objects)
12. **arteri-a**
    - an artery *or* the artery (object)

13. **arteri-ae**
    - arteries *or* the arteries (objects)
14. **ir-itis**
    - the inflammation of the irises (condition)
15. **ir-is**
    - an iris *or* the iris (object)
16. **irid-es**
    - irises *or* the irises (objects)
17. **vaso-plasty**
    - the surgical repairing of a vessel (treatment)
18. **vas**
    - a vessel *or* the vessel (object)
19. **vas-a**
    - vessels *or* the vessels (objects)
20. **ophthalm(o)-encephal-a**
    - the parts of the brain involving the eye (objects)
21. **hemato-cerebr-a**
    - collections of blood in the cerebrum (objects)
22. **hem(o)-encephal-on-s**
    - collections of blood in the brain (objects)
23. **pneumono-thorac-es**
    - the parts of the chest involving the lungs (objects)

Your ability to quickly recognize nouns, both abstract and concrete (and to quickly spot the difference), is essential when you encounter multiple-word *phrases* in Medical Terminology.

10

URO-GENITAL SYSTEMS


kidney
renal pelvis
ureter
bladder
urethra

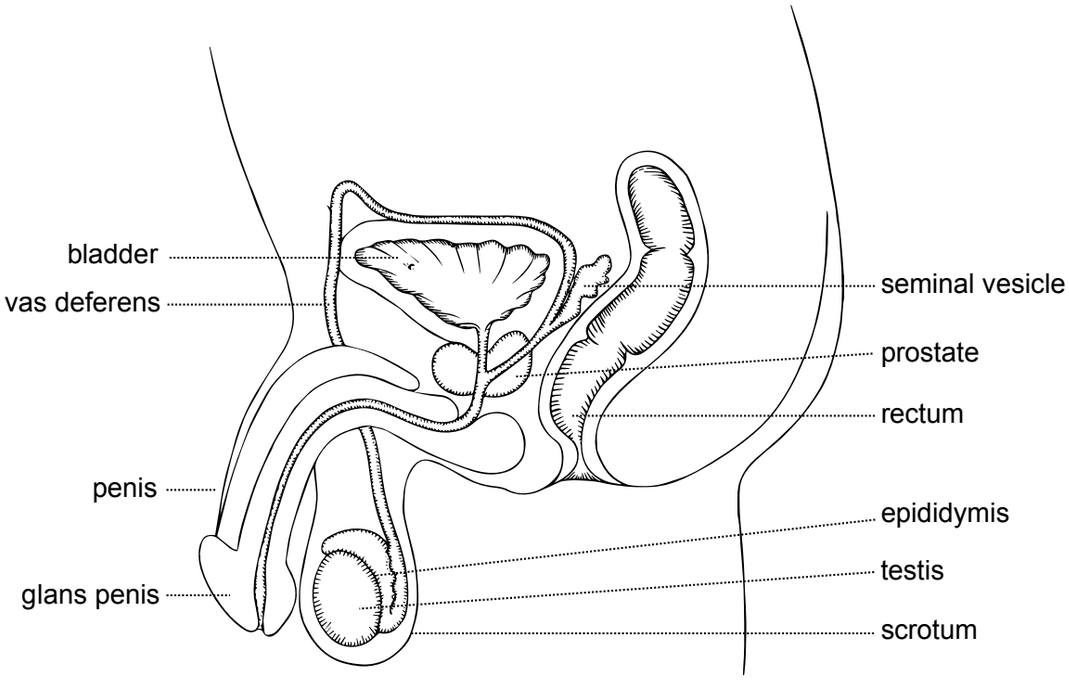
PART A. COMBINING FORMS

GENERAL

1.	**lumb-o**	(**lumb**ago)	**l**oin	**lumb-us**
2.	**inguin-o**		groin	**inguen**
3.	**peri-ne-o**	(**peri**cardium)	**perine**um	**peri-ne-um**
4.	**gen-it-o**	(**gen**esis)	**genit**als	**gen-it-al-ia**

URINARY

5.	**ur-o, ur-on-o**	(**Uran**us)	**urin**e; **urin**ary tract	
6.	**ur-in-o**	(**wa**ter)	**urin**e; **urin**ary tract	**ur-in-a**
	x-ur-ia		the abnormal presence of x in the urine	
	x-ur-es-is		the passage of x in the urine	
7.	**ur-at-o**	(**ur**ine)	**urat**e	
8.	**ur-e-a-, ur-e-o**	(**ur**ine)	**urea**	
9.	**ur-o-bil-in-o**	(**bil**e)	**urobilin**	
10.	**nephr-o**		kid**ne**y	
11.	**ren-o**	(ad**ren**al)	kidney	**ren**
12.	**pyel-o**	("trough")	renal **pelv**is	
13.	**pelv(i)-o, pelv-i**	(**full**; 3.25)	renal **pelv**is	**pelv-is ren-al-is**
14.	**ureter-o**	(**ur**ine)	**ureter**	**ureter**
15.	**cyst-o, cystid-o**	(chole**cyst**)	bladder; **cyst**	**cyst-is**
16.	**vesic-o**		bladder; cyst	**vesic-a**
17.	**urethr-o**	(**ur**ine)	**urethr**a	**urethr-a**

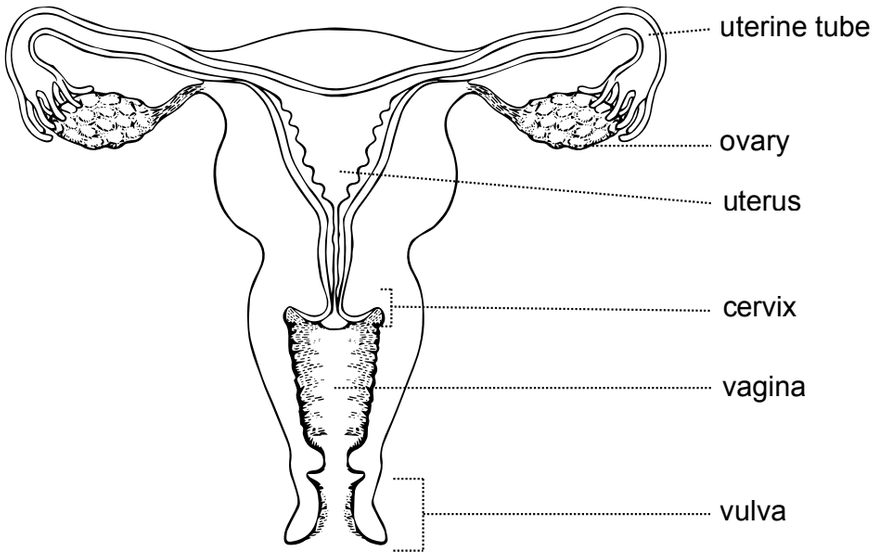

bladder
vas deferens
penis
glans penis
seminal vesicle
prostate
rectum
epididymis
testis
scrotum

GENITAL

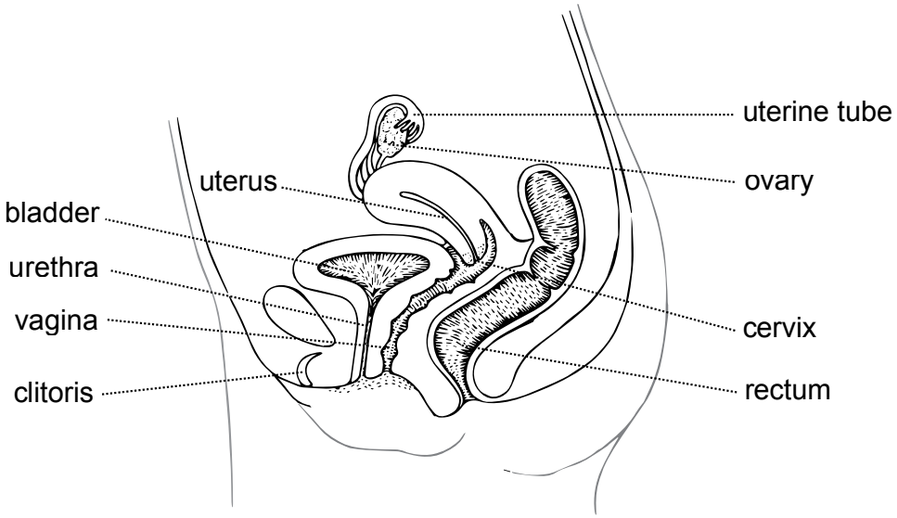
MALE

18. **sperm(at)-o**	(**sperm**)	**sperma**tozoon; semen	
19. **semin-o, semen-o**	(**semin**al)	**semen**	
20. **osche-o**		scrotum	
21. **scrot-o**		**scrot**um	**scrot-um**
22. **orchi-o, orchid-o**	(**orchid**)	testis	
23. **test-o, test-i-cul-o**	(**test**icle)	**test**is	**test-is**
24. **epi-didym-o**	("upon [the] twins")	**epididym**is	**epi-didymis**
25. **vas-o**	(5.15)	**vas** deferens	**vas de-fer-ens**
26. **vesic-ul-o**	(**vesic**a)	seminal **vesicle**	**vesic-ul-a**
27. **gon-e-cyst-o**	(**gon**ad, **cyst**)	seminal vesicle	
28. **spermat-o-cyst-o**	(**sperm, cyst**)	seminal vesicle	
29. **pro-stat-o**	(**prostit**ute)	**prostat**e	**pro-stat-a**
30. **phall-o**	(**phall**ic)	penis	**phall-us**
31. **pen-o**	(**pen**cil)	**pen**is	**pen-is**
32. **balan-o**	("acorn")	glans penis	**glans pen-is**

Frontal View



Lateral View



FEMALE

33. **o-o**	(**av**iation)	egg; **ov**um	
34. **ov-o**	(**ov**ary)	egg; **ov**um	**ov-um**
35. **men-o, em-men(i)-o** **x-o-men-ia**	(**moon**)	**menses**; **mens**truation vicarious menstruation from x	
36. **o-o-phor-o**	(**ov**um-**bear**ing)	**ov**ary	
37. **ov-ar-i-o**	(**ov**um)	**ovar**y	**ov-ar-i-um**
38. **salping-o**	(“tube”)	uterine tube	**salpinx**
39. **tub-o**	(“tube”)	uterine **tub**e	**tub-us**
40. **hyster-o**	(**hyster**ia)	**uter**us	
41. **metr-o**	(**mater**nal)	uterus	
42. **uter-o**	(**uter**ine)	**uter**us	**uter-us**
43. **cervic-o**	(2.17; 7.33)	**cervix** (of the uterus)	**cervix uter-i**
44. **trachel-o**	(2.18)	cervix (of the uterus)	
45. **colp-o**	(**gulf**)	vagina	
46. **vagin-o**	(“sheath”)	**vagin**a	**vagin-a**
47. **clitor(id)-o, clitor-i**		**clitor**is	
48. **vulv-o**	(“covering”)	**vulv**a	
49. **epis(i)-o**	(**episi**otomy)	vulva	
50. **nymph-o**	(“bride”)	**nymph**ae	**labi-a min-or-a**
51. **hymen-o**	(“membrane”)	**hymen**	

PART B. NOTES

COMMON SENSE

The base "lumb-o" (1 above), because it designates a general area, and the base "colp-o" (45 above), because it denotes a cavity with walls, function like "celi-o" and "lapar-o" (see the Note on "celi-o" in Chapter 9) in many therapeutic terms.

The base "ur-o" (5 above) **occasionally** denotes "urinary elements" instead of "urine," which explains why "uremia" means "the abnormal presence of urinary elements in the blood" rather than "the abnormal presence of blood in the urine."

Just as "hepat**ic**-o" and "pancreat**ic**-o" have specific meanings (see the Note on "hepatic-" in Chapter 9), so too "cyst**ic**-o" (from 15 above) consistently denotes "the cystic **duct**."

Similarly, "ur**ic**-o" (from 5 above), literally "pertaining to the urine," will most often designate "uric acid."

Several of the bases presented in this chapter have more general meanings, which you have already learned, as well as the specific ones they take on in uro-genital contexts.

Study the following examples and satisfy yourself that they are logically translated in each case.

pelviotomy (3.25)	the cutting of the **pelvis**
pelvilithotomy (10.13)	the cutting out of a calculus involving the **renal pelvis**
vasovagal (5.15)	p.t. the vagus nerve and the **vessels**
vasectomy (10.25)	the cutting out of the **vas deferens**
bucco**cervic**al (2.17) (7.33)	p.t. the **neck** and cheek p.t. the buccal surface of the **cervix of a tooth**
cervicectomy (10.43)	the cutting out of the **cervix of the uterus**

trachelomyitis (2.18)	the inflammation of the muscles of the **neck**
trachelitis (10.44)	the inflammation of the **cervix of the uterus**

"Tub-o" and "salping-o" (39 and 38 above) both mean "tube" (in general) and are specialized to mean "uterine tube" by context.

NOMINA ANATOMICA

LATIN PHRASES

As its endings show, "genit-**al-ia**" (4 above) is a neuter plural **adjective** used as a noun (compare English "genital-**s**"); the proper *Nomina Anatomica* form is actually "organ-a [= "organs"] genit-al-ia."

The adjective in the phrase "vas de-fer-ens" (25 above) is of a type rarely found outside the *Nomina Anatomica*.

The endings of the second words in the phrases "glans pen-**is**" and "cervix uter-**i**" (32 and 43 above) indicate that they are **possessive nouns** (translated "**of** the penis" and "**of** the uterus" respectively). Like "balan-o," "glans" means "acorn."

The adjective in the phrase "labi-a min-or-a" (= "lesser lips;" 50 above) is again of a type which is rarely found outside the *Nomina Anatomica*. Note that "nymph-**ae**" is also a plural (singular "nymph-**a**") and that the Latin phrase is actually more frequently found in Medical Terminology than is the English word.

APPARENTLY IRREGULAR INFLECTIONAL ENDINGS

"Ingu**en**" (2 above), formed from "ingu**in**-o," is like "abdom**en**;" see the Note in Chapter 9.

For "ren" and "ureter" (11 and 14 above), see the Note on "vas" in Chapter 5. The plurals are "ren-**es**" and "ureter-**es**" respectively.

The plural of "epididym**is**" (24 above) is "epididym**id-es**," which shows that the combining form was originally "epididym**id**-o;" for the formation of the nominative singular, see the Note on "pes" in Chapter 2. For the origin of the shortened combining form "epididym-o" see the Note on "iris" in Chapter 4.

For "salpin**x**" (38 above), see the Note on "coccyx" in Chapter 3.

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-10

PHRASES 1: KNEEBONES, OR KNEE BONES?

By now you would translate the compound word "knee-bone-s" without even thinking, noting the nominative plural ending and the fact that the word denotes "bones" rather than "knees," namely "bones of the knee" (or possibly "bones of the knees"). What about the phrase "knee bones"? Play with this for a moment, noticing that while "knee bones" could denote "kneebones," the phrase is more ambiguous than the compound word.

- knee bones
  - the bones of the knee(s)
  - *or* the bones p.t. the knee(s)

What if the phrase were "knee's bones?" Would that be ambiguous? Or "knee-ish bones?" If you are not confused by this line of thought, translate the phrase "bony knees" as well.

- knee-'s bon-e-s
  - the bones **of** the knee
- knee-s' bon-e-s
  - the bones **of** the knee**s**
- knee-ish bon-e-s
  - the bones **p.t.** the knee(s)
- bon-y knee-s
  - knees **p.t.** bone(s)

The trouble with the phrase "knee bones" in fact is that it is far too inclusive: your knee bones would include any (or all) of the following.

- each bone of each knee
- all the bones of both knees
- each bone p.t. each knee
- all the bones p.t. both knees

Phrases in Medical Terminology, by contrast, are far less ambiguous. That is to say, the words in these phrases *always* show by their endings what kind of words they are (like "bon-e" or "bon-y" or "knee" or "knee-'s"), so that you rarely have to be confused. Work through the following made-up phrases; if you do become confused, review the adjectival endings given in Chapter 1.

1. **brachial muscle** _____
2. **muscular brachium** _____
3. **brachial muscles** _____
4. **muscular brachia** _____
5. **musculus brachialis** _____
6. **muscular brachiodysplasia** _____
7. **brachial myodysplasia** _____
8. **myodysplasia brachialis** _____
9. **brachiodysplasia muscularis** _____

ANSWERS AND EXPLANATIONS

1. **brachi-al muscl-e**
   - a/the muscle p.t. an/the arm(s)
   - (that is, "a muscle" or "the muscle" p.t. "an arm", "the arms" or "the arms")
2. **muscul-ar brachi-um**
   - an/the arm p.t. muscles
3. **brachi-al muscl-e-s**
   - the muscles p.t. an/the arm(s)
4. **muscul-ar brachi-a**
   - the arms p.t. muscle
5. **muscul-us brachi-alis**
   - a/the muscle p.t. an/the arm(s)

6. **muscul-ar brachio-dysplasia**
   - the defective formation of the arm(s), p.t. muscles
7. **brachi-al myo-dysplasia**
   - the defective formation of muscles, p.t. the arms
8. **myo-dysplasia brachi-alis**
   - the defective formation of muscles, p.t. the arms
9. **brachio-dysplasia muscul-aris**
   - the defective formation of the arms, p.t. muscles

As a technical point, note that each of the phrases above falls into one of 4 categories. They can be Latin (with the noun always coming first) or English (with the noun always last); either way, they can denote either body parts or conditions.

PHRASES 2: LATIN OR ENGLISH?

Translate the following examples, remembering that the language is irrelevant. Note that phrases of all four types can theoretically be as long as anyone wants to make them. Always refuse to panic: find the noun and translate it first of all; then remember that all adjectives in the phrase are individually modifying that noun, and translate them accordingly. When you have worked through the plausible phrases here, try the imaginary mouthful at the very end, just to build some confidence.

1. **thoracocervical veins**_____
2. **thoracic cervical veins**_____
3. **cervicothoracic veins**_____
4. **venae thoracocervicales**_____
5. **venae thoracicae cervicales**_____

6. **venae cervicothoracicae** _____

7. **encephalitogenic cerebellovasostasis** _____

_____

8. **bronchoplegic spiropenia** _____

9. **cerebellovasostasis encephalitogenica** _____

_____

10. **spiropenia bronchoplegica** _____

11. **vasa pneumonalia cardiaca thoracica cervicalia** _____

_____

ANSWERS AND EXPLANATIONS

ENGLISH PHRASES DENOTING BODY PARTS

1. **thoraco-cervic-al vein-s**
   - the veins p.t. the neck, involving the chest
2. **thorac-ic cervic-al vein-s**
   - the veins p.t. the neck and p.t. the chest
   - *or* the veins p.t. the chest and p.t. the neck
3. **cervico-thorac-ic vein-s**
   - the veins p.t. the chest, involving the neck

LATIN PHRASES DENOTING BODY PARTS (*NOMINA ANATOMICA*)

4. **ven-ae thorac-o-cervic-ales**
   - the veins p.t. the neck, involving the chest
5. **ven-ae thorac-icae cervic-ales**
   - the veins p.t. the neck and p.t. the chest
   - *or* the veins p.t. the chest and p.t. the neck
6. **ven-ae cervico-thorac-icae**
   - the veins p.t. the chest, involving the neck

ENGLISH PHRASES DENOTING DISORDERS

7. **encephal-ito-genic cerebello-vaso-stas-is**
   - the stopping of vessels of the cerebellum, producing the inflammation of the brain
8. **broncho-pleg-ic spiro-pen-ia**
   - a deficiency of breathing, p.t. the paralysis of the bronchi

LATIN PHRASES DENOTING DISORDERS

9. **cerebello-vaso-stas-is encephal-ito-genica**
   - the stopping of vessels of the cerebellum, producing the inflammation of the brain
10. **spiro-pen-ia broncho-pleg-ica**
    - a deficiency of breathing, p.t. the paralysis of the bronchi
11. **vas-a pneumon-alia cardi-aca thorac-ica cervic-alia (Latin)**
    - = **pneumon-al cardi-ac thorac-ic cervic-al vessels (English)**
    - vessels which are pneumonal, cardiac, thoracic and cervical (preliminary translation)
    - the vessels p.t. the lungs, p.t. the heart, p.t. the chest and p.t. the neck (correct answer)

The good news is that, in the real world, the only really, really long phrases are of the second group above (*Nomina Anatomica*) – just like the one you just dealt with. If you think that phrase was confusing, think again about knee

bones: what would you make of something called "the neck and chest and heart and lung vessels?" Wouldn't you be tempted to assume they were "vessels **of** the neck and (**of** the) chest and (**of** the) heart and (**of** the) lungs?" The trouble is, that phrase could theoretically also exist in the *Nomina Anatomica*, but it would have to feature totally different endings, ones that you do not learn in this course (that is, you can't say "knee-'s bones" yet).

vasa pulmon-is cord-is thorac-is cervic-is

- (*not* for translation; but for reference, the translation follows)
- the vessels **of** the lung, (and) **of** the heart, (and) **of** the chest and **of** the neck

Oh, and in case you were wondering, "vessels of the lung**s**" are vasa pulmon-**ium**; but relax: that kind of ending – compare "knee-s' bones" – is quite rare and is also not covered in this course.

11

PSYCHOLOGICAL TERMS

PART A. COMBINING FORMS

BASES

1.	**psych-o**	(**psych**ology)	mind
2.	**phren-o**	(6.15; schizo**phren**ia)	mind
3.	**ide-o**	(**ide**ology)	**ide**a
4.	**neur-o**	(4.7; **neur**otic)	emotions
5.	**er(ot)-o**	(**erot**ic)	sexual desire
6.	**nyct-o**	(**noct**urnal)	**night**
7.	**hypn-o**	(**hypn**osis)	sleep; **hypn**otism
8.	**oneir-o**		dream
9.	**narc-o**	(**narc**otic)	stupor
10.	**pharmac-o**	(**pharmac**ist)	drug
11.	**esth-es(i)-o**	(**esthet**ics)	perception
12.	**an-esth-es(i)-o**	(**anesthet**ic)	loss of perception
13.	**hallucin-o**	(**hallucin**ogenic)	**hallucin**ation
14.	**nos-o**		disease
15.	**hyster-o**	(10.40)	**hyster**ia
16.	**epi-lept-o**	(**epi**dermis)	**epileps**y
17.	**pseud-o**	(**pseud**onym)	false; falsely

TERMINATIONS

18. **x-o-phob-ia**	(claustro**phobia**)	a morbid dread of x
19. **x-o-phob-e**		one with a morbid dread of x
20. **x-o-phil-ia**	(claustro**philia)**	a morbid fondness for x
21. **x-o-phil-ic**	[in psychology]	pertaining to a morbid fondness for x
	[in physiology]	having an affinity for x
22. **x-o-phil-e**	(biblio**phile**)	one with a morbid fondness for x one with a propensity to (do the action of) x
23. **x-o-phil**		something with an affinity for x
24. **x-o-phil-i-ac**	(hemo**philiac**)	= x-o-phil-ic **or** = x-o-phil-e
25. **x-o-man-ia**	(klepto**mania**)	a morbid fondness for x
26. **x-o-man-ic**		pertaining to a morbid fondness for x
27. **x-o-man-i-ac**	(klepto**maniac**)	= x-o-philiac
28. **x-esth-es-ia**	(11 above)	the perception of x
29. **x-an-esth-es-ia**	(12 above)	the loss of perception of x
30. **x-o-leps-y**	(16 above)	a seizure of/involving x
31. **x-o-lagn-ia**	("lustful")	sexual gratification involving x

PART B. NOTES

COMMON SENSE

Bases presented here which you have encountered (with different meanings) in previous chapters, should give you no trouble.

Study the following examples.

phrenic (6.15)	pertaining to the **diaphragm (or)**
(11.2)	pertaining to the **mind**
neuritis (4.7)	the inflammation of the **nerves**
neurosis (11.4)	an abnormal condition involving the **emotions**
hysteropexy (10.40)	the fixation of the **uterus**
hysteroneurasthenia (11.15)	the lack of strength of the **emotions**, involving **hysteria**

The bases above, as used in psychology, reflect ancient but erroneous ideas about the relationship between mind and body. The ancient Greeks believed that the mind resided in the diaphragm (6.15 and 11.2), while later writers held that the nerves were connected with or responsible for the emotions (4.7 and 11.4), and that the symptoms of what we still call "hyster-ia" really were due to "an abnormal condition involving the uterus" (10.40 and 11.15).

"x-o-phil-i-ac" and "x-o-man-i-ac" (24 and 27 above) are formed by the addition of an **adjectival** ending (1.9) to a base, and therefore should themselves be adjectives. The use of these terms as nouns is due to a process which, though rare in Medical Terminology, is common enough in everyday English.

From frequently occurring phrases consisting of an adjective and a noun, the noun is often dropped so that the adjective takes the place of the whole phrase. Thus, when we speak of "the poor," we really mean "poor **people**;" we have Canadi**an** art and Canadi**an** politics, but "**a** Canadi**an**" means "a Canadian **person**."

Review the Note on "genitalia" in Chapter 10. A few other medical words which you have already learned were originally adjectives. Study the following words and combining forms, with their literal translations.

petr-**os**-o	(8.8 & 1.4)	a **rocky** part
squam-**os**-o	(8.9 & 1.4)	a **scaly** part
medi-ast-**in-um**	(6.17 & 1.8)	a **middle** thing
a-damant-**in**-o	(7.25 & 1.8)	a **hard** part
cap-ill-**ar-y**	(5.19 & 1.5)	a vessel **p.t.** little hairs
peri-ton-**e-um**	(9.5 & 1.86)	a thing **stretched** around
trach-**e-a**	(6.10 & 1.86)	a **rough** part
corn-**e-a**	(4.21 & 1.86)	a **horny** part
scler-**a**	(4.22 & 1.86)	a **hard** part
pro-stat-**a**	(10.29 & 1.86)	a part **standing** before

PSEUD-O (17 ABOVE)

Study the following terms and their definitions carefully.

pseudoganglion	a false ganglion
pseudoappendicitis	the false inflammation of the appendix
pseudopericardial	falsely pertaining to the pericardium

The unusual word orders occur because "pseud-o" is used as if it were a **prefix**, and belongs to a category of combining forms which will be presented in Chapter 13.

Where "N" is any **noun** ending and "A" is any **adjectival** ending, the following formulas apply.

pseud-o-x-N	a/the false x
pseud-o-x-A	falsely pertaining to x

A BRIEF LIST OF MISCELLANEOUS PSYCHOLOGICAL PROBLEMS

The following list of psychological words is included for your interest only. While their terminations are all found in Part A above, the bases (defined in the third column below) to which these are attached do not occur frequently enough to make learning them necessary. Practice in learning the terminations, however, can be had by creating a suitable translation for each word.

acrophobia	(2.7)	heights
agorophobia	(**agor**a)	marketplace
agorophilia		
agromania	(**agr**iculture)	fields; open places
aichmophobia	(**acm**e)	sharp points
ailurophobia		cats
ailurophilia		
algolagnia	(1.26)	pain
algophobia		
amathophobia		dust
bibliomania	(**bibl**e)	books
bibliotherapy		
callomania	(**call**isthenics)	beauty
claustrophobia	(**clos**e)	being **clos**ed in
claustrophilia		
coitophobia	(**coit**us)	sexual intercourse
demonophobia		**demon**s

ergomaniac	(en**erg**y)	work
etheromania		**ether** (as stimulant)
herpetophobia	(s**erp**ent)	creeping things
kleptolagnia		stealing
kleptomania		
kleptomaniac		
mysophobia		filth
mysophobiac		
mysophilia		
mythomania		**myth**
mythophobia		
nostomania	(**nost**algia)	home
nudophobia		being **nud**e
nymphomania	(10.50)	being a bride
ochlophobia		crowds
opsomania		dainty foods
opsomaniac		
parthenophobia	(**Parthen**on)	virgins
peccatiphobia	(im**pecc**able)	sinning
pedophilia	(**ped**agogy)	children

peladophobia		baldness
scopophilia	(**x-o-scop**y)	seeing (voyeurism)
scopophobia		being seen
scotophilia		darkness
scotophobia		
sitomania		food
sophomania	(**soph**isticated)	(one's own) wisdom
toxicomania	(**toxic**)	poison
toxicomaniac		
toxicophobia		
trichotillomania	(2.10)	pulling out one's hair
xenophobia		strangers
zoophilia	(**zo**ology)	animals
zoophobia		

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-11

NOMINA ANATOMICA: ANATOMIC NAME, OR *NOMEN ANATOMICUM*?

Do the following phrases all necessarily denote the same object in the real world?

- skull bone
- bone p.t. the skull
- a bone of the skull
- cranial bone
- a bone p.t. the skull
- os craniale
- the bone p.t. the skull

Could the same object in the real world be denoted by all of the above phrases? (Please note that this is not the same question.) What about the following more familiar phrases?

- knee bones
- the bones p.t. a knee
- bones of the knee
- the bones p.t. knees
- bones of the knees
- ossa gonalia

If these questions still leave you a little confused, welcome to the wonderful world of "anatom-ic name-s" (names p.t. anatomy), as we say in English, or *nomin-a anatom-ica* (names p.t. anatomy), as we say in Latin. The Latin phrase-system of naming body parts, called the *Nomina Anatomica* (*NA*), in fact arose partly in response to the kinds of ambiguities and inefficiencies inherent in English, some of which vanish (or seem to vanish) when phrases are expressed in Latin (even in the kind of watered-down Latin used in this system).

The first advantage that Latin offers for the naming of body parts is that Latin has no articles (a, the, an). Therefore the term os craniale is "a bone p.t. the skull" or "the bone p.t. the skull," and if no ambiguity is thereby resolved,

at least we are using far fewer words. A more important point is that Latin concrete nouns that name things are not used (in the *NA*) to name the material of which those things are made; thus os craniale cannot mean "bone (the material) p.t. the skull." Most importantly, however, Latin words show by their endings certain facts about themselves that are not always revealed by their English counterparts. In the *NA*, it is impossible to say "skull bone;" that is, you cannot put two nouns together without one of two possible modifications: the second noun either takes an ending meaning "of" or is turned into an adjective. You don't need to worry about this, but "bone **of** the skull" in the *NA* is "os crani-i," while (as you know already) "skull-ish bone" (= bone p.t. the skull) is "os crani-ale."

For our present purposes, the most important aspects of all this are that adjectives in the *NA* are always marked as adjectives by their endings, and each adjectival ending tells whether the noun it modifies is itself singular or plural. Thus (as you know already) "ossa crani-al-ia" means "bones p.t. the skull;" "vena crani-al-is" by contrast means "a or the vein p.t. the skull."

A further advantage of the *NA* (involving another systematic simplification of real Latin) is that the primary noun of any phrase is always the first word. (Note that this reverses the normal English order, of course: "skull-ish bone" becomes "os craniale.") The function of this ordering is to tell us right away what the phrase is about. For example, in English we might speak of "the right half of the brain's rear upper artery;" the first word of the *NA* equivalent is "arteria," so that we know (among other things) right off the top that we are talking about "the artery of the brain's right half," and not about "the right half of an artery."

Finally, any *NA* phrase is theoretically specifying one particular part of the body, to the exclusion of all others that might look like it or otherwise be confused with it. This feature solves the ongoing issue of "specificity" in Medical Terminology: in other words, the *NA* usually refers to "**the** part" or "**the** parts" rather than "**a** part" or "parts."

Therefore, in dealing with any *NA* phrase found in this book or in the materials associated with it (no matter how long the phrase is), you can count on five things.

- The first word will be the noun.
- The first word of your definition will be an article; most often it will be "the."

- Following the article will be your translation of the first word of the Latin phrase.
- All other words will be adjectives.
- Each adjective in the phrase separately modifies the noun.

With all of this in mind, translate the following hypothetical *NA* phrase denoting a body part.

vas brachiale cervicale craniale _____

_____

The body part called in *NA* the vas brachiale cervicale craniale is first of all a "vas," so we will be saying "the vessel." That vessel is brachial; it is also a cervical vessel; and the same vessel is cranial as well. Thus there is no "cross-communication" of adjectives: "neck-ish" and "arm-ish" cannot apply to each other. This may seem self-evident but it can be surprisingly difficult to keep straight when you come to translate *NA* phrases.

vas brachi-ale cervic-ale crani-ale _____

_____

- the brachi-al cervic-al crani-al vessel (preliminary answer)
- the vessel p.t. the arm *and* p.t. the neck *and* p.t. the skull

One reason that it is comparatively easier to keep track of what words are doing what in *NA* phrases is that every Latin noun belongs by nature to one of only three categories (traditionally called "genders"). For example, the combining form "nerv-" designates an object in the real world which is called a "nerv-us" and which happens to fall in the first category, the one traditionally called "masculine." Adjective-endings associated with this category include -in-us and -ar-is, among others. The word "arteri-a" by contrast is of the second category, called "feminine," and is found with adjectives ending in -al-is and -ic-a, while the word "vas" happens to be "neuter" (third category) and adjectives describing it must have endings like -ar-e and -os-um. (You may want to review the first page of Chapter 1 here, noting that each of the Latin forms of the adjectival endings fall into one of two types.)

NOMINATIVE SINGULARS: THE WHICHY WHAT?

With this in mind – perhaps with one eye on the adjectival terminations in Chapter 1, and maybe with another eye on the chart in Chapter 5 – generate suitable *NA* phrases with which to name the following objects.

1. **the cranial nerve** _____
2. **the nerve p.t. the skull** _____
3. **the cranial artery** _____
4. **the artery p.t. the skull** _____
5. **the cranial vessel** _____
6. **the vessel p.t. the skull** _____
7. **the urinary vessel** _____
8. **the urinary artery** _____
9. **the urinary nerve** _____
10. **the thoracic vessel** _____
11. **the thoracic nerve** _____
12. **the thoracic artery** _____
13. **the brachial artery** _____
14. **the nerve p.t. the arms** _____

15. **the brachial thoracic vessel** _____

16. **the artery p.t. the arm and p.t. the chest** _____

_____

17. **the nerve p.t. the chest and p.t. the arm** _____

_____

18. **the thoracic artery involving the arm** _____

_____

19. **the brachiothoracic nerve** _____

_____

20. **the artery p.t. the arm and involving the chest** _____

_____

ANSWERS: SINGULAR LATIN PHRASES

Check your answers against the following phrases.

1. **the cranial nerve**
   - nerv-us crani-al-is
2. **the nerve p.t. the skull**
   - nerv-us crani-al-is
3. **the cranial artery**
   - arteri-a crani-al-is

4. **the artery p.t. the skull**
   - arteri-a crani-al-is
5. **the cranial vessel**
   - vas crani-al-e
6. **the vessel p.t. the skull**
   - vas crani-al-e
7. **the urinary vessel**
   - vas urin-ar-i-um
8. **the urinary artery**
   - arteri-a urin-ar-i-a
9. **the urinary nerve**
   - nerv-us urin-ar-i-us
10. **the thoracic vessel**
    - vas thorac-ic-um
11. **the thoracic nerve**
    - nerv-us thorac-ic-us
12. **the thoracic artery**
    - arteri-a thorac-ic-a
13. **the brachial artery**
    - arteri-a brachi-al-is
14. **the nerve p.t. the arms**
    - nerv-us brachi-al-is
15. **the brachial thoracic vessel**
    - vas brachi-al-e thorac-ic-um *or* vas thoracicum brachiale
16. **the artery p.t. the arm and p.t. the chest**
    - arteri-a brachi-al-is thorac-ic-a *or* arteria thoracica brachialis
17. **the nerve p.t. the chest and p.t. the arm**
    - nerv-us brachi-al-is thorac-ic-us *or* nervus thoracicus brachialis
18. **the thoracic artery involving the arm**
    - arteri-a brachio-thorac-ic-a

19. **the brachiothoracic nerve**
    - nerv-us brachio-thorac-ic-us
20. **the artery p.t. the arm and involving the chest**
    - arteri-a thoraco-brachi-al-is

NOMINATIVE PLURALS: THE WHICHY WHATS?

Pluralize each phrase – perhaps while glancing at the phrases in the chart in Chapter 6.

1. **nerv-us crani-al-is**_____
2. **arteri-a crani-al-is** _____
3. **vas crani-al-e** _____
4. **vas urin-ar-i-um** _____
5. **arteri-a urin-ar-i-a** _____
6. **nerv-us urin-ar-i-us** _____
7. **vas thorac-ic-um** _____
8. **nerv-us thorac-ic-us** _____
9. **arteri-a thorac-ic-a** _____
10. **arteri-a brachi-al-is** _____
11. **nerv-us brachi-al-is** _____

12. **vas brachi-al-e thorac-ic-um** _____

_____

13. **arteri-a brachi-al-is thorac-ic-a** _____

_____

14. **nerv-us brachi-al-is thorac-ic-us** _____

_____

15. **arteri-a brachio-thorac-ic-a**_____

_____

16. **nerv-us brachio-thorac-ic-us**_____

_____

17. **arteri-a thoraco-brachi-al-is** _____

_____

ANSWERS: PLURAL LATIN PHRASES

1. **nerv-us crani-al-is**
   - nerv-i crani-al-es
2. **arteri-a crani-al-is**
   - arteri-ae crani-al-es
3. **vas crani-al-e**
   - vas-a crani-al-ia

4. **vas urin-ar-i-um**
   - vas-a urin-ar-i-a
5. **arteri-a urin-ar-i-a**
   - arteri-ae urin-ar-i-ae
6. **nerv-us urin-ar-i-us**
   - nerv-i urin-ar-i-i
7. **vas thorac-ic-um**
   - vas-a thorac-ic-a
8. **nerv-us thorac-ic-us**
   - nerv-i thorac-ic-i
9. **arteri-a thorac-ic-a**
   - arteri-ae thorac-ic-ae
10. **arteri-a brachi-al-is**
    - arteri-ae brachi-al-es
11. **nerv-us brachi-al-is**
    - nerv-i brachi-al-es
12. **vas brachi-al-e thorac-ic-um**
    - vas-a brachi-al-ia thorac-ic-a
13. **arteri-a brachi-al-is thorac-ic-a**
    - arteri-ae brachi-al-es thorac-ic-ae
14. **nerv-us brachi-al-is thorac-ic-us**
    - nerv-i brachi-al-es thorac-ic-i
15. **arteri-a brachio-thorac-ic-a**
    - arteri-ae brachio-thorac-ic-ae
16. **nerv-us brachio-thorac-ic-us**
    - nerv-i brachio-thorac-ic-i
17. **arteri-a thoraco-brachi-al-is**
    - arteri-ae thoraco-brachi-al-es

FROM LATIN TO ENGLISH: WHAT'S THE ANATOMIC NAME OF THAT *NOMEN ANATOMICUM*?

Translate each of the following phrases back into English. Don't settle for Medical English words like "cranial" and "urinary;" translate them into real English (urin-ary = p.t. urine *or* p.t. the urinary tract). If you are wondering whether to say, for example, "vessels p.t. the nose" or "**the** vessels p.t. the nose," remember that the real purpose of the *NA* is to give a name to every *specific* body part.

1. **nerv-i crani-al-es**_____
2. **arteri-ae crani-al-es** _____
3. **vas-a crani-al-ia**_____
4. **vas-a urin-ar-i-a** _____
5. **arteri-ae urin-ar-i-ae** _____
6. **nerv-i urin-ar-i-i** _____
7. **vasa thorac-ic-a** _____
8. **nerv-i thorac-ic-i** _____
9. **arteri-ae thorac-ic-ae**_____
10. **arteri-ae brachi-al-es**_____
11. **nerv-i brachi-al-es** _____
12. **vas-a brachi-al-ia thorac-ic-a** _____

_____

13. **arteri-ae brachi-al-es thorac-ic-ae**_____

_____

14. **nerv-i brachi-al-es thorac-ic-i** _____

_____

15. **arteri-ae brachio-thorac-ic-ae** _____

_____

16. **nerv-i brachio-thorac-ic-i**_____

_____

17. **arteri-ae thoraco-brachi-al-es**_____

_____

ANSWERS: TRANSLATIONS OF PLURAL LATIN PHRASES

1. **nerv-i crani-al-es**
   - the nerves p.t. the skull
2. **arteri-ae crani-al-es**
   - the arteries p.t. the skull
3. **vas-a crani-al-ia**
   - the vessels p.t. the skull
4. **vas-a urin-ar-i-a**
   - the vessels p.t. urine
   - *or* ...p.t. the urinary tract
5. **arteri-ae urin-ar-i-ae**
   - the arteries p.t. the urinary tract (*not* ...p.t. urine)

6. **nerv-i urin-ar-i-i**
   - the nerves p.t. the urinary tract
7. **vasa thorac-ic-a**
   - the vessels p.t. the chest
8. **nerv-i thorac-ic-i**
   - the nerves p.t. the chest
9. **arteri-ae thorac-ic-ae**
   - the arteries p.t. the chest
10. **arteri-ae brachi-al-es**
    - the arteries p.t. the arm
    - *or* ...p.t. the arms *or* ...an arm
11. **nerv-i brachi-al-es**
    - the nerves p.t. the arms
    - *or* ...p.t. the arm *or* ...an arm
12. **vas-a brachi-al-ia thorac-ic-a**
    - the vessels p.t. an arm and p.t. the chest (*or*....)
13. **arteri-ae brachi-al-es thorac-ic-ae**
    - the arteries p.t. the chest and p.t. the arm (*or*....)
14. **nerv-i brachi-al-es thorac-ic-i**
    - the nerves p.t. the chest and p.t. the arms (*or*....)
15. **arteri-ae brachio-thorac-ic-ae**
    - the arteries p.t. the chest and involving the arm
    - (*or*...arms, *or* ...the arms)
16. **nerv-i brachio-thorac-ic-i**
    - the nerves p.t. the chest and involving an arm (*or*....)
17. **arteri-ae thoraco-brachi-al-es**
    - the arteries p.t. the arms and involving the chest
    - *or* the arteries p.t. an arm (*or* the arm) and involving the chest

(If some of the occurrences of "*or*...." trouble you, remember that "brachi-al" = "p.t. an arm" *or* "p.t. the arm" *or* "p.t. the arms" and that "chest **and** arm" = "arm **and** chest").

12

SUBSTANCES (ET CETERA)

PART A. COMBINING FORMS

1.	**hydr-o**	(**hydr**ogen)	**water**; fluid	
2.	**hygr-o**	(**hygr**ometer)	moisture	
3.	**aer-o**	(**aer**oplane)	**air**; gas	
4.	**phys-o**	(“puff”)	gas	
5.	**sarc-o**	(**sarc**ophagus)	flesh	
6.	**hist-o, hist-i**	(**hist**ology)	tissue	
7.	**syn-ov(i)-o**	(**ov**um)	**synovi**a	**syn-ov-i-a**
8.	**epi-thel-i-o**	(**epi**dermis)	**epitheli**um	**epi-thel-i-um**
9.	**kary-o**	(“nut”)	nucleus	
10.	**nucle-o**	(**nucle**ar)	**nucle**us	**nucle-us**
11.	**fibr-o**	(“filament”)	**fiber**	**fibr-a**
12.	**in-o, in-os-o**	(“muscle”)	fiber	
13.	**elast-o, elast-ic-o**		**elastic** tissue	
14.	**muc-o, muc-i, muc-os-o**	(“snivel”)	**muc**us	
15.	**myx-o**		**muc**us	
16.	**blenn-o**		mucus	
17.	**ser-o, ser-os-o**	(“whey”)	**ser**um	

18. **lip-o, lipar-o**	(**lipo**suction)	fat; **lip**ids
19. **adip-o, adip-os-o**	(**adipos**e)	fat
20. **steat-o**	(“stiff fat”)	fat
21. **pimel-o**	(“soft fat”)	fat
22. **seb-o**	(“stiff fat”)	**seb**um
23. **cer(umin)-o**	(**cer**aceous)	wax
24. **chol-e-ster(ol)-o**	(9.38; **stere**o)	**cholesterol**
25. **hidr-o, -idr-o**		**sweat**
26. **py-o**	(**pu**trid)	**pu**s
27. **lith-o**	(**x-o-lith**)	calculus
28. **kerat-o**	(4.20)	**hor**n
29. **alcohol-o**		**alcohol**
30. **alkal-o, alkal-i**		**alkal**i
31. **pur(in)-o**	(**pur**e **urin**e)	**purin**e
32. **amyl-o**	(**amyl**ose)	starch
33. **acid-o**		**acid**
34. **acet-o, acet-i**	(**acet**ic)	**acid**
35. **ket(on)-o**		**keton**e bodies
36. **galact-o**	(**galax**y)	milk
37. **lact-o**	(**lact**ation)	milk
38. **ole-o**	(petr**ole**um)	**oil**

39. **glyc-o**	(**glyc**erin)	sugar
40. **sacchar-o**	(**saccha**rin)	**sugar**
41. **opson(in)-o, opsin-o**	(“victuals”)	**opsonin**
42. **myel-in-o**	(3.18)	**myelin**
43. **porph(yr)(in)-o**	(**purp**le)	**porphyrin**
44. **eos-in-o**	(**eas**t)	**eosin**
45. **gel(at)-o, gelat-i**	(**gelat**in)	**jell**y
46. **zym-o, en-zym-o**	(“leaven”)	**enzym**e
47. **peps-in-o, pept-in-o**	(dys**peps**ia)	**pepsin**
48. **prot-e(in)-o**	(**prot**otype)	**protein**
49. **album(in)-o**	(**alb**ino)	**albumin**
50. **pept(on)-o**	(12.47)	**peptone**
51. **colla-gen-o**	(**gen**esis)	**collagen**
52. **fibr-in-o**	(12.11)	**fibrin**
53. **tox-o, tox-ic-o**	(8.24-27)	poison
54. **arsen-o, arsen-ic-o**	(“strong”)	**arsenic**
55. **metall-o**	(**metall**ic)	**metal**
56. **crystall-o**	(**crystall**ine)	**crystal**
57. **hyal-o**	(**hyal**oid body)	glass
58. **vitr(e)-o**	(**vitr**iolic)	glass

59.	**calci-o, calc-i**	(**calc**ulus)	**calci**um
60.	**anthrac-o**	(“coal”)	carbon
61.	**cupr-i**	(**Cu**)	**copper**
62.	**sider-o**		iron
63.	**ferr-o**	(**Fe**)	iron
64.	**stann-o**	(**Sn**)	tin
65.	**thi-o**	(“brimstone”)	sulfur
66.	**kali-o, kal-i**	(**K**)	potassium
67.	**iod-o, iod-in-o, iod-i**	(**vio**let)	**iodin**e
68.	**a-zot-o**	(**zo**ology)	nitrogen
69.	**phos-ph(at)-o, phos-phor-o**	(**phot**ography)	**phosphat**e; **phosphor**us
70.	**hal-o**	(**hal**ogen)	**sal**t
71.	**oxy-, ox-i**	(**oxy**moron)	**oxy**gen
72.	**coni-o**	(**coni**osis)	dust
73.	**x-oma**	(carcin**oma**)	a tumor involving x
	x-om(at)-o	(carcin**omat**ous)	a tumor involving x
74.	**onc-o**	(**onc**ology)	tumor
	x-onc-us		a tumor involving x

PART B. NOTES

SUBSTANCES

Notice that substances form a general class which is different from the general class of body parts and organs. Review the Notes on "Substances" in Chapters 5 and 6, and study the following examples.

aerocystoscopy	the examination of the bladder, **involving** air
hydrorachitis	the inflammation of the spine, **involving** fluid
lactotoxin	a poisonous substance **in** milk [note the order]

Review "x-o-pexy" (1.65) and "x-o-lysis" (1.66), and notice (in addition to the distinction made in Chapter 1 between their diagnostic and therapeutic meanings) that both terminations sometimes refer to "adhesions" between parts of the body. But when the terminations are joined to roots denoting substances, this concept does not apply. Instead, the following formulas hold, in both diagnostic and therapeutic words wherein "S" denotes a substance. (Note that "fixation" has a meaning in chemistry different from the one it has in surgery.)

S-o-pexy	the fixation of S
S-o-lysis	the disintegration of S

MEMBRANES

Synovia (7), mucus (14-16) and serum (17) are often associated with specific membranes. In compound words, the context will usually show whether the membrane or the substance is meant. Study the following examples.

synovitis	the inflammation of a synovi**al membrane**
mucotome	an instrument for cutting a muc**ous membrane**
seroserous	pertaining to two ser**ous membranes**

The following formula holds where "x" is an organ with a serous coat.

ser-o-x-itis	the inflammation of **the serous coat of x**

COMMON SENSE

"Hyal-o" (57) and "vitr(e)-o"(58) must often be translated as "**something resembling** glass," as in the following examples.

hyalitis	the inflammation of **something resembling** glass [in practice, "the inflammation of the **hyaloid** membrane of the eye"]
vitreoretinal	pertaining to the retina and **something resembling** glass [in practice, "pertaining to the retina and the **vitreous** body of the eye"]
vitreodentin	dentin **which resembles** glass
hyalinuria	the abnormal presence in the urine of a substance **resembling** glass

"Kerat-o" (28) literally means "horn," and the combining form is used to designate the cornea (4.20-21) because the latter is the "horny" part of the eye. Context within the word will usually show whether the substance or the body part is meant.

"Anthrac-o" (60) literally means "carbon," but in practice it usually refers to carbon in some specific form. Study the following examples, but in your own translations use "something involving."

anthracometer	an instrument for measuring **carbon dioxide in the air**
anthracosis	an abnormal condition involving **coal dust in the lungs**
anthracotherapy	treatment by means of **charcoal**

For "os" in "muc-os-o," "ser-os-o" and "adip-os-o" (14, 17 and 19 above), see the Note on "the syllable -os-" in Chapter 8. "Mucosa" and "serosa" are used as nouns in Medical Terminology, but you should be aware that they are actually adjectives, each modifying "membrana."

The "os" in "in-os-o" (12 above) is unrelated.

Note that "-in-" (or its variant form "-on-") is a component of several combining forms presented in this chapter (31, 35, 41, 42, 43, 44, 47, 48, 49, 50, 52 and 67 above). Although it bears a literal meaning ("a substance of;" 1.13), the syllable should, in these cases, be ignored in translation.

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-12

CONFUSABLES 7: WHAT'S THAT?

Chapters 7 and 8 each contain a few easily confusable combining forms. Translate the following (mostly made-up) words or phrases, paying close attention to the boundaries of meaningful combining forms.

1. **odontinotropic**_____
2. **dentinolysis** (diagnostic) _____
3. **adamantodystrophic** _____
4. **adamantinopenic** _____
5. **amelinomalacic**_____
6. **nervi palatini** _____
7. **mastoplasty**_____

8. **mastoidoplasty** _____
9. **mastozygomatic** _____
10. **zygomatoidal** _____
11. **sphenicectopia** _____
12. **zygomaticoptosis** _____
13. **vena labiognathosa** _____
14. **petrososclerosis** _____
15. **uvulectasia** _____
16. **lingula pulmonaria** _____

ANSWERS AND EXPLANATIONS

1. **odont-in-otrop-ic**
   - preferentially affecting a substance of the teeth
2. **dentino-lys-is** (diagnostic)
   - the disintegration of dentin
3. **adamanto-dystroph-ic**
   - p.t. the defective growth of enamel
4. **adamantino-pen-ic**
   - p.t. a deficiency of enamel (adamantin- = adamant-)
5. **amel-in-o-malac-ic**
   - p.t. the softening of a substance of enamel
6. **nerv-i palat-in-i**
   - the nerves p.t. the palate

7. **masto-plasty**
   - the surgical repairing of a breast
8. **mastoid-oplasty**
   - the surgical repairing of the mastoid process
9. **masto-zygomat-ic**
   - p.t. the zygomatic bone and the mastoid process
10. **zygomat-oid-al**
    - p.t. something resembling the zygomatic bone
11. **sphen-ic-ectopia**
    - the displacement of something p.t. the sphenoid bone
12. **zygomatic-optosis**
    - the downward displacement of the zygomatic bone
13. **ven-a labio-gnath-os-a**
    - the vein p.t. the jaw, involving the lip
14. **petroso-sclerosis**
    - the hardening of the petrous part of the temporal bone
15. **uvul-ectasia**
    - the distention of the uvula
16. **ling-ul-a pulmon-ar-i-a**
    - the little tongue p.t. the lung

CONFUSABLES 8: LIP, OR LIP-BONE?

Luckily, not too many "soft-tissue" structures in us humans have associated bones named after them. Four skull-bones, however, are named this way. The difference in meaning is the one illustrated by the difference between "head" and "skull," and the context within the whole word should resolve any apparent ambiguity. Work out the best possible translation of each of the following.

1. **maxillodental** _____

2. **maxillozygomatic** _____

3. **mandibulolinguia** _____
4. **mandibulomaxillary** _____
5. **nasostomic** _____
6. **sutura nasofrontalis** _____
7. **lacrimorhinon** _____
8. **lacrimectomy** _____
9. **lacrimosclerosis** _____
10. **ethmoidolacrimectopia** _____

ANSWERS AND EXPLANATIONS

1. **maxillo-dent-al**
   - p.t. the teeth and the maxilla
2. **maxillo-zygomat-ic**
   - p.t. the zygomatic bones, involving the maxilla
3. **mandibulo-lingu-ia**
   - an abnormal condition involving the tongue, involving the lower jaw
4. **mandibulo-maxill-ary**
   - p.t. the maxilla and mandible
   - *or* p.t. the upper jaw and lower jaw
5. **nas-ostom-ic**
   - p.t. the making of an opening in the nose
6. **sutur-a naso-front-al-is**
   - the suture between the frontal bone and nasal bone

7. **lacrimo-rhin-on**
   - a collection of tears in the nose
8. **lacrim-ectomy**
   - the cutting out of the tear sac
9. **lacrimo-sclerosis**
   - the hardening of the lacrimal bone
10. **ethmoido-lacrim-ectopia**
    - the displacement of the lacrimal bone, involving the ethmoid bone

CONFUSABLES 9: SUTURE OR STITCH?

The head-bone joints called "sutures" are named this way because they *look* a little like (uneven) stitches holding the various bones together. Translate the following.

1. **maxillorrhaphic** _____
2. **suturae maxilloethmoidales** _____
3. **cephalorrhaphalgia** _____
4. **suturae craniales** _____

ANSWERS AND EXPLANATIONS

1. **maxill-orrhaph-ic**
   - p.t. the suturing of the upper jaw
   - *not* p.t. the suture**s of** the upper jaw
2. **sutur-ae maxillo-ethmoid-al-es**
   - the sutures between the ethmoid bones and the maxilla
3. **cephal-orrhaph-algia**
   - pain involving the suturing of the head
4. **sutur-ae crani-al-es**
   - the sutures p.t. the skull

MULTIPLE COMBINING FORMS 3: "OF," "INVOLVING," OR "AND"?

Remember that, although you won't learn (and be responsible for) how to say, for example, "the nerve **of** a muscle **of** the foot" (nervus muscul-**i** ped-**is**), and (for example) "the veins **of** the digit**s of** the **feet**," the rules for how you deal with two or more combining forms *within* one adjective don't change just because, in the *NA*, the adjective is now in Latin rather than English. If necessary, review "Multiple Combining Forms 1" in Part C of Chapter 3 before translating the following phrases.

1. **musculi digitales pedales** _____

   _____

2. **musculus digitopedalis** _____

   _____

3. **musculus pedodigitalis** _____

   _____

4. **nervi pedodigitales** _____

   _____

5. **nervus digitopedalis** _____

   _____

6. **vena cervicocephalica** _____

   _____

7. **venae cephalicae cervicales** _____

_____

8. **ossa cervicalia cephalica** _____

_____

9. **os cephalicocervicale** _____

_____

10. **vasa cervicalocephalica** _____

_____

11. **vasa cephalodermatica** _____

_____

12. **ligamenta podacralia** _____

_____

ANSWERS AND EXPLANATIONS

1. **muscul-i digit-al-es ped-al-es**
   - the muscles p.t. the feet **and** p.t. the digits
2. **muscul-us digito-ped-al-is**
   - the muscle p.t. the foot, **involving** a digit *or* digits
3. **muscul-us pedo-digit-al-is**
   - the muscle p.t. the digit(s) **of** the foot *or* feet

4. **nerv-i pedo-digit-al-es**
   - the nerves p.t. the digit(s) **of** the foot *or* feet
5. **nerv-us digito-ped-al-is**
   - the nerve p.t. the foot, **involving** a digit *or* digits
6. **ven-a cervico-cephal-ic-a**
   - the vein p.t. the head, **involving** the neck
   - *or* the vein p.t. the head **and** neck
7. **ven-ae cephal-ic-ae cervic-al-es**
   - the veins p.t. the neck **and** p.t. the head
8. **oss-a cervic-al-ia cephal-ic-a**
   - the bones p.t. the head **and** p.t. the neck
9. **os cephal-ic-o-cervic-al-e**
   - the bone p.t. the neck, **involving something** p.t. the head
   - *or* the bone p.t. the neck and **something** p.t. the head
10. **vas-a cervic-al-o-cephal-ic-a**
    - the vessels p.t. the head, **involving something** p.t. the neck
    - *or* the vessels p.t. the head and **something** p.t. the neck
11. **vas-a cephalo-dermat-ic-a**
    - the vessels p.t. the skin **of** the head
12. **ligament-a pod-acr-al-ia**
    - the ligaments p.t. the extremities **of** the foot *or* feet

LEVEL-OF-MEANING 1: HOW ENGLISH DO WE LET THIS GET?

Do you find the following phrases at all troublesome? Can you readily translate them, as you would translate the phrase "human-oid machine," as "a machine resembling a human"?

- coracoid process
- xiphoid process
- thyroid gland
- mastoid process
- styloid process
- hyoid bone

If you do have difficulties here, it might be because you are having trouble deciding just how literally to interpret the meaningful parts. If we are going to be very literal, we have to make the following translations (which of course are never used in the real world).

corac-oid pro-cess
- (*NA* pro-cess-us corac-oid-eus)
- the projection resembling a raven['s beak]

xiph-oid pro-cess
- (*NA* pro-cess-us xiph-oid-eus)
- the projection resembling a sword

thyr-oid gland
- (*NA* gland-ul-a thyr-oid-ea)
- the little acorn resembling a door

mast-oid process
- (*NA* pro-cess-us mast-oid-eus)
- the projection resembling a breast

styl-oid process
- (*NA* pro-cess-us styl-oid-eus)
- the projection resembling a stylus

hy-oid bone
- (*NA* os hy-oid-eum)
- the bone resembling [the letter] U

In the real world, then, the glandula thyroidea is "the thyroid gland". This is a so-called "level of meaning" problem (see the rules given in Chapter 8); another way to understand this is that the ending -oid added to any combining form that already contains -oid- "defaults" to the generic adjective translated "pertaining to." Thus, "a thyr-oid problem" is "a problem **p.t.** the thyr**oid** gland" (*not* "a problem **resembling** the thyroid gland").

Translate the following words and phrases.

1. **sternoxiphoid**_____
2. **humeralocoracoid** _____
3. **mastostyloid** _____
4. **glossohyoid**_____
5. **mastoidedema** _____
6. **suturae occipitomastoideae**_____

ANSWERS AND EXPLANATIONS

1. **sterno-xiph-oid**
   - p.t. the xiphoid process, involving the sternum
2. **humer-al-o-corac-oid**
   - p.t. the coracoid process, involving something p.t. the humerus
3. **masto-styl-oid**
   - p.t. the styloid and mastoid processes
4. **glosso-hy-oid**
   - p.t. the hyoid bone, involving the tongue
5. **mast-oid-edema**
   - the swelling of the mastoid process
6. **sutur-ae occipito-mast-oid-eae**
   - the sutures between the mastoid proccesses and the occiput

LEVEL-OF-MEANING 2: AS ENGLISH AS THAT?

Something analogous happens when the "double adjective" -oid-al- is used (presumably this originated from the kind of unease we are discussing here).

Translate the following pairs (noting that in each pair the first form is preferred in the *NA*, though the second can occur).

1. **ossa ethmoidalia** _____
2. **os ethmoideum** _____
3. **os sphenoidale** _____
4. **os sphenoideum** _____
5. **os hyoideum** _____
6. **os hyoidale** _____

ANSWERS AND EXPLANATIONS

1. **oss-a ethm-oid-al-ia**
   - the ethmoid bones
2. **os ethm-oid-eum**
   - the ethmoid bone
3. **os sphen-oid-al-e**
   - the sphenoid bone
4. **os sphen-oid-eum**
   - the sphenoid bone
5. **os hy-oid-eum**
   - the hyoid bone
6. **os hy-oid-al-e**
   - the hyoid bone

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PREPOSITIONAL PREFIXES

PART A. COMBINING FORMS

PREFIXES COMMON IN MEDICAL TERMINOLOGY

1.	**hyper-**	(**hyper**active)	excessive; ab**ov**e	
2.	**epi-**	(**epi**demic)	upon; excessive	
3.	**sup-r-a-**	(**super**)	above	**sup-r-a**
4.	**hypo-**	(**hypo**dermic)	insufficient; below	
5.	**sub-** (= 39)	(**sub**marine)	below	
6.	**inf-r-a-**	(**infer**ior)	below	**inf-r-a**
7.	**per-i-**	(**peri**scope)	surrounding	
8.	**circ-um-**	(**circum**navigate)	around	**circ-a**
9.	**para-**	(**para**medical)	beside	
10.	**ex-tr-a-**	(**exter**nal)	outside	**ex-tr-a**
11.	**ex-** (= 31)	(**ex**clude)	outside	
12.	**ex-o-**	(**exo**gamy)	outside	
13.	**ect-o-**	(**ecto**zoon)	outside	
14.	**end-o-**	(**endo**gamy)	**in**side	
15.	**en-**	(**en**demic)	**in**side	
16.	**in-tr-a-**	(**intra**venous)	**in**side	**in-tr-a**
17.	**ent-o-**	(**ento**zoon)	**in**side	

18. **pr-e-** (= 35)	(**pre**fix)	be**fore**	
19. **pr-o-** (= 36)	(**pro**spect)	be**fore**	
20. **re-tr-o-**	(**retro**spect)	behind	
21. **post-**	(**post**date)	behind; after	**post**
22. **trans-** (= 40)	(**trans**fer)	**thr**ough	
23. **in-ter-**	(**inter**stellar)	between; among	**in-ter**
24. **syn-**	(**syn**chronize)	together; with	
25. **ant-i-**	(**anti**bacterial)	against	

PREFIXES COMMON IN TECHNICAL ENGLISH

[Note: "pos, posit" = "put;" "duc, duct" = "lead"]

26. **ab-**	(**ab**duct)	(away) from; **off**	**ab, a**
27. **ad-**	(**ap**position; **ad**duce)	**to; to**wards; **at**	**ad**
28. **com-**	(**com**pose; **con**duct)	together; with	**cum**
29. **de-**	(**de**pose; **de**duct)	away; (down) from; about, concerning	**de**
30. **dis-**	(**dis**pose)	apart; away	
31. **ex-** (= 11)	(**ex**pose)	outside; out of	**ex, e**
32. **in-**	(**im**pose; **in**duction)	**in**(to); on(to)	**in**
33. **ob-**	(**op**pose)	against; near	**ob**

34. **per-**	(**per**spiration)	through; over	**per**
35. **pr-e-** (= 18)	(**pre**position)	be**fore**	
36. **pr-o-** (= 19)	(**pro**pose; **pro**duce)	be**fore**; **for**	**pr-o**
37. **re-**	(**re**pose; **re**duce)	back; again	
38. **se-**	**se**duce	away	
39. **sub-** (= 5)	(**sup**pose)	below; under; beneath	**sub**
40. **trans-** (= 22)	(**trans**pose)	**thr**ough; across	**trans**

LESS COMMON PREFIXES

41. **ana-**	(**ana**tomy)	**on**; up(**on**)	
42. **ant-e-**	(**ante**cedent)	before	**ant-e**
43. **apo-**	(**apo**calypse)	**off**; from	
44. **cata-**	(**cata**strophe)	down	
45. **con-tr-a-**	(**contra**dict)	against	**con-tr-a**
46. **dia-**	(**dia**metric)	through	
47. **sup-er-**	(**super**cede)	above	
48. **ul-tr-a-**	(**ultra**sonic)	beyond	**ul-tr-a**

PART B. NOTES

PROBLEMS OF TRANSLATION

Be warned that the meaning of a prepositional prefix in a compound word is often more difficult to predict than the meaning of any other part of the word. Most of these difficulties are shared with other types of combining forms which also function as prefixes; the general name for these is "determinants."

Prepositional prefixes are usually to be taken closely with the bases immediately following them. This will affect the order in which words beginning with them must be translated.

Prepositional prefixes generally have **adjectival** force. Translations of words beginning with these prefixes will therefore generally contain **adjectival phrases**.

Study the following nouns and their translations, in which the adjectival phrases are in bold face, and notice also the order of translation.

epicardium	something **upon the heart**
pericecitis	the inflammation of something **surrounding the cecum**

When its termination shows that a word beginning with a prepositional prefix is itself an adjective, the prefix is to be taken closely with the termination. Such words regularly denote **location**, and translation can begin with the English adjectives "situated" or "located," which in these cases are much more specific than "pertaining to." Study the following examples, and notice that since phrases like "upon the stomach" and "above the liver" are already adjectival, the tags "situated" and "located" are not needed.

epigastric	(situated or located) **upon the stomach** (not "p.t. something upon the stomach")
suprahepatic	(situated or located) **above the liver** (not "p.t. something above the liver")

METAPHORICAL EXTENSIONS OF MEANING

Prepositions generally denote **spatial** relations between objects. The meanings of some prepositions, however, can be extended so that they denote other relationships.

Study the following examples, and satisfy yourself that the metaphorical connections between the spatial and non-spatial meanings are clear.

"Pre-" (18 above), "pro-" (19 above) and "post-" (21 above) can refer to **time** as well as to **space**.

preanal	(**situated**) before the anus	(space)
prealbuminuric	(**occurring**) before the abnormal presence of albumin in the urine	(time)
postcranial	(**situated**) **behind** the skull	(space)
posthemorrhagic	(**occurring**) **after** the rapid flowing of blood	(time)

"Hyper-" (1 above) and "epi-" (2 above), which denote that something is **above** or **upon** something else, can be used metaphorically to express that something is **above** normal, or excessive. Notice that the extended meaning is the more common for "hyper-;" context will usually resolve any ambiguity, as in the following examples.

hypernephritis	the inflammation of something **above** the kidney
hyperdactylia	an abnormal condition involving **excessive** [= **an above normal number of**] digits
hypercalcipexy	the fixation of **excessive** [= **an above normal amount of**] calcium

"Hypo-" (4 above), which indicates that something is **below** something else, is more frequently used in an extended sense to denote that something is **below** normal, or insufficient.

hypodermic	**below** the skin
hypogalactia	an abnormal condition involving **insufficient** [= **a below normal amount of**] milk

COMMON SENSE

Some of the words you have already learned actually consist of a prefix and a base. Note that in the following list, the translation given is **literal** and should not be used; added words are in boldface.

epi-derm-is (2.4)	something upon the skin
syn-desm-os-is (3.47)	something with a ligament
en-cephal-on (4.1)	something inside the head
per-i-cardi-um (5.12)	something surrounding the heart
hypo-phys-is (5.32)	something growing below **the brain**
par-ot-id gland (5.33)	a gland beside the ear
para-thyr-oid (5.35)	beside the thyroid **gland**
ad-ren-al gland (5.37)	a gland at the kidney
sup-r-a-ren-al (5.38)	above the kidney
epi-glott-is (6.8)	something upon the glottis
per-i-odont-i-um (7.20)	something surrounding a tooth
pro-stat-a (10.29)	**a part** standing before **the penis**

The names of many other parts of the body are formed like the words in the above list, but most of these will give no trouble if translated literally. Occasional examples will be found in the Translation Exercises in the *Workbook*.

Sometimes two prefixes occur before a base. The first will generally govern the second, while the second will govern the base. Study the following examples; additional, literal translations are given for the first two.

ep-en-cephal-ic	upon the brain ("upon something inside the head")
sub-epi-derm-al	below the epidermis ("below something upon the skin")
para-epi-gastr-ic	beside something upon the stomach

Five prepositional prefixes used in Medical Terminology are also common in ordinary technical English. Notice that the meanings of these prefixes (5 = 39; 11 = 31; 18 = 35; 19 = 36; 22 = 40) are somewhat more flexible when the words to which they are attached are less specialized.

Many prepositional prefixes were free-standing prepositions in Latin. The following Latin phrases, exhibiting prepositions, are occasionally used in English.

post meridiem (21)	after midday
inter alia (23)	among others
ab ovo (26)	from the egg
ad nauseam (37)	to (the point of) nausea
magna cum laude (28)	with great praise
de facto (29)	from the fact (="actual")
ex tempore (31)	out of (a particular) time (="unpremeditated")

in absentia (32)	in the absence (of)
per annum (34)	over the year
pro forma (36)	for (the sake of) form
sub rosa (39)	under the rose (="secretly")
ante meridiem (43)	before midday
ultra vires (48)	beyond (one's) powers

PHONETICS AND SPELLING

Prefixes never take a combining vowel. **Occasionally** a vowel at the end of a prefix will be dropped before another vowel. Examples found above include "pa**ro**tid" and "e**pe**ncephalic;" a few others will be encountered in the *Workbook* Exercises.

ASSIMILATION

When a prefix ends in a consonant, that consonant will sometimes be **assimilated** to a following consonant. The word "a**s**-**s**imilate," meaning "make similar to," is itself a good example of the process, for it is formed by adding the prefix "a**d**-" to the base "**s**imil-."

Assimilation is rare in the kind of Medical Terminology presented in this book, because the combining forms involved were usually borrowed directly from Greek and Latin and therefore have undergone little phonetic change.

In normal technical English, however, assimilation is very common. This is because the words involved have come into our language at different times during its history, often through French, and thus reflect different degrees of change in pronunciation. The following list gives most of the common forms. Notice that often, although not always, the last consonant of the prefix will simply be changed to the consonant immediately following it.

PREFIX	MEANING	FOLLOWING CONSONANT	ASSIMILATED RESULT	EXAMPLE
15. **en-**	(inside)	p/b	em-	e**m-b**roil
24. **syn-**	(with)	p/b	sym-	sy**m-p**athy
		l	syl-	sy**l-l**able
		s	sy-	sy-**s**tem
26. **ab-**	(from)		a-	**a**-vert
			abs-	**abs**-tention
27. **ad-**	(to)		a-	**a**-scend
		c	ac-	a**c-c**laim
		f	af-	a**f-f**erent
		g	ag-	a**g-g**regate
		l	al-	a**l-l**ocate
		p	ap-	a**p-p**rove
		r	ar-	a**r-r**ogant
		s	as-	a**s-s**ign
		t	at-	a**t-t**ention
28. **cum-**	(together)		com-	**com**-placent
			co-	**co**-operate
			con-	**con**-gregate
		l	col-	co**l-l**ocate
		r	cor-	co**r-r**ect
30. **dis-**	(apart)		di-	**di**-vide
		f	dif-	di**f-f**erent

PREFIX	MEANING	FOLLOWING CONSONANT	ASSIMILATED RESULT	EXAMPLE
31. **ex-**	(out of)		e-	**e**-volve
			ec-	**ec**-tomy
		f	ef-	e**f-f**erent
32. **in-**	(in; on)		en-	**en**-velope
		l	il-	i**l-l**usion
		p/b	im-	i**m-p**rove
		r	ir-	i**r-r**igate
33. **ob-**	(against)	c	oc-	o**c-c**lusal
		f	of-	o**f-f**er
		p	op-	o**p-p**ose
37. **re-**	(back; again)		red-	**red**-undant
39. **sub-**	(below)	c	suc-	su**c-c**eed
		f	suf-	su**f-f**ix
		g	sug-	su**g-g**est
		m	sum-	su**m-m**on
		p	sup-	su**p-p**lant
		r	sur-	su**r-r**ogate
40. **trans-**	(through)		tran-	**tran**-spire
			tra-	**tra**-verse
45. **contra-**	(against)		counter-	**counter**-act

PART C. FURTHER NOTES & EXERCISES: REVIEWING CHAPTERS 1-13

REVIEWING ADJECTIVES

PREFIXED ADJECTIVES 1: WHERE'S THE WHICHIMICALLIT?

The primary function of prepositional prefixes is to show spatial relations – in particular, the position of one thing in relation to another. The simplest word-types featuring these prefixes are adjectives that answer the question "where is Z?" (where "Z" is the word the adjective is modifying). Thus, while "hepatic tumor" is "a tumor p.t. the liver," a "supra-hepat-ic tumor" (where is the tumor?) is "a tumor located above the liver." For such words, the following formulaic approaches apply, where "x" is a combining form denoting an organ or part, "P" denotes a prepositional prefix, and "-ic" serves as a stand in for "any adjectival ending."

x-ic	p.t. x (e.g., hepat-ic = p.t. the liver)
P-x-ic	located P x (e.g., supra-hepat-ic = located above the liver)

Note further that, if our tumor is, for example, "located inside the head," it could just as accurately (and more efficiently) be said to be "inside the head." If this makes sense to you, an even simpler (and therefore better) formulation is possible.

P-x-ic	P x (e.g., supra-hepat-ic = above the liver)

To put this another way, the three hepatic phrases below are exact equivalents of one another, each completing a sentence like "the tumor is…."

"The diseased tissue is suprahepatic."

"The diseased tissue is located above the liver."

"The diseased tissue is above the liver."

The more technical explanation is that the English phrases "located above x" and "above x" are both adjectival, equally valid as translations of a medical adjective like "supra-hepat-**ic**." Note in passing that when the adjective is used with a noun it goes before that noun, while adjective phrases come after.

"The suprahepatic tissue is diseased."

"The tissue (located) above the liver is diseased."

A consideration that may help here is that you have been using English adjectival phrases all along, every time you have begun a translation with the phrase "pertaining to." All you are doing now is learning a different adjectival phrase strategy for use with a particular set of words (ones which, though adjectives, begin with a prepositional prefix). Thus, in each of the following pairs, the two sentences are equivalent to each other.

"The problem is hepatic."

"The problem is p.t. the liver."

"The hepatic problem is killing the patient."

"The problem p.t. the liver is killing the patient."

With all this in mind, translate the following adjectives, each of which could modify a noun like "tumor" or "instrument," and could therefore answer a hypothetical question like "where is that tumor?" or "*where's* my whichimacallit?" Use the "training wheels" (a word to translate "-ic" like "situated" or "located") as long as you need to, but work to understand adjectival phrases well enough to be able to eventually leave them off.

1. **hyperhepatic** _____
2. **epicranial** _____
3. **suprapalatine** _____
4. **hypogastric** _____
5. **sublingual** _____

6. **infracardiac** _____

7. **perivascular** _____

8. **circumthoracic** _____

9. **pararhinal** _____

10. **extrapulmonal** _____

11. **exosteal** _____

12. **exocardiac** _____

13. **ectoceliac** _____

14. **endorenal** _____

15. **ensomatic** _____

16. **intracardiac** _____

17. **entogastric** _____

18. **preduodenal** _____

19. **progalactic** _____

20. **retrocystic** _____

21. **posthepatic** _____

22. **transepidermal** _____

23. **interpneumal** _____

24. **synosteal** _____

25. **antiurinary** _____

ANSWERS AND EXPLANATIONS

1. **hyper-hepat-ic**
   - located above the liver (preliminary answer)
   - above the liver (correct answer)
2. **epi-crani-al**
   - located upon the skull (preliminary answer)
   - upon the skull (correct answer)
3. **supra-palat-ine**
   - located above the palate (preliminary answer)
   - above the palate (correct answer)
4. **hypo-gastr-ic**
   - located below the stomach (preliminary answer)
   - below the stomach (correct answer)
5. **sub-lingu-al**
   - below the tongue
6. **infra-cardi-ac**
   - below the heart
7. **peri-vascul-ar**
   - surrounding a vessel
   - (note that "located surrounding a vessel" would sound odd)
8. **circum-thorac-ic**
   - around the chest
9. **para-rhin-al**
   - beside the nose

10. **extra-pulmon-al**
    - outside the lungs
11. **ex-oste-al**
    - outside a bone
12. **exo-cardi-ac**
    - outside the heart
13. **ecto-celi-ac**
    - outside the abdomen
14. **endo-ren-al**
    - inside the kidneys
15. **en-somat-ic**
    - inside the body
16. **intra-cardi-ac**
    - inside the heart
17. **ento-gastr-ic**
    - inside the stomach
18. **pre-duoden-al**
    - before the duodenum
19. **pro-galact-ic**
    - before milk
    - (would “located before milk” make any sense?...)
20. **retro-cyst-ic**
    - behind the bladder
21. **post-hepat-ic**
    - behind the liver
22. **trans-epiderm-al**
    - through the epidermis
23. **inter-pneum-al**
    - between the lungs

24. **syn-oste-al**
    - with the bone
25. **anti-urin-ary**
    - against urine
    - (could you say, "located against urine"?...)

PREFIXED ADJECTIVES 2: LOCATED AGAINST URINE?

"Located before milk" or "situated against the urine" probably do *not* sound like very useful phrases. On the other hand, you can certainly talk about pregalactic swelling, or antiurinary medications.

Translate the following words, trying to think of suitable "long-version" adjectival phrases that you might use if you wanted to stick with "training wheels" (and don't try starting with "pertaining to").

1. **postgastric**_____
2. **postendocrinal**_____
3. **prestercoral** _____
4. **pregalactic** _____
5. **synosteotic** _____
6. **synpneumonotic** _____
7. **preurinary**_____
8. **suburinary** _____
9. **antiurinary** _____
10. **antigalactic** _____

ANSWERS AND EXPLANATIONS

1. **post-gastr-ic**
   - (located) behind the stomach
2. **post-endocrin-al**
   - (occurring) after secretion
3. **pre-stercor-al**
   - (occurring) before feces
4. **pre-galact-ic**
   - (occurring) before milk
5. **syn-oste-ot-ic**
   - (occurring) with an abnormal condition involving bone
6. **syn-pneumon-ot-ic**
   - (occurring) with an abnormal condition involving the lungs
7. **pre-urin-ary**
   - (occurring) before urine *or*
   - (located) before the urinary tract
8. **sub-urin-ary**
   - (located) below the urinary tract
9. **anti-urin-ary**
   - (operating) against urine
10. **anti-galact-ic**
    - (operating) against something involving milk

PREFIXED ADJECTIVES 3: BUT CAN'T IT SOMETIMES JUST "PERTAIN"?

The simplest translation of any adjective "P-x-ic" is not necessarily the *only* translation that you might have to use in the real world. Consider the following phrases, some of which contain a word you translated above as answering the "where is x?" question. Does it really make sense to say, "a disease (located) around the tendons?" What about "an examination below the stomach" or "an image inside the stomach?" Is "a hypodermic needle" *really* "(located) below

the skin?" Where is an intravenous drip located, exactly? Apply your thinking to the generation of translations that *do* work.

1. **hypogastric examination** _____
2. **perivascular measurement** _____
3. **intracardiac image** _____
4. **entogastric suturing** _____
5. **cirumthoracic disease** _____
6. **endocardial treatment** _____
7. **hypodermic needle** _____
8. **intravenous drip** _____
9. **endorenal failure** _____
10. **paracolonic inflammation** _____

ANSWERS AND EXPLANATIONS

1. **hypogastric examination**
   - an examination **p.t. something** below the stomach
2. **perivascular measurement**
   - a measurement **p.t. something** surrounding vessels
3. **intracardiac image**
   - an image **p.t. something** inside the heart
4. **entogastric suturing**
   - suturing **p.t. something** inside the stomach

5. **circumthoracic disease**
   - a disease around the chest *or*
   - a disease **p.t. something** around the chest
6. **endocardial treatment**
   - treatment **p.t. something** inside the heart
7. **hypodermic needle**
   - a needle **p.t. something** below the skin
8. **intravenous drip**
   - a drip **p.t. something** inside a vein
9. **endorenal failure**
   - failure **p.t. something** inside a kidney
10. **paracolonic inflammation**
    - inflammation beside the colon *or*
    - inflammation **p.t. something** beside the colon

Such uses of adjectives of this type (P-x-ic) are relatively rare. Make a note of the fact that (as often, in Medical Terminology as in life generally) context can be important, and be prepared to be flexible accordingly. But in this course (in the textbook, the *Workbook*, the videos, and the online exercises), you will generally see the adjectives with no helpful accompanying noun; in that case "Plan A" is always to keep it simple (no training wheels), as in the following examples, which show perfect answers for some of the above adjectives when they are in isolation.

hypodermic	below the skin
paracolonic	beside the colon
pregalactic	before milk
antiurinostatic	against the stopping of urine
postendocrinal	after secretion

PREFIXED ADJECTIVES 4: BELOW MILK?

Notice that there are three cases in which the translations of prefixes do not indicate locations (whether in space, or metaphorically in time or action).

hyper-	excessive; above
epi-	upon; excessive
hypo-	insufficient; below

Remember that (according to the conventions presented in the Introduction) this listing means that, by actual count, hyper- more often means "excessive" than "above," and hypo- more often means "insufficient" than "below." With these thoughts in mind, translate the following words.

1. **hyperhepatic** _____
2. **hyperhepatomegalic** _____
3. **epirenal** _____
4. **epirenorrheic** _____
5. **hypocardiac** _____
6. **hypocardiopoietic** _____
7. **epiphlebostenotic** _____
8. **hyperhematorrhagic** _____
9. **hypoglycemic** _____
10. **hypogalactic** _____

ANSWERS AND EXPLANATIONS

1. **hyper-hepat-ic**
   - above the liver
   - *not* excessive liver
   - *not* excess liver**s**
   - *not* p.t. excess livers
   - *probably not* p.t. an excessive liver
2. **hyper-hepato-megal-ic**
   - p.t. the excessive enlargement of the liver
   - *not* p.t. the enlargement of excessive livers
   - *not* above the enlargement of the liver
3. **epi-ren-al**
   - upon the kidney
4. **epi-ren-orrhe-ic**
   - p.t. the excessive flowing of something from a kidney
5. **hypo-cardi-ac**
   - below the heart
   - *not* insufficient heart
   - *probably not* p.t. an insufficient heart
6. **hypo-cardio-poiet-ic**
   - p.t. the insufficient formation of the heart
   - *not* p.t. the formation of insufficient hearts
7. **epi-phlebo-stenot-ic**
   - p.t. the excessive narrowing of veins
   - *probably not* p.t. the narrowing of something upon the veins
8. **hyper-hemat-orrhag-ic**
   - p.t. the rapid flowing of excessive blood
   - *possibly* p.t. the excessive rapid flowing of blood
9. **hypo-glyc-em-ic**
   - p.t. the abnormal presence of insufficient sugar in the blood
10. **hypo-galact-ic**
    - p.t. insufficient milk

PREFIXED ADJECTIVES: SUMMARY NOTES

So far, we are only looking at adjectives that begin with prepositional prefixes.

An advantage to "leaving off the training wheels" is that the various "expanded translations" ("located," "occuring," "operating" etc.) can get confusing.

Be extremely careful not to start leaving out "pertaining to" on the (wrong) theory that it functions the same way that the "training wheels" do here.

Adjectives are adjectives are adjectives; if your medical word is an adjective, that fact must be shown somehow or other in your translation of that word. Cautionary examples follow.

hypo-urin-ot-ic

- *not* an abnormal condition involving insufficient urine (this translation perfectly suits the noun, hypo-urin-os**is**)
- p.t. an abnormal condition involving insufficient urine

epi-phlebo-stenot-ic

- *not* excessive narrowing of veins (this translation is a noun phrase; compare epi-phlebo-stenos**is**: **the** excessive narrowing of veins)
- p.t. to the excessive narrowing of veins

hypo-galact-ic

- *not* insufficient milk (this translation is another noun phrase denoting a condition, for which there might be a number of suitable nouns)
  - hypo-galact-**ia**: an abnormal condition involving insufficient milk, *or*
  - hypo-galact-ias**is**: the abnormal presence of insufficient milk, *or*
  - galact-o-pen**ia**: a deficiency of milk
- (and, lest we forget, *not* "below the milk")

REVIEWING NOUNS

PREFIXED NOUNS 1: THE "IN-THE-HEAD-THING?"

Pretend for a moment you've forgotten that en-cephal-on means "brain" and that peri-cardi-um means "pericardium;" how would you translate these words *literally*, according to their construction (P-x-N, where "N" = "nominative singular ending")? "In-the-head-thing" and "surrounding-the-heart-thing" would work perfectly (except for sounding a bit weird). How

about, respectively, "something inside the head" and "something surrounding the heart"? (The ancient Greeks, by the way, had no idea at all what "the gunk inside the head" was for, so you can just imagine an anatomy lesson the evening after a battle.)

With these thoughts in mind, review "Prefixed Adjectives 3" above and (keeping one eye on the words you dealt with there) translate the following nouns.

1. **hypogaster** _____
2. **perivasculum** _____
3. **endosteum** _____
4. **entogaster** _____
5. **periosteum** _____
6. **endocardium** _____
7. **hypodermis** _____
8. **intravena** _____
9. **paracolon** _____

ANSWERS AND EXPLANATIONS

1. **hypo-gaster**
   - something below the stomach
2. **peri-vascul-um**
   - something surrounding a vessel
3. **end-oste-um**
   - something inside a bone

4. **ento-gaster**
   - something inside the stomach
5. **peri-oste-um**
   - something surrounding a bone
6. **endo-cardi-um**
   - something inside the heart
7. **hypo-derm-is**
   - something below the skin
8. **intra-ven-a**
   - something inside a vein
9. **para-col-on**
   - something beside the colon

PREFIXED NOUNS 2: PLAIN OLD DEATH, OR EXCESSIVE DEATH?

Most nouns with prefixes do *not* name tangible physical objects located in or around the body or its parts. Translate the following words (some of the first few may be familiar to you).

1. **hypoglycemia** _____
2. **epigastralgia** _____
3. **epicardiectomy** _____
4. **hypocalcipexy** _____
5. **hyperodontia** _____
6. **hypercardiotrophy** _____
7. **hyperhidrosis** _____

8. **hypohidrosis**_____

9. **hypodontia** _____

10. **hyperhistonecrosis**_____

ANSWERS AND EXPLANATIONS

Note that most of the nouns in this exercise have prefixes that are being used in their extended or metaphoric senses.

1. **hypo-glyc-em-ia**
   - the abnormal presence of insufficient sugar in the blood
2. **epi-gastr-alg-ia**
   - pain in something upon the stomach
3. **epi-cardi-ectom-y**
   - the cutting out of something upon the heart
4. **hypo-calci-pex-y**
   - the insufficient fixation of calcium
   - *or* the fixation of insufficient calcium
5. **hyper-odont-ia**
   - an abnormal condition involving excessive teeth
6. **hyper-cardio-troph-y**
   - the excessive growth of the heart
7. **hyper-hidr-os-is**
   - an abnormal condition involving excessive sweat
8. **hypo-hidr-os-is**
   - an abnormal condition involving insufficient sweat
9. **hyp-odont-ia**
   - an abnormal condition involving insufficient teeth
10. **hyper-histo-necros-is**
    - the death of excessive tissue
    - (probably) *not* the excessive death of tissue

PREFIXED NOUNS 3: THE INSIDE RUPTURING?

Review "Prefixed Adjectives 3" above one more time, and translate the following abstract nouns.

1. **hypodermitis** _____
2. **peribronchiolitis** _____
3. **intracardiography** _____
4. **entoarteropathy** _____
5. **endourology** _____
6. **perimyelography** _____
7. **hypogastrectomy** _____
8. **endocardiosis** _____
9. **paracolitis** _____
10. **hypotympanometry** _____

ANSWERS AND EXPLANATIONS

Note that the following nouns have purely "prepositional" prefixes, in that they are indicating locations.

1. **hypo-derm-it-is**
   - the inflammation of something below the skin
2. **peri-bronchi-ol-it-is**
   - the inflammation of something surrounding the little bronchi

3. **intra-cardio-graph-y**
   - the recording of something inside the heart
4. **ento-artero-path-y**
   - a disease of something inside an artery
5. **endo-ur-olog-y**
   - the study of something inside the urinary tract
6. **peri-myelo-graph-y**
   - the recording of something surrounding the spinal cord
7. **hypo-gastr-ectom-y**
   - the cutting out of something below the stomach
8. **endo-cardi-os-is**
   - an abnormal condition involving something inside the heart
9. **para-col-it-is**
   - the inflammation of something beside the colon
10. **hypo-tympano-metr-y**
    - the measurement of something below the middle ear

PREFIXED NOUNS 4: SPECIALISTS INSIDE THE TEETH?

Another large group of nouns denote tangible, physical objects, many of which are *not* naturally found in the body. Translate the following words.

1. **endogastroscope** _____
2. **hypopharyngoscope** _____
3. **perichondroma** _____
4. **perimyelogram** _____
5. **endostethoscope** _____
6. **periosteotome** _____

7. **anticytolysin**_____

8. **anticytotoxin** _____

9. **endodontist**_____

10. **subencephalologist** _____

ANSWERS AND EXPLANATIONS

1. **endo-gastro-scop-e**
   - an instrument for examining something inside the stomach
2. **hypo-pharyngo-scop-e**
   - an instrument for examining something below the pharynx
3. **peri-chondr-oma**
   - a tumor involving something surrounding a cartilage
   - *not* a tumor surrounding a cartilage
4. **peri-myel-ogram**
   - a record of something surrounding the spinal cord/bone marrow
   - *not* a record surrounding the spinal cord/bone marrow
5. **endo-stetho-scop-e**
   - an instrument for examining something inside the chest
   - *not* an instrument for examining inside the chest
6. **peri-oste-otom-e**
   - an instrument for cutting something surrounding bone
   - *not* an instrument surrounding the cutting of bone
7. **anti-cyto-lys-in**
   - a subtance which operates against the disintegration of cells (comparison with the adjective anti-cyto-lyt-ic generates the verbal idea of "operating")
8. **anti-cyto-tox-in**
   - something which operates against a substance poisonous to cells

9. **end-odont-ist**
   - one who specializes in something inside teeth
   - *not* one who specializes inside teeth
10. **sub-encephal-olog-ist**
    - one who studies the sub-encephal-on (preliminary answer)
    - one who studies something below the brain
    - (but note that she herself is *not* "below the brain")

PREFIXED NOUNS 5: BELOW THE BEHIND, OR BEHIND THE BELOW?

The last example above shows the correct procedure for dealing with words that begin with *two* prefixes. Working backwards,

en-cephal-on
- something inside the head (literally)

sub-en-cephal-on
- something below the encephalon (preliminary answer)
- something below something inside the head (literally)
- something below the brain (correct answer)

Translate the following words.

1. **endoperineuritis** _____

2. **endoperimyocarditis** _____

ANSWERS AND EXPLANATIONS

1. **endo-peri-neur-it-is**
   - the inflammation of something inside something peri-neur-al
     - *or* ...something inside the "peri-neur-on" (preliminary answers)
   - the inflammation of something inside something surrounding a nerve (correct answer)

2. **endo-peri-myo-card-it-is**
   - the inflammation of something inside something peri-myo-cardi-al (preliminary answer)
   - the inflammation of something inside something surrounding the myocardium (correct answer)

PREFIXED ADJECTIVES 6: SURROUNDING THE DEATH OF?

The "double prefix" words above introduce one more consideration. Prefixed adjectives that can be analyzed at the first "level of translation" as referring to (real or supposed) prefixed nouns must be dealt with very carefully. Try the following words.

1. **postmastectomic**_____
2. **perimyocarditic**_____
3. **enchondrosarcomatous** _____
4. **pregastritic** _____
5. **periosteoedematous**_____
6. **antihyperglycemic** _____
7. **postmenorrheic**_____
8. **intermammary** _____
9. **peripancreatonecrotic**_____

ANSWERS AND EXPLANATIONS

1. **post-mast-ectom-ic**
   - (occurring) after mast-ectom-y (preliminary answer)
   - after the cutting out of a breast
   - *not* p.t. the cutting out of something behind a breast
2. **peri-myo-card-it-ic**
   - p.t. the inflammation of the perimyocardium (preliminary answer)
   - p.t. the inflammation of something surrounding the myocardium
   - *not* surrounding the inflammation of the myocardium
3. **en-chondro-sarc-omat-ous**
   - p.t. a tumor involving flesh inside cartilage
   - *or* p.t. a tumor involving something inside flesh and cartilage
   - *not* inside a tumor involving flesh and cartilage
4. **pre-gastr-it-ic**
   - before gastr-itis (preliminary answer)
   - before the inflammation of the stomach
   - *probably not* p.t. the inflammation of a pregaster
5. **peri-osteo-edemat-ous**
   - p.t. the swelling of something surrounding bone
   - *not* surrounding the swelling of the bone
6. **anti-hyper-glyc-em-ic**
   - (operating) against the abnormal presence in the blood of excessive sugar
   - *not* p.t. something against the abnormal presence in the blood of excessive sugar
7. **post-men-orrhe-ic**
   - after the flowing of the menses
8. **inter-mamm-ary**
   - (located) between the breasts
   - *probably not* p.t. something between the breasts

9. **peri-pancreato-necrot-ic**
   - p.t. peri-pancreato-necros-is (preliminary answer)
   - p.t. the death of something surrounding the pancreas
   - *not* surrounding the death of the pancreas

INSIDES AND OUTSIDES: "THE OUTSIDE BOX" OR "THE OUTSIDE OF THE BOX"?

Pretty clearly the following English phrases do *not* all mean the same thing.

- surrounding a vein
- something surrounding a vein
- the surrounding of a vein
- the surrounding vein

However, confusion sometimes arises with the prefixes meaning "inside" and "outside," probably because we can use these words in English as nouns simply by applying articles to them. Translate the following words.

1. **perivenous** _____
2. **perivena** _____
3. **ectoderm** _____
4. **endodontium** _____

ANSWERS AND EXPLANATIONS

1. **peri-ven-ous**
   - surrounding a vein
2. **peri-ven-a**
   - something surrounding a vein

3. **ecto-derm**
   - **something** outside the skin
   - *not* the outside of the skin
   - *not* the outside skin
   - *not* the outer skin
4. **end-odonti-um**
   - **something** inside the tooth
   - *not* the inside of the tooth
   - *not* the inside tooth
   - *not* the inner tooth

In summary, the prepositional prefixes tell us that for example something is "inside the box," but they are not capable of naming "**the** inside box" or "**the** inside **of** the box."

Appendix 1

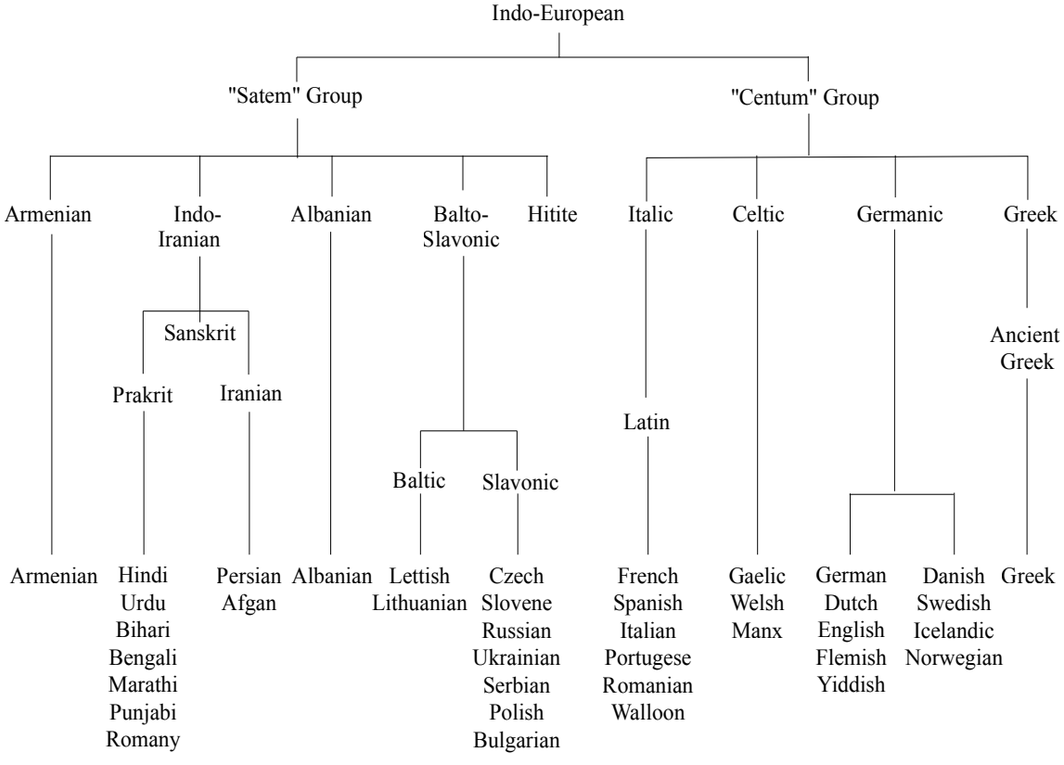
HISTORICAL LINGUISTICS

SOME BASICS OF HISTORICAL LINGUISTICS

All languages change over time. Groups of people, originally speaking the same language, will if they live separately over a few generations be unable to understand each other. Thus languages diversify as they change, and new languages are "born." English, for example, began as a dialect of Old Germanic; when its speakers (the so-called "Angles, Saxons and Jutes") had lived in comparative isolation in Britain long enough (from about 400 to 600 A.D.) for the dialect to be partly incomprehensible to their mainland cousins, we can say that English began to emerge as a separate language.

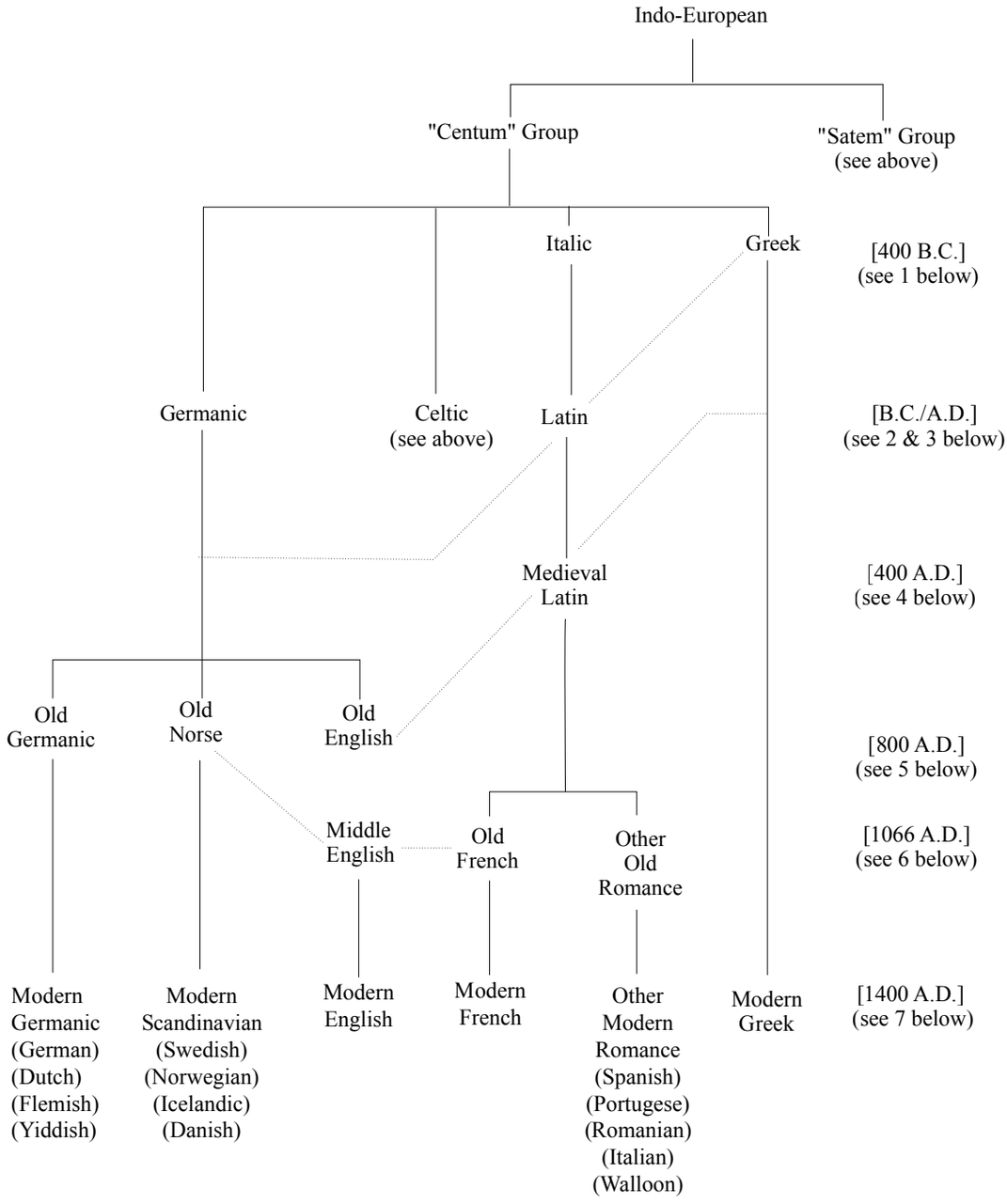
English, Latin and Greek, as well as most of the languages of Europe and India, derive ultimately from an ancient language conventionally called Indo-European. The relations between the ones which are most important for our purposes can be expressed by the following diagrams.

THE MAJOR MEMBERS OF THE INDO-EUROPEAN LANGUAGE "FAMILY"



ENGLISH AND SOME OF ITS CLOSE "RELATIVES"

All dates given here are very approximate. Dotted lines indicate major borrowings of vocabulary, which are each briefly discussed under "Periods of Borrowing" below.



PERIODS OF BORROWING

1) Many Greek words, as used between ca. 500 and 100 B.C., especially in the areas of philosophy and what we would now call the natural sciences, were borrowed into Latin, especially between ca. 100 B.C. and 100 A.D.

2) Early Christian texts (ca. 100 A.D. forward) were circulated in Greek; when the Romans converted to Christianity (ca. 300 A.D. forward), many words used in the new faith were borrowed along with it.

3) At more or less the same time (ca. 50 B.C. to 400 A.D.), contact between the Romans and the Germanic tribes resulted in the borrowing of many words (mostly concrete, describing objects) by the less civilized group.

4) When the Germanic invaders of England (ca. 400 A.D. forward) converted to Christianity (ca. 600 A.D.) many Latin (and Greek) words were borrowed, because Classical Latin (as written between ac. 100 B.C. and 100 A.D.) was by now the official language of the Church.

5) Between ca. 800 and 1000 A.D., continuous raiding and settling of Britain by Scandinavians (the "Danes" or "Norsemen" or "Vikings") resulted in a large number of Scandinavian words (often closely related to English ones) being borrowed.

6) After 1066 England was ruled by the family of William the Conqueror, whose language was Old French; this resulted in a large "aristocratic overlay" of the vocabulary of Old French (itself derived from Latin) upon English

7) From ca. 1400 onwards, one result of the Renaissance has been continuous and large-scale borrowing into English of Greek and Latin words used in the classical periods of these languages (ca. 500-300 B.C. and ca. 100 B.C. to 100 A.D. respectively). Most of the polysyllabic Latinate words used in the Sciences, the Social Sciences and the Humanities have been borrowed, mostly in pieces, since the beginning of the Renaissance.

Your dictionary will give you an indication of when a particular word was borrowed, though you will need to refer to the Etymology section of its Introduction in order to unpack the abbreviations. As a general rule, English words which are most similar to their original Latin or Greek forms are those borrowed most recently; those borrowed from Old French (during the century or so after 1066) show the greatest changes of form and sound.

Note that of the Periods of Borrowing above, 4, 6 and 7 represent the major sources of Latinate vocabulary; Period 5 represents an "internal" process in English which probably tended to make English speakers readier to borrow than they might otherwise have been.

DERIVATIVES AND COGNATES

A distinction is made between English words according to the ways in which they relate to words in other languages of the same family. Thus a derivative word is one which was "borrowed" or derived from a word in another language, while a cognate word is one which can be shown to be related to one in another language because of parallel descent from Indo-European. Cognate relationships are illustrated in the tables below. By way of contrast, derivatives of Latin "pater" and "mater" (themselves cognate with English "father" and "mother") include "patron," "paternity," "paternal," "matron," "maternity" and "maternal."

The relationships between words in Greek and Latin which are cognate with one another are usually easy to see, because their consonant sounds are, generally speaking, similar to those of Indo-European. Words in the Germanic branch of Indo-European, however, underwent a series of fairly consistent sound shifts which make them appear unrelated to their Latin and Greek cognates.

TABLE OF CONSONANT EQUIVALENTS

The following table illustrates the three main "strings" of consonant change, a simplified description of which follows.

A. The Indo-European sound which usually became "P" in Latin and Greek regularly became Germanic "F."
The Indo-European sound which usually became "F" in Latin and Greek regularly became Germanic "B."
The Indo-European sound which usually became "B" in Latin and Greek regularly became Germanic "P."

(Abbreviated: P = F; F = B; B = P)

B. The Indo-European sound which usually became "T" in Latin and Greek regularly became Germanic "TH."
The Indo-European sound which usually became "TH" in Latin and Greek regularly became Germanic "D."
The Indo-European sound which usually became "D" in Latin and Greek regularly became Germanic "T."

(Abbreviated: T = TH; TH = D; D = T)

C. The Indo-European sound which usually became "K" (/K/) in Latin and Greek regularly became Germanic "H."
The Indo-European sound which usually became "H" in Latin and Greek regularly became Germanic "G" (/G/).
The Indo-European sound which usually became "G" (/G/) in Latin and Greek regularly became Germanic "K" (/K/).

(Abbreviated: /K/ = H; H = /G/; /G/ = /K/)

Note that examples are given below each consonant; those in the "Latin/Greek" column are Latinate (words derived from one or both of those languages) and reflect the original Indo-European sound, while the native English words in the second column (cognate with those in the first) indicate the "Germanic shift" which that sound underwent. Where examples in the first column are capitalized, the word or capitalized part of it is cognate with the capitalized part of the corresponding Germanic word. [Note also that more detailed explanations of these shifts may be found in almost any introductory book on Historical Linguistics or the history of the English language.]

		INDO-EUROPEAN	
		LATIN/GREEK	GERMANIC/ ENGLISH
P = F; F = B; B = P			
	P = F	**P**YRE	**F**IRE
		PISCES	**F**ISH
	F = B	**F**RATERnal	**B**ROTHER
		FRAGment	**B**REAK
	B = P	LA**B**ial	LI**P**
		CANNA**B**is	HEM**P**
T = TH; TH = D; D = T			
	T = TH	**T**ENse	**TH**IN
		TRIcycle	**TH**REE
	TH = D	**TH**YR (Gk "door")	**D**OOR
		THYGATER (Gk "daughter")	**D**AUGHTER
	D = T	**D**ENTal	**T**OOTH
		DUplex	**T**WO
/K/ = H; H = /G/; /G/ = /K/			
	/K/* = H	**C**ORDial	**H**EART
		CANNABis	**H**EMP
	H = /G/	**H**OST	**G**UEST
		HORTiculture	**G**ARDen
	/G/* = /K/	A**G**Riculture	A**C**Re
		GRAIN	**C**ORN

* /K/ [=k, qu, "hard" c], /G/ [= "hard" g]

Appendix 2

ETYMOLOGICAL NOTES

SYMBOLS & ABBREVIATIONS USED

<	in "*a* < *b*" = "*a* is derived from *b*"
>	in "*a* > *b*" = "*b* comes from *a*"
cf.	= compare
G	= Greek
L	= Latin
E	= English
IE	= Indo-European (note that all IE forms are hypothetical)
AMT	= this book

EXAMPLE ENTRY WITH TRANSLATION (FROM CHAPTER 1)

21. **–megal/y:** < G **megas** "large" < IE **meg(h)**- "large" > E **much** + L **Mai**/a (goddess of increase [> E **Ma**y]) + **mag**n/us (> E **mag**n/itude, etc.) + **mai**/or (> E **maj**/or + **maj**/or/ity, etc.) + **max**/im/us (> E **max**/im/um, etc.) + **mag**ister (> E **mag**istrate + **ma**ster + **mi**stress, etc.) + Sanskrit (> E) **mah**a/raj/ah "great king"

    The English suffix **-megal/y** (number 21 in Chapter 1) is derived from Greek **megas** meaning "large," which is itself derived from a postulated Indo-European form **meg(h)**- also meaning "large;" from it are derived English **much** and Latin **Mai**/a (from which is derived English **Ma**y) and Latin **mag**n/us (from which are derived English **mag**n/itude and other words) and Latin **mai**/or (from which are derived English **maj**/or and **maj**/or/ity and other words) and Latin **max**/im/us (from which are derived English **max**/im/um and other words) and Latin **mag**ister (from which are derived English **mag**istrate and **ma**ster and **mi**stress and other words) and Sanskrit **mah**a/raj/ah, meaning "great king" (the English word derived from the Sanskrit one is identical to it).

ETYMOLOGICAL NOTES — CHAPTER 1

1. **-iz/e:** < G **-iz**/ein (verb forming suffix; corresponding agent nouns are in "-ist" [12 below], corresponding abstract nouns are in "-ism" [see also on 42 below])

    sym/path/iz/e "to suffer (see 20 below) with (13.24);" **sol/i/loqu/iz/e** "to speak alone;" **fin/al/iz/e** "to make final;" **crystall/iz/e** "to make [into] crystal (12.56)"

2-10. Note that English permits a high degree of flexibility of grammatical function regardless of suffix (so that a speaker may say, for example, "an annu/al" [2 below] or "a rust/ic" [3 below]). Medical Terminology, by contrast, tends to be much more rigorous in following the usual practice in Latin of only changing function when suffix form changes.

It should also be noticed that while other adjective-forming sufixes do exist in Medical Terminology (-ile, for example), these are extremely rare compared to those presented in AMT.

2. **-al:** < L -al/is (adjective forming suffix; see also 5 & 6 below)

na/t/ion/al "p.t. [a group] born [together];" **ann/u/al** "p.t. a year, yearly"

3-4. In Chemical Nomenclature "-ic" and "-ous," added to combining forms denoting metals, distinguish between two valences of the metal, with "-ic" always designating the higher, and "-ous" the lower valence, as the following examples indicate:

ferr/**ic** chlor/ide $FeCl_3$

ferr/**ous** chlor/ide $FeCl_2$

A parallel convention is observed in the case of non-metals:

chlor/**ic** acid $HClO_3$

chlor/**ous** acid $HClO_2$

3. **-ic:** < L **-ic**/us < G **-ik**/os (adjective forming suffix); related to English "**-y**" (in words like chill/**y**, stick/**y** & wav/**y**); for specialization in many modern words describing chemical compounds, in contrast to "-ous" (4 below), see on 3-4 above

cub/ic "p.t. a cube (see 3.10);" **rust/ic** "p.t. the country"

4. **-ous**: < L **-os**/us "full of" (adjective forming suffix with a specific meaning which in Medical Terminology is usually generalized) > E **-os**/e (in words like verb/**os**/e); for specialization in many modern words describing chemical compounds, in contrast to "-ic" (3 above), see on 3-4 above

rid/i/cul/ous "p.t. a little (6.27) laugh," or "full of little laughs;" **danger/ous** "full of danger," or "p.t. danger;" **ven/ous** "p.t. veins (5.18)"

5. **-ary:** < L **-ar**/ius (see on 6 below) > L noun forming suffix -ari/um "place for", as in library and glossary, etc.

stell/ar "p.t. the stars;" **pol/ar** "p.t. a pole"

6. **-ar:** < L -**ar**/is (adjective forming suffix) > E -**ary** (5 above); probably in origin a variant of "-**al**/is" (2 above) produced by dissimilation after bases ending in "-l-" (as, ste**ll**/**ar**/is [> E ste**ll**/**ar**, etc.] < ste**ll**/**al**/is); phonetic mutability of the alveolar sounds /l/ & /r/ is very common in Indo-European (cf. E tu**rtl**e < L tu**rtu**r & E ma**rbl**e < L ma**rmo**r).

   ex/empl/ar/y "p.t. an example;" **milit/ar/y** "p.t. soldiers;" **second/ary** "p.t. the second [rank]"

7. **-an:** < L -**an**/us (adjective forming suffix)

   medi/an "p.t. the middle;" **Mexic/an** "p.t. Mexico"

8. **-in/e:** < L -**in**/us (adjective forming suffix)

   can/in/e "p.t. dogs;" **mar/in/e** "p.t. the sea"

9. **-ac:** < L -**ac**/us < G -**ak**/os (adjective forming suffix)

   cardi/ac "p.t. the heart (see 5.8);" **elegi/ac** "p.t. an eleg/y"

10. **-oid:** < G **eid**/os "form, shape" (> E **id**ol + i/**od**/ine [12.67] + kal/**eid**/o/scop/e "an instrument for examining [71 below] beautiful forms") < IE **weid-** "see, know" (for the union of these two meanings in one word cf. E "see" as in "I see what you mean") > E **wit** + **wit**/ness + **wis**e + **wis**/dom (+ probably **wiz**/ard + **guid**e + **guy** ["guide-wire"]) + L **vid**/er/e (> E **vis**/ion + pro/**vid**/e + re/**vis**/e, etc.) + G (> E) **id**/ea (11.3) + **hist**ori/a "a learning by inquiry" (> E **hist**ory) + Sanskrit > E **ved**/as "knowledge;" for the transformation of the word meaning "shape" into a suffix meaning "resembling," cf. E -ly (in words like heaven/ly) < Old E lic "body, form"

    human/oid "resembling a human;" **andr/oid** "[a machine] resembling a man"

11. **-ia:** < L < G **-i/a** (feminine singular ending of abstract nouns); this abstract G ending has been specialized in Medical Terminology to denote "abnormal condition" probably because Medical science naturally developed out of observation only of those conditions and states which were abnormal; note that E derivatives of L "**-ia**" include "**-y**" and some occurences of "**-e**" (in "hemorrhag**e**," for example)

    in/somn/ia "an abnormal condition involving not sleeping;" **pneumon/ia** "an abnormal condition involving the lungs (6.12)"

12. **-ist:** < G **-ist**/es < **-iz**/ein (see 1 above); (agent-noun forming suffix, corresponding to verbs ending in "**-iz**/e" and abstract nouns ending in "-ism"

    bi/o/log/ist "one who studies (61 below) life;" **dent/ist** "one who specializes in teeth (7.19);" **violin/ist** "one who specializes in the violin"

13. **-in:** < L **-in**/us (8 above); denotes a concrete noun by change of function, with specialized meaning in Medical Terminology

    ad/ren/al/in "a substance of [a gland] at (see 13.27) the kidney (10.11; see also 5.37)" = "a substance of the ad/ren/al [glands];" **insul/in** "a substance of the islets [of Langerhans, in the pancreas] (5.39);" **pect/in** "a substance which fixates (65 below) [jams & jellies];" **kin/in** "a substance which moves (25 below) [something in the body]"

14. **-it/is:** < G **-it**/es (feminine singular adjective ending); originally forming adjectives modifying the noun "nos/os" ("disease;" 11.14) which was later dropped from the resultant phrases; specialized in modern Medical Terminology to mean "the inflammation of"

    laryng/it/is (originally, laryng/it/es nos/as "disease p.t. the larynx") "the inflammation of the larynx (6.9);" **bronch/it/is** "the inflammation of the bronch/i (6.11)"

15. **-o/rrhex/is:** < G **hreg**/ny/nai "to break" (> E -o/**rrhag**/ia [30 below]) < IE **bhreg**- > E **break** + **breach** + breech + L **frang**/er/e (> E **frag**/il/e + **frac**/t/ur/e + **frag**/ment, etc.)

    dermat/o/rrhex/is "the rupturing of the skin (2.3)"

16. **-schis/is:** < G **schiz**/ein (> E **schis**m, etc. + **schiz**/o- + **schist**/o-) < IE **skei(d)**- "to cut or separate" > E **shi**ver (of glass) + **shi**n (because it is formed from two bones, the tibia [2.34] and fibula [2.35], which appear to be one split one) + L **sc**/ir/e "to distinguish, to know" (> E **sc**/i/enc/e, etc.) + **sc**ind/er/e "to cut" (> E **sc**iss/ion + re/**sc**ind + perhaps **sc**iss/or/s)

    schism "a splitting [especially of a church];" **schist** "[any of a group of easily] splitting [rocks (mica, for example)];" **trich/o/schis/is** "the splitting of hairs (2.10)"

17. **-ias/is:** < G **-ias**/is (abstract noun ending, denoting process or condition); specialized in Medical Terminology to mean "the abnormal presence of"

    lith/ias/is "the abnormal presence of a calculus (40 below)"

18. **-clas/is:** < G **klast**/os "broken" < IE **kel-** "to strike" > L **cal**am/itas (> E **cal**am/it/y)

    icon/o/clast/ic "p.t. the breaking of images" (originally applied to zealots of the early eastern Christian church, who on biblical grounds destroyed many images of Christ and the saints); **crani/o/clas/is** "the breaking of the skull (3.4)"

19. **-os/is:** < G **-os/is** (abstract feminine noun ending, denoting state or condition); specialized in Medical Terminology to mean "an abnormal condition involving"

    neur/os/is "an abnormal condition involving the nerves (4.7) or emotions (11.4);" **psych/os/is** "an abnormal condition involving the mind (11.1)"

20. **-path/y:** < G **path**/os "feeling, suffering" > E **path**/os + **path**/et/ic + **-path** (75 below; "**-path**y" and "**-path**" have been specialized in Medical Terminology); the G word influenced the development of, but is not related to, L pat/i "to suffer" (> E pat/i/ent + pass/ion)

    psych/o/path "one with a disease (75 below) of the mind (11.1);" **path/o/log/y** "the study of (61 below) diseases;" **dermat/o/path/y** "a disease of the skin (2.3)"

21. **-megal/y:** < G **megas** "large" < IE **meg(h)-** "large" > E **much** + L **Mai**/a (goddess of increase [> E **Ma**y]) + **mag**n/us (> E **mag**n/itud/e, etc.) + **mai**/or (> E **maj**/or + **maj**/or/ity, etc.) + **max**/im/us (> E **max**/im/um, etc.) + **mag**ister (> E **mag**istrate + **ma**ster + **mi**stress, etc.) + Sanskrit (> E) **mah**a/raj/ah "great king" (for "raj/ah" see on "rect/um," 9.31)

    mega/lith "a large stone (see 40 below);" **megal/o/man/ia** "a morbid fondness (11.25) [concerning one's own] 'largeness';" **dermat/o/megal/y** "the enlargement of the skin (2.3)"

22. **-phag/y:** < G **phag**/ein "to eat"

    sarc/o/phag/us "something (82 below) which ingests flesh (12.5);"**es/o/phag/us** (9.9) "something (82 below) [which] bears [what is] eaten"

23. **-gen/es/is:** < L **gen/es**/is "birth, generation" < G **gi/gn**/esthai "be born" < IE **gen-** "to produce, bear" > E **kin** + **kin**d + **kin**g, etc. + German **kin**d "child" (> E **kin**der/gart/en "children's garden") + L **gen**us, **gen**er/is "birth, origin, kind" (> E **gen**us + **gen**er/al + **gen**re + **gen**er/ic + **gen**der + **gen**i/us + **gen**u/in/e + **gen**/it/al [10.4] + **gen**/e + **gen**/o/cid/e + **gen**tle + **gen**try, etc.) + **na**sc/i "to be born" (> E **na**t/ur/e + re/**na**iss/ance + **na**t/ion + **na**t/al + **na**t/iv/e + **na**t/iv/it/y + pu**n**y [< French puis **n**e "born after"], etc.) + **germ**/a "sprout, embryo" (> E **germ** + **germ**/ane + **germ**/in/ate, etc.) + **n**aev/us (> E **n**ev/us "birthmark") + G **gon**/e "seed" (> E **gon**/ad [5.40] + **gon**/e/cyst [10.27]) + probably G **gyn-** "woman" + **gyn**/aik- (> E **gyn**e-, **gyn**(ec)/o- + **gyn**/ec/o/log/y, etc.) + possibly L (> E) **Jun**o

    gen/es/is "the production [of something];" **gen/et/ic/s** "the science of (60 below) the production [of offspring]"

24. **-poi/es/is:** < G **poi**/ein "to make" > E **poe**m + **poe**t, etc.

    po/et/ic "p.t. the formation [of groups of sounds and words];" **onomat/o/poi/et/ic** "p.t. the formation of a name [for a thing, by imitation of the sound naturally associated with that thing; 'buzz,' for example]" (G onoma, onomat-, L nomen, nomin- and E name are cognate); **hormon/o/poi/et/ic** "p.t. the formation of hormones (5.28)"

25. **-kin/es/is:** < G **kin**/ein "to move" > E **cin**/ema, etc.

    kin/et/ic "p.t. movement;" **cin/ema** (shortened from kin/emat/o/graph "an instrument for recording [76 below] movements") "a [place for pictures involving] movement;" **hem/a/kin/es/is** "the movement of blood (5.1)"

26. **-alg/ia:** < G **alg**/os "pain"

    nost/alg/ia "pain involving [thoughts of] home;" **neur/alg/ia** "pain involving the nerves (4.7)"

27. **-odyn/ia:** < G **odyn**/e "pain"

    oste/odyn/ia "pain in the bones (3.1);" **an/odyne** "without pain"

28. **-pleg/ia:** < G **pleg**/e "a stroke" (> E **plag**ue) < IE **plag-** "to strike" > L **plang**/er/e (> E **plang**/ent + **plai**nt, etc.) + E **flaw** "sudden gust of wind" + (perhaps) **flag** "to droop" (> **flag** "symbolic piece of cloth")

    para/pleg/ic (literally) "p.t. the paralysis of [the part] beside (13.9) [the healthy part];" the word now refers to paralysis of the lower half, rather than one side, of the body; **hemi/pleg/ia** "the paralysis of half [of the body]"

29. **-pen/ia:** < L **paen**/e "almost" > E **pen**/insul/a, etc.; specialized in Medical Terminology to denote "a deficiency of"

    pen/insul/a "an (83 below) almost-island (see 5.39);" **pen/ult/im/ate** "almost last;" **oste/o/pen/ia** "a deficiency of bone (3.1)"

30. **-o/rrhag/ia:** < G **rheg**/ny/nai "to break," in the sense of a river "breaking forth" or "breaking its bounds;" hence "to burst forth" < IE **bhreg-** (see on 15 above)

    hem/o/rrhag/e "the rapid flowing of blood (5.1);" **rhin/o/rrhag/ia** "the rapid flowing of [blood from] the nose (2.14)"

31. **-malac/ia:** < G **malak**/os "soft" < **malass**/ein "to soften" (> G **malag**ma > Arabic al **malgh**am > probably E a**malg**am "alloy of mercury" > a**malg**am/ate "to combine") < IE **mlak-** "to crush or grind" < IE **mel-** > L **moll**/is "soft" (> E **moll**/i/fy "to make soft" + **moll**usc + **moil** [in "toil and moil"]) + **mol**/a "millstone" (> E **mill** + **mol**/ar "grinding [tooth]") + G **myl**/e "mill" (> E a/**myl**/o "starch" [12.32]) + E **mil**d + **mel**t

+ s**mel**t "to melt metal" + en/a**mel** (see also on 7.24) + **meal** "grindable grain;" L (< G) **malac**/ia "calmness at sea" was in later Latin, by popular etymology (a morphological misunderstanding), broken into "mal-" = "evil" [> mal/ice, etc.] + "-ac-" [9 above], and "bon/ac/ia" (> E bonanza) was coined as a supposed opposite; we have heard that in Modern Greek "**malak**/a," addressed to a male, is a fighting insult

crani/o/malac/ia "the softening of the skull (3.4)"

32. **-necr/os/is:** < G **nekr**/os "dead body" (> E **necr**/o/phil/ia + **necr**/o/pol/is, etc.) < IE **nek**- "death" > L **noc**/er/e "to harm" (> E in/**noc**/ent "not harming" + in/**noc**/u/ous + **nox**/i/ous "full of harm" + [through French] **nuiss**ance) + **nec**/ar/e "to kill" (> E inter/**nec**/ine "killing between [groups of related individuals]" + per/**nic**/i/ous "full of [the propensity to] kill thoroughly" [for the prefixes see 13.23 & 13.34]); possibly related to IE **nekwt-** "night" > E **night** + L **nox**, **noct**/is (> E **noct**/urn/al) + G **nyx**, **nyct**/os (11.6)

necr/o/phil/ia "a morbid fondness for (11.20) dead [bodies];" **necr/o/pol/is** "city of the dead, cemetary;" **necr/o/manc/y** "divination [by means] of dead [bodies];" **oste/o/necr/os/is** "the death of bone (3.1)"

33. **-sten/os/is:** < G **sten**/os "narrow" > E **sten**/o

sten/o/graph/y "the narrow recording (64 below) [of information];" "steno" is a common clipped form for "sten/o/graph/er;" the idea of "narrow recording" probably comes from the use of shorthand; **laryng/o/sten/os/is** "the narrowing of the larynx (6.9)"

34. **-scler/os/is:** < G **skler**/os "hard;" see also on **skel**et/on, 3.3

scler/os/is "a hardening;" **scler/ous** "hard, horny"

35. **-pt/os/is:** < G **pt/os**/is "a falling" < IE **pet-** "to rush at, fall, fly" > G **pt**er/on "wing, feather" (> E **pt**er/o/dactyl "wing-fingered" [2.33] + helic/o/**pt**er "helix-winged") + **pt**oma (> E **pt**oma/in/e "[any of a class of alkaloids found in organic material which is] falling [apart (= de/cay/ing)]) + L **pet**/er/e "to seek" (> E **pet**/i/tion + com/**pet**/e + im/**pet**/u/ous, etc. + -i/**pet**/al) + E **feath**er

splen/o/pt/os/is "the downward displacement of the spleen (5.25)"

36. **-agr/a:** < G **agr**/a "a seizure" related to G **ag**/ein + L **ag**/ere (< IE **ag-** "to drive" [see on 7.28])

pod/agr/a "gouty pain in the foot (2.34)"

37. **-o/rrhe/a:** < G **rhe**/ein < IE **sreu-** "to flow" > E st**ream** + G **rhis**, **rhin**/os "nose" (2.14; > E **rhin**/o/cer/os, etc.) + **rheum**a "a flowing" (> E **rheum**e + **rheum**at/ism, etc.)

    dia/rrhe/a "the flowing [of waste] through (13.34) [the large intestine];" **rhe/o/stat** "an instrument for stopping (73 below) the flowing of [electrical current];" **lymph/o/rrhe/a** "the flowing of lymph (5.22)"

38. **-edema:** < G **oidema**, **oidemat**/os "a swelling;" the spelling "oedema" is a British transliteration

    Oed/i/pus "swollen-foot (2.34);" the name alludes to the story that when his parents sent him to die of exposure, in a fruitless attempt to thwart a prophecy that he would grow up to kill his father and sleep with his mother, they also nailed the infant's ankles together; **edema** "a [watery] swelling" (= dropsy); **lymph/edema** "the swelling of lymph [nodes] (5.22)"

39. **-cel/e:** < G **kel**/e "tumor, hernia, rupture" < IE **kaul**a probably < IE **keu-** "swelling, arch, cavity" > probably G **koil**/os "hollow" (> E **cel**i/o "abdomen" [9.1]) + **pa**n-, **pa**nt- "all" (> E pan/the/ism, etc.) + L **cav**/us "hollow" (> E **cav**/e + **cav**/ity + ex/**cav**/at/e, etc. + **ca**ge) + E **holl**ow + **high** + **heigh**t + G **ky**ri/os "ruler" + **ky**ri/ak/os "p.t. a ruler" (> E **ch**urch + [through Proto-Germanic] **ki**rk); note that L /k/ (usually corresponding to G /k/ and E /h/) occasionally corresponds to G /p/, as in the following examples:

L **c**ol/ere	G **p**ol/os	E **wh**eel ("wh" = /hw/)
L e**qu**/us	G hi**pp**/os	E **h**orse
L se**qu**/or	G he**p**o/mai	"follo**w**"
L **qu**in/que	G **p**ent/e	"fi**v**e"
L co**qu**/ere	G **p**ess/ein	"**c**ook"
L ie**c**ur	G he**p**ar	"li**v**er"

    note also that the voiced versions of these sounds sometimes follow the same pattern:

L **g**lans	G **b**alan/os	"a**c**orn"

    crani/o/cel/e "the protrusion of the skull (3.4)"

40. **-lith:** < G **lith**/os "stone" > (through French) E –**lit**e "stone" (used in the names of rocks, fossils and minerals; e.g. copr/o/**lit**e "a stone [formed from] feces [9.40]")

    mon/o/lith "a single stone;" **ne/o/lith/ic** "p.t. the new stone [age];" **arteri/o/lith** "a calculus involving an artery (5.16)"

41. **-spasm:** < G **spasm**/os < IE **spe-** "to extend" (possibly related to IE **spei-** "to expand" [see on 9.33]) > E **spa**n + G **sta**di/on (> E **sta**di/um)

    spast/ic "p.t. spasms;" **spasm/od/ic** (-od- is a variant of -oid [10 above]) "resembling spasms;" **neur/o/spasm** "a spasm of nerves (4.7)"

42. **-ism/us:** L < G **-ism**/os (abstract noun suffix for verbs in -iz/ein; see on 1 above); specialized in Medical Terminology to mean "a spasm of"

    blephar/ism "spasm of the eyelids (2.11)" < L blephar/ism/us < G blephar/iz/ein; **pharyng/ism/us** "a spasm of the pharynx (6.6)"

43. **-ec/top/ia:** < G **ek-** "out" (13.31) + G **top**/os "place" (> E **top**/ic + **top**/o/graph/y, etc.)

    top/o/graph/y "the recording of (64 below) places;" **top/ic** "[something] p.t. [one] place" (cf. "top/ic/al medication"); **u/top/ia** (coined by Sir Thomas More in 1516) "no place" ("dys/top/ia," a very recent coinage literally meaning "a defective place," is perhaps due to confusion between G "ou" [> More's "u-"] and G "eu" "normal, good, well" as in "eugenics," etc.); **splen/ec/top/ia** "the displacement of the spleen (5.25)"

44. **-ec/tas/ia:** < G **ek-** "out" (13.31) + G **tas**/is "a stretching;" **tas**/is < G **tein**/ein "to stretch" (> E peri/**tone**/um [9.5]) < IE **ten(d)-** "to stretch" > G **ten**on, **ten**ont/os (> E **ten**/o, **ten**ont/o [3.44]) + L **tend**o, **tend**in/is (> E **tend**/o, **tend**in/o [3.45] + **tend** + **tens**e + dis/**tend** + ex/**tend**, etc.) + L **ten**/ere "to hold" (> E **ten**/ant + **ten**/ure + **tend**er, etc. + L [> E] **tens**/or + ex/**tens**/or) + E **thin** + **thin**g; for another set of derivatives of IE **ten-** see on 8.5

    tas/i/meter "an instrument for measuring (78 below) the expansion [of solids];" **neur/ec/tas/ia** "the distention of the nerves (4.7)"

45. **-plas/ia:** < G **plas**/ein "to mold" (> E **plast**/ic + **plast**er + **plas**ma [5.4]) < IE **pla-** "to smooth, make flat, spread out" > L **pla**n/us (> E **plai**n + **pla**ne) + **pal**m/a (> E **pal**m) + **pla**t/us (> E **pla**te + **pla**te/let + **pla**teau) + G **pla**tys (> E **pla**ty/pus "flat-foot" [2.34]) + **pla**n/ein "to wander" (> E **pla**n/et "wanderer" [as opposed to "fixed" stars]) + E **fl**oor + **fiel**d + **fl**at

    plast/ic "p.t. formation;" specialized to mean "easily formed;" recently, by change of function, the adjective has come to serve also as a noun, presumably by the dropping of the noun from a phrase like "plastic material;" **mamm/o/plas/ia** "the formation of the breasts (2.28)"

46. **-dys/plas/ia:** < G **dys-** "defective" + **-plas**/ia (45 above)

    dys/func/tion "defective function;" **dermat/o/dys/plas/ia** "the defective formation of the skin (2.3)"

47. **-troph/y:** < G **treph**/ein "to feed" < IE **dherebh-** "to coagulate" > G **thromb**/os "a clot" (5.5); E "troph/y" ("memorial of victory") is unrelated

    a/troph/y "a [withering away, due to] lack of growth;" **oste/o/troph/y** "the growth of bones (3.1)"

48. **-dys/troph/y:** < G **dys-** "defective" + **-troph/y** (47 above)

    mus/cul/ar dys/troph/y "defective growth p.t. the muscles (3.43)"

49. **-a/troph/y:** < G **a-** "without" + **-troph/y** (47 above)

    a/mor/al "without moral [principles];" **splen/a/troph/y** "the lack of growth of the spleen (5.25)"

50. **-a/sthen/ia:** < G **a-** "without" + G **sthen**/os "strength"

    call/i/sthen/ic/s (or "cal/i/sthen/ic/s") "the science of (60 below) strength and beauty;" **sthen/ic** "p.t. strength;" **neur/a/sthen/ia** "the lack of strength of the nerves (4.7)"

51. **-therap/y:** < G **therap**eu/ein "to nurse, care" > E **therap**eut/ic

    chem/o/therap/y "treatment by means of chemical (see on 9.36) [drugs];" **therap/ist** "one who (12 above) treats [some disorder]"

52. **-iatr/y:** < G **iatr**/os "healer"

    psych/iatr/y "the healing of the mind (11.1);" **pod/iatr/y** "the healing of feet (2.34)"

53. **-stas/is:** < G **stas**/is "a standing" < IE **sta-** "stand" > E **sta**nd + **sta**ndard + **sta**ck + L **st/a**/re "to stand" (> E **sta**ble + **sta**ge + **sta**nce + **sta**nchion + **sta**nza + **sta**te + **sta**tus + **sta**tion + **sta**tistic + **sta**tue + **sta**ture + **sta**tute + **sta**unch + **sta**y + **sta**id + pro/**sti**t/ute, etc. + pro/**sta**t/e [10.29] + sub/**sta**/nce) + G (> E) **sta**men + G hi**sta**nai "to set" (> E sy**st**em + G epi/**sta**nai "to understand" [the metaphor is similar to that preserved in E "under/**sta**nd"] > E epi/**st**em/o/log/y "the study of knowledge"); the "-n-" of "stand" is a rare English survival of an IE present-tense infix (seen also in E "think" + "bring" [compare "stood" + "thought" + "brought"] and in several L + G verbs)

    stat/ic "p.t. a stopping, stopped;" **stat/us** "standing;" **hem/o/stas/is** "the stopping of [the flowing of] blood (5.1)"

54. **-plast/y:** see 45 above; the abstract noun "-plast/y," formed from the adjectival base of "plast/ic," has been specialized in Medical Terminology to mean "the surgical repairing of"

    plast/ic surgery "surgery p.t. the formation [of a specific part];" **labi/o/plast/y** "the surgical repairing of the lip (7.9)"

55. **-cent/es/is:** < G **kent**/es/is "a pricking" < IE **kent-** "to prick" > G **kent**r/on "sharp point" (> L **cent**r/um > E **cent**r/e + **cent**r/o) + Old High German **hent**ag > (perhaps) E **hand**y (for the metaphor, cf. E "sharp" = "pointed, clever" and "keen" = "sharp, sharp-witted"); but "hand/y" may also be from "hand" (which is unrelated)

    amni/o/cent/es/is "the surgical puncturing of the amnion"

56. **-o/rrhaph/y:** < G **rhapt**/ein "to stitch" < IE **werp-** "to twist" > E **wrap** + **rav**el

    rhaps/od/y "a sutured (= 'stiched') song;" **rhaps/od/iz/e** "to (1 above) [speak or write as if] stitching songs;" **neur/o/rrhaph/y** "the suturing of nerves (4.7)"

57. **-o/tom/y:** < G **tom**/e "a cutting" (> E a/**tom**) < **tem**n/ein "to cut" (> **tom**/os "piece cut off," hence "book" > E **tom**/e) < IE **tem-** "to cut" > L **ton**d/ere "to shear" (> E **ton**sure + **ton**sor/i/al)

    a/tom "a [particle] without [the possibility of] cutting;" **mast/o/tom/y** "the cutting of a breast (2.27)"

58. **-ec/tom/y:** < G **ek-** "out" (13.31) + **-tom/y** (57 above)

    tonsill/ec/tom/y "the cutting out of the tonsils;" **ap/pend/ec/tom/y** "the cutting out of the appendix (9.28)"

59. **-o/stom/y:** < G **stoma**, **stomat**/os "mouth" > E **stom**ach (9.11; < L < G **stom**ach/as "throat, gullet") + **stom**a "opening" + **stom**(at)/o "mouth" (7.6) + ana/**stom**/os/is; it is worth pointing out to students that this form is unrelated to 57 above

    col/o/stom/y "the making of an opening in the colon (9.25)"

60. **-ic/s:** partial translation of the G & L neuter plurals **-ik**/a & **-ic**/a (3 above) "things pertaining to;" specialized in Medical Terminology to mean "the science of"

    phys/ic/s "the science of natural things;" **lingu/ist/ic/s** "the science of specialization in (12 above) tongues (= 'languages;' 7.12);" **kin/et/ic/s** "the science of movement (25 above)"

61. **-o/log/y:** < G **log**/os "word, thought, reasoning" (> E **log**/ic + **log**/ist/ic/s, etc.) < G **leg**/ein "to speak, collect" < IE **leg-** "to gather" > L **lex**, **leg**/is "law" (> E **leg**/al + **loy**/al + **law**, etc.) + **leg**/ere "to collect" (> E e/**lec**t + col/**lec**t + col/**leg**/e + se/**lec**t, etc.) + E **leech** "gatherer [of knowledge]" hence "physician" (& hence the "bloodsuckers" early associated with medical practitioners)

    bi/o/log/y "the study of life"

62. **-scop/y:** < G **skop**/os "watcher" < (by metathesis) IE **spek-** "to peer, look" > E **spy** + L **spec**t/are "to see" (> E **spec**t/a/cle + **spec**tre + **spec**tr/um + **spec**ul/ate + in/**spec**t + re/**spec**t, etc.) + **spec**/i/es (> E **spec**/i/al + **spec**/i/fy, etc.); note the metathesis in G of the sounds /p/ + /k/

tel/e/scop/y "the examination of distant [things]"

63. **-metr/y:** < G **metr**/on "a measure" < IE **me-** "mark off" (related to IE **med-** > probably [through L] E **med**ical + **med**itate) > E **me**al "time [for eating]" (cf. piece/**me**al "measured by pieces") + **me**te + **mo**on + **mo**nth + L **me**ns/is "month" (> E **me**ns/es + **me**nstr/u/at/e) + **me**ns/ur/a (> E **me**asure) + **mo**d/us "measure, manner, mode" (> E **mo**d/e + **mo**d/el + **mo**d/er/ate + **mo**d/ern + **mo**d/i/fy, etc. + **mo**d/ul/e + [< L **mo**d/ul/us; note metathesis] **mo**ld) + G **me**n "moon, month" (> E **me**n/o + **-me**n/ia [10.35]) + probably L **ma**n/us "hand" (> E **ma**n/u/al + **ma**n/u/fact/ure + **ma**n/u/script + **ma**n/ure + **ma**n/oeuvre [both literally "hand-work"], etc. + probably **ma**s/turb/ate [< **ma**n/us + turb/are "to disturb with the hand"])

speed/o/metr/y "the measurement of speed;" **metr/e** "a [standard] measurement"

64. **-graph/y:** < G **graph**/ein "to scratch, incise; (hence) to write" (> G **gramm**a "what is written" [> E **gram** + **gramm**/ar]) < IE **gerebh-** > E **gou**ge + **carv**e + **crab** + **cray**/fish (the last two because their claws were thought of as "scratchers"); the G verb exhibits an interesting change of meaning due to technological change (when writing material more easily dealt with than stone came into usage); for this kind of semantic change, cf. E (< L) "audit" originally "listen to [a verbal description of, e.g., business transactions]"

tel/e/graph/y "the recording of distant [words];" **radi/o/graph/y** "the recording of [something, by means of] radiation"

65. **-pex/y:** < G **pekt**/os "congealed" < IE **pak-** "to fasten" > E **fang** + L **pax**, **pac**/is (> E **peac**e + **pac**/i/fy, etc.) + **pang**/ere (> E **pac**t + **pag**e) + **pag**/us "countryside" (> E **pag**/an) + **pa**l/us (> E **pa**le "picket")

pect/in "a substance which (13 above) fixates [jams & jellies];" **mast/o/pex/y** (therapeutic) "the fixation of a breast (2.27)"

66. **-lys/is:** < G **ly**/ein "to loose" < IE **leu-** "to cut, loosen" > E **los**e + **loss** + **los**t (but not "loose") + L **lu**/ere "to release" (> E so**lv**e + so**lu**tion + ab/so**lv**e, etc. [all < L se/**lu**/ere])

electr/o/lys/is "the disintegration of [something, by means of] electricity;" **ana/lys/is** "a loosening up (13.41) [into easily comprehensible components];" **epi/derm/o/lys/is** (diagnostic) "the disintegration of the epidermis (2.4);" **dactyl/o/lys/is** (therapeutic) "the separation of the adhesions of the digits (2.23)"

67. **-trop/ism:** < G **trop**/os (> E **trop**/ic + **trop**/e) < G **trep**/ein "to turn;" the idea of "preferentially affecting" came from the notion of "turning toward"

    trop/ic/al "p.t. the turning [back of the sun in its apparent north and south seasonal journeys];" **trop/e** "a turn [of figurative speech];" **heli/o/trop/e** "something which turns [toward] the sun;" **neur/o/trop/ism** "the tendency to preferentially affect nerves (4.7)"

68. **-phag/e:** see 22 above

    erythr/o/phag/e "a [cell] which ingests red [blood cells]"

69. **-o/tom/e:** see 57 above

    crani/o/tom/e "an instrument for cutting the skull (3.4)"

70. **-ec/tom/e:** see 58 above

    scler/ec/tom/e "an instrument for cutting out the sclera (4.22)"

71. **-scop/e:** see 62 above

    tel/e/scop/e "an instrument for examining distant [things];" **spectr/o/scop/e** "an instrument for examining spectra"

72. **-clast:** see 18 above

    icon/o/clast "someone who breaks images;" **crani/o/clast** "an instrument for breaking the skull (3.4)"

73. **-stat:** see 53 above

    therm/o/stat "an instrument for stopping [the production of] heat;" **rhe/o/stat** "an instrument for stopping the flowing of (37 above) [electrical current]"

74. **-gen:** see 23 above

    carcin/o/gen "a substance which produces cancer;" **path/o/gen** "a substance which produces diseases" (20 above)

75. **-path:** see 20 above

    psych/o/path "one with a disease of the mind (11.1)"

76. **-graph:** see 64 above

    tel/e/graph "an instrument for recording distant [words];" **phon/o/graph** "an instrument for [reproducing] recorded sound"

77. **-gram:** see 64 above

    tel/e/gram "a record of distant [words];" **mamm/o/gram** "a record of a breast (2.28)"

78. **-meter:** see 63 above; notice that in Medical (and technical) Terminology the ending has a more specialized meaning than in standard English; thus in words like "dia/**meter**" & "peri/**meter**" the original meaning of "measurement" is retained

    speed/o/meter "an instrument for measuring speed;" **bar/o/meter** "an instrument for measuring [atmospheric] pressure;" **therm/o/meter** "an instrument for measuring heat"

79. **-gen/ic:** see 23 above

    carcin/o/gen/ic "producing cancer;" **path/o/gen/ic** "producing disease (20 above)"

80. **-gen/ous:** see 23 above

    indi/gen/ous "produced in [a region or country];" **aut/o/gen/ous** "produced by one's own self"

81. **-trop/ic:** see 67 above

    trop/ic/s "the [place]s p.t. the turning [of the sun in its apparent north and south seasonal journeys];" **dermat/o/trop/ic** "preferentially affecting the skin (2.3)"

82. **-us:** Latin masculine nominative singular ending (presented in AMT Chapter 3) for many nouns and adjectives; "-**os**", the G cognate, is found as the ending of some nouns in Medical Terminology, but these are not generally used in the *Nomina Anatomica*

    muc/us "slime (12.14);" **alumn/us** "nourished (masculine nominative singular)," hence "a male graduate"

83. **-a:** Latin feminine nominative singular ending (presented in AMT Chapter 4) for many nouns and for those adjectives whose masculines end in "-us"

    vertebr/a "a joint (3.20);" **alumn/a** "nourished (feminine nominative singular)," hence "a female graduate"

84. **-um:** Latin neuter nominative singular ending (presented in AMT Chapter 5) for many nouns and for those adjectives whose masculines end in "-us;" "-um" is cognate with G "**-on**" (85 below)

    crani/um "a skull (3.4);" **col/loqu/i/um** "a talking together (13.28);" **sym/pos/i/um** "a drinking together (13.24)"

85. **-on:** Greek neuter nominative singular ending (presented in AMT Chapter 5) retained on some nouns borrowed into Latin and Late Latin (and therefore into contemporary Medical Terminology; some of these words are used in the *Nomina Anatomica*); "-on" is cognate with L "**-um**" (84 above)

    gangli/on "a knot (4.9);" **electr/on** "a [particle with an] electric [charge]"

86. **-(e)us, -(e)a, -(e)um:** Latin adjective-forming endings, added to noun and adjective bases; note that a rare variant has "-i-" instead of "-e-"

    mus/cul/us coccyg/e/us (masculine) "a muscle (3.43) p.t. the coccyx (3.30);" **ven/a coccyg/e/a** (feminine) "a vein (5.18) p.t. the coccyx;" **ligament/um coccyg/e/um** (neuter) "a ligament (3.48) p.t. the coccyx"

ETYMOLOGICAL NOTES — CHAPTER 2

Note that Greek neuter nouns in "-ma, -mat/os" typically result in two combining forms in Medical Terminology: the etymologically "correct" "-mat/o," and a shorter form (less frequently found) "-m/o" made apparently on the analogy of feminine nouns ending in "-a." Thus, for example, "som/o" is found along with "somat/o" (2 below), and "derm/o" with "dermat/o" (3 below).

1. **anthrop/o:** < G **anthrop**/os "man" ([in the generic sense] = "human, humankind")

    anthrop/o/log/y "the study of humans;" **anthrop/oid** "resembling humans;" **anthrop/o/morph/ic** "p.t. the form of humans"

2. **som(at)/o:** < G **soma**, **somat**/os "body" < IE **twonn** "compact, sturdy" < IE **teu-** "to swell" > E **thum**b "swollen [finger]" + **thim**ble + **thi**gh + **thou**s/and "many hundred" + L **tum**/ere "to swell" (> E **tum**or + **tum**/e/sc/ence + **tum**id + **tum**ult, etc.) + **tu**ber "a swelling" (> E **tu**ber + **tu**ber/os/ity + **tu**ber/cul/os/is, etc.)

    psych/o/somat/ic "pertaining to the body and the mind (11.1);" **chrom/o/som/e** "a colored body"

3. **derm(at)/o:** < G **derma**, **dermat**/os "skin" < IE **der-** "to skin" > E **tear** "to rip;" E **derm**/is < Late L < G **derma**

    dermat/o/log/y "the study of the skin;" **dermat/o/log/ist** "one who studies the skin;" **pachy/derm** "thick skin" hence "elephant"

4. **epi/derm(at)/o:** < Late L **epi/derm**/is "something upon (13.2) the skin (3 above);" hence "outer layer of skin"

    epi/derm/o/lys/is "the disintegration of the epidermis"

5. **cyt/o:** < G **kyt**/os "vessel" < IE **(s)keut-** "to cover" > E **hid**e "outer covering" + **hid**e "to remove from sight" + **sky** + **shoe** + **show**er + L **cut**/is "skin" (> E **cut**/i/cl/e [< L **cut**/i/cul/a] "little [6.27] skin" hence "epidermis" + **cut**/ane/ous "p.t. the skin") + **cu**c/ull/us "cap, hood" (> E **co**wl) + G **kyst**/is "sac, bladder" (> E **cyst** + **cyst**/o [10.15])

   cyt/o/logy "the study of cells;" **erythr/o/cyt/e** "a red [blood] cell"

6. **arthr/o:** < G **arthr**/on "joint" < IE **ar-** "to put together, join, fit" > E **ar**m + L **ar**s, **ar**t/is (> E **ar**t + **ar**t/i/fic/e + **ar**t/e/fac/t, etc.) + **ar**t/us "limb" (> E **ar**t/i/cl/e + art/i/cul/at/e + **ar**t/i/c/ul/at/ion, etc.) + **ar**m/a (> E **ar**ms + **ar**m/ament etc.) + **ra**tio, **ra**tion/is "a reckoning" (> E **ra**tion/al, etc. + **re**ason) + probably **ord**o, **ord**in/is "straight row" (> E **ord**/er + **ord**in/ary + **ord**ain + **ord**in/at/ion + **ord**in/ance + **ord**in/al, etc.)

   arthr/it/is "the inflammation of joints;" **arthr/o/pod** "[an invertebrate with] feet (34 below) [which have] joints"

7. **acr/o:** < G **akr**/os "terminal, outmost, topmost" < IE **ak-** "to be pointed, be sharp" > E **edg**e + **ear** (of corn) + (probably) **ug**ly (originally "dreadful") + L **ac**/er/e "to be sharp, sour" (> E **ac**et/ic [12.34] + **ac**id [12.33] + **ac**rid + **ac**rimonious, etc.) + **ac**er "sharp" (> E **eag**re) + **ac**u/ere "to sharpen" (> E **ac**/umen + **ac**/ute) + **ac**/us "needle" (> E **ac**/u/puncture) + G **ak**me (> E **ac**me + **ac**ne) + **aich**m/os (> E **aich**m/o/phob/ia "a morbid dread [11.18] of sharp points") + **ox**ys "sharp acid" (> E **ox**y/mor/on + **ox**y/gen [12.71]) + IE **ak**m- "sharp stone" > IE **ko**mos "stone hammer" > E **ha**mmer

   Acr/o/pol/is "the topmost [part] of the city;" **Akr/on** (a town in Ohio, high in the mountains); **acr/o/nym** "a name [made from] the outmost [parts] (= initial letters) [of words];" **acr/o/phob/ia** "a morbid dread (11.18) of topmost [places] (= heights);" **acr/o/stic** "a verse [or other arrangement of words in which the] outmost [parts of the line form a word or phrase];" **acr/o/bat** "[one who] walks [on the] outmost [parts of the feet] (= on tiptoe);" **acr/o/megal/y** "the enlargement of the extremities"

8. **mel/o:** < G **mel**/os "limb," hence "musical member or part," hence "song" > E **mel**/od/y "sung song" + **mel**/o/drama "sung action" + (through French and Spanish < L dulc/e **mel**/os "sweet song") dulc/i/**mer**

   mel/alg/ia "pain in a limb"

9. **cephal/o:** < G **kephal**/e < IE **ghebhal-** > E **gabl**e + G en/**kephal**/on (4.1) "something inside (13.15) the head," hence "brain"

   en/cephal/it/is (literally "the inflammation of something inside the head") "the inflammation of the brain;" **cephal/o/metr/y** "the measurement of the head"

10. **trich/o:** < G **thrix**, **thrich**/os

    trich/in/os/is "an abnormal condition [caused by] a substance [resembling] hairs," hence "a disease caused by hair-like worms;" **trich/o/till/o/man/ia** "a morbid fondness for (11.25) tearing out [one's own] hair;" **trich/o/schis/is** "the splitting of the hairs"

11. **blephar/o:** < G **blephar**/on "eyelid" specialized < **blep**/ein "to see"

    blephar/it/is "the inflammation of the eyelid"

12. **ophthalm/o:** < G **ophthalm**/os < IE **oqw-** > E **ey**e + wind/**ow** (originally "wind-eye") + L **oc**ul/us (4.17; a diminutive [see 6.26] > E bin/**oc**ul/ar, etc.) + **-ox** (in fer**ox** [> E fer**oc**ious] + atr**ox** [> E atr**oc**ious]) + G **ops** (> G **opt**/ik/os [4.16; > E **opt**/ic/s, etc.] + pros/**op**/on [15 below] "the [part] towards the eyes," hence "the face" + Cycl/**ops** [> E])

    ophthalm/o/log/y "the study of the eyes;" **ophthalm/o/log/ist** "one who studies the eyes"

13. **ot/o:** < G **ous**, **ot**/os < IE **ous-** > E **ear** + L **aur**/is (> E **aur**/al)

    ot/o/laryng/o/log/y "the study of the larynx (6.9) and ears;" **ot/ot/ic** (note the homonyms) "p.t. an abnormal condition involving the ear"

14. **rhin/o:** < G **rhis**, **rhin**/os < IE **sreu-** "to flow;" see on 1.37

    rhin/o/cer/os "something with a horned (12.28) nose" ("rhino" is a common clip); **rhin/o/plast/y** "the surgical repairing of the nose"

15. **pros/op/o:** < G **pros/op**/on "the [part] towards the eyes," hence "the face;" for -ops, see on 12 above

    Cycl/ops "a circle-eye [d (hence 'one-eyed') creature];" **pros/op/o/graph/y** "the recording of 'faces' [and other details about individual people]"

16. **faci/o:** < L **faci**/es (> E **fac**e) < IE **dhe-** "to put, set" > E **do** + **dee**d + **doo**m + L **fac**/ere "to make, do" (> E **fac**t + af/**fec**t + de/**fec**t + ef/**fec**t + in/**fec**t, etc.) + G **thek**/e "sheath" + **the**me (> E **the**me) + G (> E **the**s/is + pros/**the**s/is)

    faci/al "p.t. the face;" **sur/fac/e** "the face above (13.47) [the real thing];" **super/fici/al** "p.t. the face above (13.47) [the real thing];" **prim/a faci/e** "on first face," hence "at first sight"

17. **cervic/o:** < L **cervix**, **cervic**/is "neck;" note that this term is used for many other body structures which roughly have the same shape

    cervic/al vertebr/ae "vertebrae (3.20) p.t. the neck;" **cervic/al cancer** "cancer p.t. the neck [-like part of the uterus (10.43)]"

18. **trachel/o:** < G **trachel**/os "neck, throat" (apparently not related to trache/a [6.10])

    trachel/odyn/ia "pain in the neck"

19. **om/o:** < G **om**/os < IE **om(e)sos** "shoulder" > L (> E) **humer**/us (3.9)

    acr/om/i/on (3.7) "the extremity (7 above) of the shoulder;" **om/odyn/ia** "pain in the shoulder"

20. **brachi/o:** < L **brachi**/um (> E **brac**e + **brac**elet + em**brac**e) < G **brachi**/on "arm" < G **brachy**/s "short" < IE **mrghu** + "short" > E **merry** (originally, "a short [time]") + L **brev**/is "short" (> E **brief** + **brev**ity, etc.); G **brachi**/on at first designated the upper, or "short," arm

    brac/e/let (through French < L brachi/al/is "p.t. the arm;" "-let" perhaps by confusion with the diminutive, as in "arm/let") "an [ornament] for the arm;" **em/brac/e** "to [put one's] arms onto;" **cervic/o/brachi/al** "p.t. the arm and neck"

21. **ancon/o:** < G **ank**/os "a bend" < IE **ank-** "to bend" > G **ank**ylose (> L **ang**ul/us > E **ang**le + **ank**yl/o) + **angk**ur/a (> E **anch**or) + E **ank**le; for the application of the word to "the elbow" compare E "el/bow" "the bowed (= bent) [part] of the el" (for "el" = "arm" see 3.11)

    ancon/agr/a "gouty pain in the elbow"

22. **cheir/o, chir/o:** < G **kheir**, **kheir**/os

    chir/o/pract/or "one who works [by means of] hands;" a fascinating parallel is seen in "surgeon" < Middle E < Old French ser/urg/ien < L < G chir/urg- "hand work;" thus the two words mean the same thing, despite what many would perceive as a difference in degree of elevation between them; **chir/o/pter/an** (of bats) "having winged hands;" **cheir/o/spasm** "a spasm of the hands"

23. **dactyl/o:** < G **daktyl**/os < IE **deik-** "to show or point" (one of a very few roots possibly traceable to a very ancient "mother tongue," or first human language; see *Scientific American*, April 1991 page 139, and more generally, *The Sciences*, May/June 1990 pages 20-27; less controversially, IE **deik-** is related to G **dik**/ein) > L **dig**it/us (> E **dig**it "a finger or toe") + **dic**/ere "to say" (> E **dic**t/ion + e/**dic**t + in/**dic**t + contra/**dic**t + pre/**dic**t, etc.) + E **teach** + **tok**en + **toe**; the extended meaning of **dig**it ("numerical figure") probably derives from the practice of counting on one's fingers, while the **dac**tyl as a type of metrical foot is so called because its shape (long + short + short) recalls the three sections of a finger

    pter/o/dactyl "digit-wing[ed]" (for "pter-" cf. "helic/o/pter" "helix-wing[ed]" and "chir/o/pter/an" under 22 above); **dactyl/o/rrhe/a** "the flowing of something from the digits" (not "the flowing of digits")

24. **onych/o:** < G **onyx**, **onych**/os "nail, claw, onyx stone" < IE **onogh-** > E **nai**l + L **ung**u/is "nail, claw, hoof" (> E **ung**/ul/a "claw, hoof" + **ung**/ul/at/e)

    onyx "a [veined gemstone resembling a finger-]nail;" **onych/o/phag/ist** "one who [chews and] eats [finger-]nails"

25. **thorac/o:** < L < G **thorax**, **thorak**/os "breastplate, breast, chest;" specified anatomically to designate the cavity containing the heart and lungs

    thorac/o/abdomin/al "p.t. the abdomen (9.2) and chest"

26. **steth/o:** < G **steth**/os "chest"

    steth/o/scop/e "an instrument for examining the chest;" **steth/o/cent/et/ic** "p.t. the surgical puncturing of the chest"

27. **mast/o:** < G **mast**/os (> E **mast**/odon "an [animal with some] breast[-like] teeth [7.18]") < IE **mad-** "moist, dripping" (possibly related to IE **ma**mma [see on 28 below]) > E **meat** + **mast** "nuts used for hog food;" "Amazon" was erroneously explained by the ancient Greeks as if < "a/**mast**/on" = "one without a breast" (the idea being that these mythical women warriors removed the right breast in order to facilitate shooting with a bow; the name of the river comes from early Spanish explorers who made the allusion upon seeing natives in headdresses and grass skirts, and called the area "land of the Amazons")

    mast/ec/tom/y "the cutting out of a breast"

28. **mamm/o:** < L **mamm**/a "mother, teat, breast" < IE **mamma** (see also on 27 above and 10.41) > E **momm**a + **momm**y + **mom**

    mamm/al "p.t. a breast" hence by specialization and change of function "an animal which suckles its young;" **mamm/o/gram** "a record of a breast"

29. **thel/o:** < G **thel**/e "nipple" (> E epi/**thel**/i/um [12.8]) < G **thel**az/ein "to suckle" < IE **dhe-** "to suck, suckle" > L **fe**min/a (> E **fe**min/ine + **fe**m/ale) + **fi**li/us "son" (> E **fi**li/al) + **fe**t/us "progeny" (> E **fe**t/us, etc.) + **fe**ll/are "to suck" (> E **fe**ll/at/io)

    thel/it/is "the inflammation of a nipple"

30. **omphal/o:** < G **omphal**/os "navel, hub" < IE **ombh-**, **nobh** "navel" > E **navel** + **nav**e ("central part of a wheel") + L **umbil**/ic/us ([31 below] "something p.t. the navel" hence "the navel and umbilical cord") + **umb**o (> E) "boss (= raised central part) of a shield;" E (< G) **omphal**/os = "boss of shield," and also "a stone at Delphi said to be the centre of the world," hence "centre, hub"

    omphal/ec/tom/y "the cutting out of the navel"

31. **umbil(ic)/o:** < L **umbil**/ic/us; see on 30 above

    umbil/ic/al cord "a cord p.t. the navel"

32. **glute/o, glut/o:** < Modern L **glut**/e/us < G **glout**/os "rump, buttock" < IE **glembh-** (> E **climb** + **clamb**er + **clench** + **cling** + **clutch**, etc. + **clump** + **clinch** + **clam** + **clamp** + **claw** + **clew** + **clue** + **clo**t + **clamm**y) < IE **gel-** "to make round, clench;" perhaps related to IE **gel-** "to freeze" > E **col**d, etc. (see on 12.45)

    glut/e/us max/im/us (shortened < mus/cul/us glut/e/us max/im/us) "[the] greatest muscle (3.43) p.t. the buttocks"

33. **gon/o, gony/o:** < G **gon**/y "knee" < IE **gneu-** > E **knee** + L **gen**/u (> E **gen**/u/flect "to bend the knee") + G **goni**/a "angle" (> E penta/**gon**, etc.)

    penta/gon "a [figure with] five angles;" **hexa/gon** "a [figure with] six angles;" **poly/gon** "a [figure with] many angles;" **gon/agr/a** "gouty pain in the knee"

34. **pod/o:** < G **pous**, **pod**/is (> E oct/o/**pus** "eight footed" + tri/**pod** + **pod**i/um + **pew** + G poly/**pous** "many-footed]" [> E poly/**p**]) < IE **pod-** > E **foot** + **fett**er + **fet**/lock + **fet**ch + L **pes**, **ped**/is ([35 below] > E **ped**al, etc.) + G **ped**/on "oarblade, rudder" (> Medieval G **ped**/ot/es "oarsman" > Medieval L **pi**lot/us [for L /l/ < G /d/ see on 4.32] > E **pi**lot); while the plural "oct/o/pod/es" ("several [individuals of the type] oct/o/pus") is literally correct this form sounds pedantic to many and is perhaps in the process of being replaced by "oct/o/pi" (formed by analogy with the plural forms of many Latin nouns ending in "us" [6.21])

    pod/iatr/y "the healing of the feet;" **chir/o/pod/y** "the [treatment of the diseases of] the feet and hands" (22 above)

35. **ped/o:** < L **pes**, **ped**/is < IE **pod-** (see on 34 above)

    ped/al (with change of function) "[a thing] p.t. the foot;" **mo/ped** (a blend of "mot/or" and "ped/al"); **cent/i/ped/e** "a thing with one hundred feet," hence "any long, segmented, many-footed insect;" **ped/i/gree** (literally "crane's foot," from the shape of a "family tree"); "ped/iatr/y" and "ped/iatr/ic/i/an" are unrelated, the homonymous initial combining form coming from G pais, paid/os "child"

ETYMOLOGICAL NOTES — CHAPTER 3

1. **oste/o:** < G **oste**/on "bone" < IE **ost-** > L **os**, **oss/is** (2 below) + G **ost**rak/on "shell, tile, potsherd" (> E **ost**rac/iz/e + **ost**rac/ism) + **ost**re/on (> E **oyst**er); **ost**rac/iz/e originally meant "to [use] potsherds [as ballots in voting to temporarily exile an overly prominent politician]"

   oss/i/fy "to be made [into] bone;" **osteo/por/os/is** "an abnormal condition involving [the abnormal formation of] pores in bone"

2. **oss(e)/o:** < L **os**, **oss/is** (see 1 above)

   osse/ous "p.t. bone;" **oss/i/cl/e** (< L oss/i/cul/um) "a little (see 6.27) bone"

3. **skelet/o:** < G **skelet**/on "dried" < G **skell**/ein < IE **skel-** "to dry out" (G **skler**/os "hard" [1.34] is related) > E **shall**ow + **shoal** + perhaps L **cal**or "heat;" "skelet/on" is shortened from "soma skelet/on" = "a dried up body (2.2)"

   mus/cul/o/skelet/al "p.t. the skeleton and muscles (43 below)"

4. **crani/o:** < L **crani**/um < G **krani**/on < IE **ker-** "top of the head" > E **horn** + **har**t "male deer" + L (> E) **cer**ebr/um (4.2) + **cer**eb/ell/um (4.3) + G (> E) **kerat-** "corne/a" (4.20 & 12.28) + L **corn**/u "horn" (> E **corn**e/o "**corn**e/a" [4.20] + **corn** "hard excrescence on the foot" + **corn**/er + **corn**/et) + probably L **cr**ist/a (> E **cr**est); notice that in many of the derived words the meaning has shifted from "top" to "hard," both qualities being characteristic of both "horns" and "skulls"

   crani/al "p.t. the skull"

5. **cleid/o:** < G **kleis**, **kleid**/os "key" < IE **kleu** "shut, hook" > L **clav**/is "key" ([6 below] > E **clav**/i/cl/e + **clav**/i/chord + **clef**) + **clau**d/er/e "to shut" (> E **clo**se + **cloi**ster + oc/**clu**s/al [7.37] + **cloy** + **clau**str/o/phob/ia) + G **klei**st/os "closed" (> E – **cleis**/is "closure" [8.21]); the collar bones, which connect the sternum (22 below) at the front of the chest with the shoulder blades (15 below) at the back, were called "keys" because of their slight resemblance to an ancient style of key (which was much simpler than modern keys)

   clav/icl/e (see 6 below) "a [bone shaped like a] little key;" **cleid/o/crani/al** "p.t. the skull and collar bone"

6. **clav/i/cul/o, clav(ic)/i:** < L **clav**/is "key" + **clav**/i/cul/a "a little (6.27) key" (see on 5 above); note that the force of the diminutive in the longer combing form is not felt in translation

   clav/i/chord < L clav/i/chord/i/um "a stringed [instrument] involving keys;" **en/clav/e** "an [area locked] in (13.32) [as if by means of a] key," hence "any cut off area;" **con/clav/e** "a [place] with (13.28) a key," hence "a locked room," hence "any private meeting;" **om/o/clav/i/cul/ar** "p.t. the collar bone and shoulder"

7. **acr/om/i/o** < G **akr/om/i/on** "the outmost part (2.7) of the shoulder (2.19);" the acromion is a projection of the shoulder blade (15 below) which articulates with the collar bone

   acr/om/i/o/clav/i/cul/ar joint "the joint p.t. the collar bone and acromion"

8. **corac/o, corac/oid/o:** < G **korax**, **korak**/os "raven" (the bird's name is probably imitative of the bird's sound); the coracoid process is a part of the shoulder blade (15 below)

   corac/oid pro/cess < L pro/cess/us corac/oid/e/us "a process [= projection] resembling [the beak of] a raven;" **corac/oid/it/is** "the inflammation of the coracoid process"

9. **humer/o:** < L **(h)umer**/us "shoulder" < IE **omes**os > G **om**/os "shoulder" (2.19); specialized in Medical Terminology to mean "upper arm bone"

   thorac/o/humer/al "p.t. the humerus and chest"

10. **cubit/o:** < L **cub/it**/um "elbow, cubit" < L **cub**/ar/e "to lie down or recline" (> E in/**cub**/at/or + **cub**/i/cl/e, etc.) < IE **keub-**(see on 8.3); the meaning "elbow" presumably derives from the Roman practice of reclining while supported by the elbow and/or forearm; hence also **cub**/it "measure of the length of a typical forearm" (for the parallel eytmology of "ell" see on 11 below)

    in/cub/at/or "a [place for] lying in" (13.32); **cub/icl/e** < L cub/i/cul/um "a small (6.27) [place for] reclining;" **brachi/o/cubit/al** "p.t. the elbow and arm"

11. **uln/o:** < L **uln**/a < IE **elei-** "bend" > E **el-** "arm" (as in **el**/bow) + **ell** "[measure of the length of] the typical forearm" (see on 10 above) + **li**mb + L ob/**li**qu/us (> E ob/**li**que); specialized to designate the longer and thinner of the two bones of the forearm

    corac/o/uln/ar/is "p.t. the ulna and the coracoid process"

12. **radi/o:** < L **radi**/us "staff, spoke or ray" (applied to the thicker, shorter bone of the forearm because of its shape) > E **ray** + **radi**ant + **radi**o + **radi**ation, etc.; probably related to L **rad**ix + E **root** (for which see 4.12)

    radi/al "p.t. a ray;" **radi/o/humer/al** "p.t. the humerus and radius"

13. **carp/o:** < Mod. L **carp**/us < G **karp**/os "wrist" < IE **kwerp-** "be mobile" > E **whirl**; L carp/er/e ("carp/e di/em") is not related; in Medical Terminology "carp/us" designates the wrist generally, while its eight small bones are collectively called "carp/al/s" (shortened < carp/al bone/s); for the etymology of E "wrist" see on 20 below

    cubit/o/carp/al "p.t. the wrist and elbow"

14. **phalang/o:** < G **phalanx**, **phalang**/os "line of soldiers" > E **phalanx** + Spanish **falang**/e (name of the Spanish fascist movement; > E **falang**/ist + **falang**/ism) < IE **bhalng-** or **bhel-** "log" E **ba(u)l**k + **pla**nk; applied metaphorically to the bones of the fingers and toes because of their shape

    phalang/it/is "the inflammation of the phalanges"

15. **scapul/o:** < L **scapul**/a "shoulder" < IE **(s)kep-** "to cut with a sharp tool" > E **shap**e + **shav**e + **shaf**t + **scab** + L (> E) **scab**/i/es; specialized to mean "the bone of the shoulder, shoulder-blade"

    faci/o/scapul/o/humer/al "p.t. the humerus, shoulder blade and face"

16. **rach(i)/o, rhach(i)/o:** < G **rhach**/is "spine" > E **rach**/is (erroneously pluralized as "rachid/es"), which is also applied to plant stems

    ricketts (probably) < rach/it/is "the inflammation of the spine;" **rach/i/cent/es/is** "the surgical puncturing of the spine"

17. **spin/o:** < L **spin**/a "thorn, prickle, backbone" (> E **spin**/e + **spin**/al, etc. + Medieval French porc/e/**spin** "spiny pig" [> E porcu**pin**e]) < IE **(s)p(h)ei-** "pointed splinter" > E **spi**t + **spi**re; perhaps related to L **spi**c/a (> E **spi**ke) + **spi**c/ul/um "a little [6.26] spike" (> E **spi**got); metaphorically applied to the backbone because of the pointed projections of the vertebrae

    spin/al column "a column p.t. spiny [bones];" **thorac/o/spin/al** "p.t. the spine and chest"

18. **myel/o:** < G **myel**/os "core" (related to G **mus** "mouse" [see 42 & 43 below]); specialized by the Greeks to mean "bone marrow" (> E **my**el/in [12.42]) and usually (but not always) in current Medical Terminology further specialized to denote the cord formed by the material (not actually bone marrow) which is the "core" of spinal column

    pol/i/o/myel/it/is "the inflammation of the grey matter of the spinal cord;" **myel/in** "a substance of bone marrow" (see 12.42)

19. **spondyl/o:** < G **spondyl**/os "round thing;" specialized to apply to a disc-shaped vertebra

    spondyl/o/lys/is "the disintegration of a vertebra"

20. **vertebr/o:** < L **vertebr**/a < **vert**/ere "to turn" (> E in/**vert**, a/**vert**, extro/**vert**, sub/**vert**, etc.) < IE **wer** + "to turn, bend twist" (see on 4.14 and 4.25 for similar IE roots which may be related) > E **war**p + **wre**nch + **wre**st + **wre**stle + **wri**the + **wre**ath + **wri**st + **wry** + **wri**ng + **wra**ngle + **wro**ng + **wra**th + **wro**th + **worr**y + Old E **wear**d "to turn [out], become" (> E **wor**th + **wor**/ship) + L **ver**m/is (> E **wor**m + **ver**min + **var**mint); the vertebrae are presumably so called because they articulate or "turn"

    in/vertebr/at/e "not having vertebrae," used as a noun by change of function; **di/vert** "to turn away;" **re/vert** "to turn back;" **vertebr/ec/tom/y** "the cutting out of a vertebra"

21. **cost/o, cost/i:** < L **cost**/a "rib, flank, side" > E **coast**

    cost/o/vertebr/al "p.t. a vertebra and a rib"

22. **stern/o:** < Mod. L **stern**/um < G **stern**/on "chest" < IE **ster-** "spread out" > E **strew** + **straw** + L **ster**n/er/e "to spread" (> L = E **stra**t/um > E **stree**t) + G (> E) **stro**ma + **stra**t/os "army" (> E **stra**t/eg/y, etc.); specialized to mean "breast-bone;" E "stern" (noun and adjective) and Latin "sternu/er/e" ("to sneeze") are not related

    strat/um "a spread [out layer];" **strat/o/sphere** "a spherical spread [out layer];" **cost/o/stern/o/plast/y** "the surgical repairing of the sternum and ribs"

23. **xiph/o, xiph/oid/o:** < G **xiph**/os "sword:" applied to the bone because of its shape.

    xiph/oid pro/cess < L pro/cess/us xiph/oid/e/us "a process (= projection) [located at the bottom of the sternum] resembling a sword;" **xiph/o/stern/um** "the sternum and xiphoid process"

24. **cox/o:** < L **cox**/a "hip" > E **cox**/a (which refers also, in zoology, to the first segment of an insect's leg) + (through French) **cuiss**e "thigh[-piece of armour]"

    cox/arthr/os/is "an abnormal condition involving the joints of the hip"

25. **pelv/i, pelv(i)/o:** < L **pelv**/is "basin" < IE **pel-** "container; to flow, fill, crowd" > E **fill** + **full** + **fol**k + L **ple**n/us "full" (> E **ple**n/o/pot/ent/iary "full-powered" + **ple**nty + **ple**n/itude + re/**ple**n/ish + com/**ple**te, etc.) + **plu**s (> E **plu**s + **plu**ral, etc.) + **ple**bs "common people" (> E **ple**b/e/an + **ple**b/i/scit/e) + G **ple**th/os "fullness" (> E **ple**th/ora) + **pol**ys "much, many" (> E **pol**y/gon, etc.) + **pye**l/os (> E **pye**l/o "renal pelvis" [10.12]); from a different sense of the IE root come a host of other words (see on 6.13); "pelvis" is metaphorically applied to the "basin-shaped" cavity formed by the "pelvic girdle" (= the ilium, ischium, pubis & sacrum)

    cephal/o/pelv/ic "p.t. the pelvis [of a pregnant woman] and the head [of a fetus]"

26. **ili/o:** < L **ili**/a "flanks, entrails" < L **ile**/um (> E **ile**/o-"lowest part of small intestine" [9.24]); specialized to refer to the bones forming the upper part of the halves of the pelvis (perhaps because they seem to contain the ileum)

    ili/o/spin/al "p.t. the spine and ilium"

27. **ischi/o:** < L **ischi**/um < G **iskhi**/on "hip-joint" (specialized to refer to the bones forming the base of the halves of the pelvis) > E **sci**/at/ic "p.t. the hip" + **sci**/at/ic/a (< L passio **sci**/at/ic/a "disease [1.20] p.t. the hip") "hip-illness"

    ischi/o/vertebr/al "p.t. the vertebrae and ischium"

28. **pub/o, pub/i:** shortened < L os **pub**er/is "bone (see 1 above) of an adult" (because of the pub/ic hair characteristic of sexual maturity) < L **pub**er "adult" > E **pub**erty, etc.

    puber/t/y < L puber/tas "adulthood;" **pub/e/sc/ent** "beginning to be adult;" **pre/pub/e/sc/ent** "before (13.18) beginning to be adult;" **ischi/o/pub/ic** "p.t. the pubis and ischium"

29. **sacr/o:** < L **sacr**/um "holy, hallowed" > E **sacr**ed, etc,; shortened from "os **sacr**/um" "sacred bone" (which is a translation of G "hier/on oste/on"); so called because it was used in sacrifices, or because it was thought to resist decay and so to be more sacred than other bones, or perhaps because it is close to the genital organs

    sacr/i/fic/e "to make sacred;" **sacr/i/leg/e** (< sacer, sacr/i + leg/er/e "to take possession of") "a (figurative) taking possession of sacred things;" **sacr/a/ment** "a sacredness," hence "a sacred [ceremony];" **sacr/o/sanct** "[both] holy and sanctioned;" **sacr/odyn/ia** "pain in the sacrum"

30. **coccyg/o** < G **kokkux**, **kokkug**/os "cuckoo" (probably imitative of the bird's sound) > L **cuc**ul/us > E **cuck**oo + **cuck**old (because the female bird changes mates, or because she lays eggs in the nests of other birds); applied to the tailbone, the small triangular terminal part of the vertebral column, probably because of its resemblance

to the shape of the bird's beak; or the body part is so named because the sound of passing gas is like the bird's sound; an old English name for the coccyx was "whistle-bone"

sacr/o/coccyg/e/al "p.t. the coccyx and sacrum"

31. **acetab/ul/o:** < L **acet/ab/ul**/um "little (6.26) vinegar holder" (applied to the pelvic part, which forms the "socket" for the head of the femur [32 below], because of its cup-like shape); **acet-** < IE **ac-** (see on 2.7); **-ab/ul**/um < **-abr**/um "holder;" for a parallel loss of "-r-" in the formation of the diminutive, see "cereb/ell/um" (4.3) < cerebr/um (4.2)

acet/ic (< L acet/um "vinegar" < L acid/us "sour;" see 2.7) "p.t. vinegar;" **acid** "a sour [substance]" (specialized in chemistry); **acetab/ul/o/plast/y** "the surgical repairing of the acetabulum"

32. **femor/o:** < L **femur**, **femor**/is "thigh;" specialized to apply to the bone of the thigh

cox/o/femor/al "p.t. the femur and hip"

33. **pat/ell/o:** < L **pat/ell**/a "little (6.28) open [dish]" (from the knee-cap's shape) < L **pat**/er/e ("to lie open;" > E **pat**ent + **pat**ina) < IE **pet-** > G **pet**al/on (> E **pet**al) + E **fath**om; "pati/ent" is unrelated (see under "-path/y" at 1.20)

pat/ent (adjective) "lying open;" the noun is shortened from "letters patent," "an open letter [from a monarch or government conferring rights to an invention];" **pat/ell/a/meter** "an instrument for measuring [the reflexes of a muscle associated with] the knee-cap"

34. **tibi/o:** < L **tibi**/a "flute, shin" < IE **twibh-** "tube-like" > G (> E) **siph**on; specialized to apply to the shin bone

tibi/o/femor/al "p.t. the femur and tibia"

35. **fib/ul/o:** < L **fib/ul**/a "little (6.26) pin or clasp" (probably) < IE **dhigw-** "stick in, pierce, fasten" > E **dik**e (+ **dyk**e) + **ditch** + L **fi**n/is (> E **fi**nish, etc.) + **fig**/er/e "to fasten" (> E **fix**); applied metaphorically to the lesser bone of the lower leg apparently because of its shape (cf. E slang "pins" to designate the legs)

ischi/o/fib/ul/ar "p.t. the fibula and ischium"

36. **tars/o:** < Mod. L **tars**/us "rear part of foot" < G **tars**/os "any flat surface, flat of the foot" < IE **ters-** "to dry" > E **thirs**t + L **torrid**/us (> E **torrid**); in Medical Terminology "tars/us" designates the ankle generally, while its eight small bones are collectively

called "tars/al/s" (shortened < tars/al bone/s); note that very occasionally, "tars/o" and "tars/us" denote the fibrous curved "plate" of the edge of the eyelid (the "tarsal plate")

tars/i/er "a [small arboreal primate notable for long hind legs and a distinct] tarsus;" **tars/o/megal/y** "the enlargement of the tarsus"

37. **calcane/o:** shortened < L os **calc/an/e**/um "bone p.t. the heel;" **calc-** "heel" < IE **(s) kel-** "to bend, be curved" > G **kol**/on "limb, member, part" (> E **col**/on "punctuation mark" + "large intestine" [9.25]); the word "calcaneus" is specialized in Medical Terminology to apply to the heel bone, and the bone itself is an anatomically enlarged and specialized tarsal bone

    fib/ul/o/calcane/al "p.t. the calcaneus and fibula"

38. **tal/o:** < L **tal**/us "ankle" (> E **tal**/on); specialized to apply to the anklebone (the bone of the ankle which joins with the ends of the fibula, tibia and calcaneus), which is itself an anatomically specialized tarsal bone

    tal/i/pes "ankle-foot" (a medical word for the condition more commonly known as "club-foot"); **tal/o/tibi/al** "p.t. the tibia and talus"

39. **astragal/o:** < L **astragal**/us < G **astragal**/os "knuckle-bone;" an older term for the talus (38 above)

    astragal/ec/tom/y "the cutting out of the talus"

40. **chondr/o:** < G **khondr**/os < IE **ghrendh-** > E **grind** + **ground** + (perhaps) **gri**st + **gri**stle; cartilage consists of gristle, or white flexible tissue found around joints and in other places such as the ears, the tip of the nose, and the wind-pipe; the fetal skeleton consists of cartilage which develops into bone

    hypo/chondr/i/ac "p.t. the hypo/chondr/i/a (= "the [region] below [13.4] [the diaphragm];" named because the diaphragm was thought to be a cartilage); this part of the body was thought to be the seat of depression and various troubles ascribed to "the vapours;" **arthr/o/chondr/it/is** "the inflammation of the cartilage of a joint"

41. **cartilag(in)/o:** < L **cartilag**o, **cartilagin**/o "firm elastic tissue" < IE **hert-** "twist together" > E **hurd**le

    cartilago cost/al/is "cartilage p.t. a rib"

42. **my/o, my/os/o:** < G **mus**, **mu**/os "mouse" (> E **my**/os/ot/is "mouse-ear" [a plant]) < IE **mus** > L **mus** (see on 43 below) + E **mous**e + Sanskrit **mus**ka "little mouse; testicle" (> [through Persian, Greek, Latin and French] E **mus**k; G **my**el/os [18 above] is related; metaphorical application of the word for mouse to the human tissue perhaps reflects the shape of muscles rippling under skin)

    derm/o/my/o/tom/e "an instrument for cutting muscle and skin"

43. **mus/cul/o:** < L **mus/cul**/us "a little (6.27) mouse" < L **mus** (see on 42 above) > E **muscl**e + **mussel**

    mus/cul/ar "p.t. muscles"

44. **ten/o, tenon(t)/o:** < G **tenon**, **tenont**/as "stretching" (see 1.44); tendons are made of a tough inelastic substance which attaches muscles to bones

    dis/tend "to stretch apart (13.30);" **tend** "stretch [toward];" **tense** "stretched," etc.; **ten/o/rrhaph/y** "the suturing of a tendon"

45. **tend/o, tendin/o:** < L **tendo**, **tendin**/is (see 1.44)

    ex/tend "to stretch out (13.11);" **in/tend** "to stretch into (13.32)," etc.; **tend/o/lys/is** "the disintegration of a tendon"

46. **desm/o:** < G **desm**/os "band, binder;" related to G **de**in "to bind" > E dia/**dem**; a ligament is a band of tough tissue either connecting ends of bones at joints, or holding organs in place

    desm/o/plas/ia "the formation of a ligament"

47. **syn/desm/o, syn/desm/os/o:** < G **desm**/os "binder" (46 above) + G **syn** "with or together" (13.24)

    syn/desm/ec/top/ia "the displacement of a ligament"

48. **ligament/o:** < L **ligament**/um < l**ig**/ar/e "to bind, to tie" > E **lig**/at/ion "the tying [of a vessel or tube in order to prevent passage through it]" + **lig**/at/ur/e "a [material used for] tying [a vessel or tube]" + **li**en + al/**ly** + al/**loy** (the last two mean "tie to [13.27]")

    ligament/um cost/o/clav/i/cul/ar/e "a ligament p.t. a collar bone and rib"

49. **apo/neur/o, apo/neur/os/o:** < Mod. L < G **apo/neur/os**/is "the [part which is] from (13.43) the sinew;" this confusing term is explicable when one realizes that G neur/on (4.7) meant "sinew" as well as "nerve;" in current Medical Terminology the word designates a "muscle sheath," the fibrous membrane which covers some muscles and connects them with tendons, thus "moving away from the sinews"

    apo/neur/o/log/y "the study of aponeurosis"

50. **achill/o:** < G **Akhill**eus; according to an apparently Late-classical myth, the Greek hero Achilles was killed by means of an arrow which severed the tendon connecting the back of his (vulnerable) heel bone to the muscles of the calf of his leg

    achill/o/ten/o/tom/y "the cutting of a[nother] tendon and the Achilles' tendon"

ETYMOLOGICAL NOTES — CHAPTER 4

1. **en/cephal/o:** G **en/kephal**/on "the part inside the head" < G **en-** (see on 13.15) + **kephal**/e (see on 2.9)

    equ/in/e en/cephal/it/is "the inflammation of the brain, p.t. horses;" **poli/o/myel/o/en/cephal/it/i**s "the inflammation of the grey [matter of] the brain and spinal cord (3.18)"

2. **cerebr/o:** < L **cerebr**/um "brain" < IE **ker-** "top of the head" (see on 3.4); while the combining form "cerebr/o" denotes the whole brain, E "cerebr/um" is restricted in its application to the two hemispheres of the upper part of the brain (see also 3 below)

    cerebr/al "p.t. the brain;" **cerebr/at/ion** "the [use of the] brain;" **crani/o/cerebr/al** "p.t. the brain and skull"

3. **cereb/ell/o:** < L **cereb/ell**/um (presumably from an older form "**cerebr/ell**/um;" for another example of the loss of "-r-" after "-b-" see on 3.31) "a little (6.28) brain (2 above);" more specifically, this term designates the part of the brain behind and below the cerebrum (2 above)

    spin/o/cereb/ell/um "the part of the cerebellum involving the spine"

4. **membran/o:** < L **membran**/a "skin" shortened (in Latin) < cut/is **membr/an**/a (< L membr/um "organ or part" [> E **member**]) "skin (see on 2.5) p.t. the organs;" adjectives frequently change function to become nouns by this process of phrase shortening, but the loss of original meaning and the gain of the meaning of the suppressed original noun is quite rare (see also on 6.10); membran/um (> E **membran**/e) retains the original sense of the whole phrase in Medical Terminology, as it denotes "the tissue serving as the cover or lining of any organ or part"

    mus/cul/o/membran/ous "p.t. membranes and muscles;" **membran/e/ous** "p.t. membranes"

5. **mening/o:** < G **meninx**, **mening**/os (related to L **membr**/um [4 above]) "membrane;" the word mening/es (note that the plural [see further 6.24]) is specialized in Medical Terminology to denote the membranes covering the brain and spinal cord: the tough outer one, called the dur/a mater ("hard mother"), the middle membrane, or arachn/oid ("resembling a spider[-web]") and the delicate inner one, or pi/a mater

("tender mother"); the dura mater and pia mater were first described in Arabic, and the phrases are translations into Latin of Arabic phrases in which the word for "mother" is used idiomatically to describe the relationship of things (thus the two membranes are the two "mothers" of the arachnoid which is between them)

mening/it/is "the inflammation of the mening/es;" **mening/o/cocc/us** "the coccus [responsible for the inflammation of] the mening/es"

6. **ep/en/dym/o:** < Modern L < G **ep/en/dyma**, ep/en/dymat/os < G **ep/en/dym**/ein "to put on (13.32) upon [or over] (13.2);" applied by Rudolph Virchow (1821-1902) to the membrane lining the central cavities of the brain and spinal cord; another thin layer in the brain (the "grey tunic" on the back of the corpus callosum) is called the "in/dus/i/um" (< L in/du/ere "to put on"), presumably a Modern Latin translation of most of the G word ep/en/dyma

   ep/en/dym/al epi/thel/i/um "the epithelium (12.8) p.t. the ependyma"

7. **neur/o:** < G **neur**/on "tendon, sinew, nerve" (these three structures were originally thought to be identical) < IE **(s)neu** "to twist or wind" > E **nee**dle + **snoo**d + L **nerv**/us "sinew, nerve, string" (> E **nerv**e [8 below], etc.) + G **nema**, **nemat**/os "thread" (> E **nem**/o, **nemat**/o "roundworm")

   neur/os/is "an abnormal condition involving the nerves," or "an abnormal condition involving the emotions" (for this development of meaning, see Chapter 11); **neur/o/log/y** "the study of the nerves"

8. **nerv/i:** < L **nerv**/us < IE **(s)neu-** (see on 7 above)

   nerv/ous system "the system [= set of cells, tissues and organs] p.t. the nerves"

9. **gangli(on)/o:** < G **gangli**/on "knot, tumor" (probably reduplicated) < IE **gel-** "to make round, clench" (see on 2.32); specialized in Medical Terminology to designate a mass of nerve cell bodies; first so used by Galen [died ca. 200 A.D.] who unfortunately used the same word to refer not only to complex nerve centres but also to "knot-like" tumors, and to glands; hence in contemporary Medical Terminology "ganglion" occasionally denotes a cystic tumor containing fluid

   ot/ic ganglion "a ganglion p.t. the ear"

10. **neuron/o:** < G (> E) **neur/on** (see on 7); specialized in Medical Terminology to denote a nerve cell

    neur/on "a nerve cell;" **neuron/ic** "p.t. a nerve cell"

11. **(neur/o)gli/o:** < L (> E) **neur/o/gli**/a "the glue of nerves" < G **neur**/on (7 above) + G **gloi**/a; **gloi**/a "mud, clay" < IE **gloi-** "to, stick, adhere" > L **glo**b/us (5.3) + **glo**mus, **glo**mer/is "ball, sphere" (> E con/**glo**mer/ate, etc.) + Late L **glu**s (> E **glu**e + **glu**tinous)

+ E clay + **cle**ave "to stick" + clammy; perhaps related to IE **gel-** "to freeze" (see on 2.32); in Medical Terminology glial cells, or neuroglia, are cells which are named because they were thought to be "nerve glue"

gli/o/som/e/s "bodies of neuroglia;" **my/o/gli/a** "neuroglia involving muscle"

12. **rad/i/cul/o:** < L **rad/i/cul**/a "a little (6.27) root" (> E: **rad/i/cl**e) < L **radix**, **radic**/is (> E **radish**) < IE **wrad-** "twig, root" > E **root** + G **rhiz**/a (> E **rhiz**/ome) + L (> E) **ra**m/us "branch" (> E **ra**m/i/fic/at/ion, etc.); L **rad**i/us (3.12) is probably related; the word "radicle" is specialized in Medical Terminology to designate the root-like beginning of a nerve

    radic/al "p.t. the roots (of some value);" as applied to change, or to new ideas, "p.t. the roots," hence "thoroughly different" (cf. "to tear up 'by the roots' [= thoroughly]"); **myel/o/rad/i/cul/o/dys/plas/ia** "the defective formation of the radicles of the spinal cord"

13. **sym/path(et)/o, sym/path/ic/o:** < G **syn** "together, with" (13.24) + G **path**/as (see on 1.20) "suffering together;" specialized in Medical Terminology to designate the part of the autonomic nervous system concerned with involuntary responses

    em/path/iz/e "to suffer [as if] inside (13.15) [another's skin];" **tel/e/path/y** "the feeling [of emotions from a] distant [source];" **sym/path/ic/o/trop/ic** "preferentially affecting the sympathetic nerves"

14. **vag/o:** < L **vag**/us "wandering" (> E **vag**abond + **vag**ue + **vag**ary) probably < IE **wag-** "to be bent" probably < IE **wa-** "to bend a part, turn" > L **vari**/us "bent, diverse" (> L **var**/i/ola "smallpox" + E **var**/y + **var**/i/ous + **var**/i/eg/at/ed + probably **var**ix [5.20]) + L **vac**/ill/are (> E **vac**/ill/ate); IE **wag-** + **wa-** are possibly related to IE **wegh-** "to move, go, pull" (> E **weigh** + **way** + **wag**on + **wai**n + L **veh**/ere "to carry" [> E **veh**icle + **vec**tor + **veh**ement] + probably L **ve**n/a [> E **ve**in; 5.18]) and to IE **wei-** "to go" (> L [> E] **via**; for another IE root **wei-**, which may or may not be related, see on 25 below, and for a similar root with a similar meaning see on 3.20); a vag/us nerve (either of the tenth pair of cranial nerves) is a "wandering nerve" because, arising in the brain, it has a wide distribution, innervating that larynx, esophagus, lungs, heart and most abdominal organs

    vag/abond "wanderer;" **vag/o/lyt/ic** "p.t. the disintegration of the vagus nerve"

15. **ophthalm/o:** see 2.12

    ophthalm/o/log/ist "one who specializes in the study of the eye"

16. **opt(ic)/o:** < G **opt/ik**/os < G **opt**/os "seen, visible;" see on 2.12

    opt/ic/al "p.t. the eye;" **opt/o/metr/ist** "one who specializes in the measurement of eyes"

17. **ocul/o:** < L **ocul**/us; see on 2.12

    bin/ocul/ar "p.t. both eyes;" **mon/ocle** "one eye"

18. **cor/e, cor(e)/o:** < G **kor**/e "maiden, girl" > E [names] **Cor**a + **Cor**inna + **Cor**inne (the last two are probably Italian diminutives; see 19 below for the application of this word to an eye-part)

    cor/ec/tom/y "the cutting out of something involving the pupil"

19. **pup/ill/o:** < L **pup/ill**/a "little (6.29) doll" < L **pup**/a "girl, doll" (> E **pup**/a) + **pup**/us "boy" (> L **pup**/ill/us "little boy" [> E **pup**il] + E **pupp**et + **pupp**y); like G kor/e (18 above), pup/ill/a is applied to the eye-part because of the small "doll-like" image of oneself seen reflected in the pupil of another

    pup/ill/o/metr/y "the measurement of the pupil"

20. **ker(at)/o:** < G **keras**, **kerat**/os "horn" < IE **ker-** "top of the head" (see on 3.4); see 21 below for the application of this word to an eye-part

    horn see 3.4; **kerat/o/malac/ia** "the softening of the cornea"

21. **corne/o:** < L **corn**/e/a "horny" (feminine singular adjective) shortened < tunic/a **corn**/e/a "horny coat;" < L **corn**/u < IE **ker-** "top of the head" (see on 3.4); like G **ker(at)**/o (20 above) L corne/o denotes the "horn-like" (because of relative hardness) layer of the eye; more specifically, the cornea is the visible part of the scler/a (22 below), the "hard" outer layer of the whole eye

    horn see 3.4; **corne/o/mand/i/bul/ar** reflex "a reflex p.t. the lower jaw (7.3) involving the cornea" (the tendency of the lower jaw to move to the side away from an irritated cornea when the open mouth is relaxed)

22. **scler/o:** < G **scler**/os "hard;" related to IE **(s)kel-** "to dry" (see on 3.3); the English noun denoting the "hard" outer layer of the eyes is formed from the adjective as if by shortening from a noun phrase, probably on the analogy of "corne/a" < "tunic/a corn/e/a" (21 above)

    scler/o/tom/y "the cutting of the sclera"

23. **retin/o:** < L **ret/in**/a < L **ret**/e, **ret**/is "net" (> E **ret**/i/cul/ar) < IE **ere-** "to loose, separate" > G **ere**m/os "solitary" (> E **her**mit) + probably L **rar**/us (> E **rar**e, etc.); the inmost layer of the eyeball is probably so named because the fibers of the optic nerve which spread into it resemble a net

    ret/i/cul/ar "p.t. a little (6.27) net;" **retin/it/is** "the inflammation of the retina"

24. **uve/o:** shortened < L tunic/a **uv/e**/a "grape[-like] coat;" L **uv**/e/a < L **uv**/a "grape" (> E **uv**/ul/a [7.16]) < IE **ei-** "reddish, colorful" > E **yew**; the vascular and pigmented layer of the eyeball (comprising the iris [25 below], the ciliary body [26 & 27 below] and the choroid [28 below]) is presumably so called because its appearance resembles that of the fruit's flesh (see also on 28 below)

    uve/it/is "the inflammation of the uvea"

25. **ir(id)/o:** < G **iris**, **irid**/is "rainbow" < IE **wir-** (> E **wir**e) < IE **wei-** "to turn, bend" (see also on 14 above and 3.20) > L **vit**/is "vine" (> E **vit**/i/cult/ure "the growing of [grape-]vines") + E **with**e "tough flexible twig of willow (used for for binding);" the G messenger goddess Iris is so called because she manifests herself as a rainbow; the eye-part is presumably so called because of its various "rainbow like" colors

    irid/e/sc/e/nt "beginning to [be like a] rainbow," hence "displaying many colors;" **irid/i/um** "a[n element which gives off a] rainbow[-like assortment of colors while dissolving in acid];" **kerat/o/ir/it/is** "the inflammation of the iris and cornea"

26. **cycl/o:** < G **kukl**/os "circle" < IE **kwakwolo-** reduplicated < IE **kwel-** > "to turn" > E **wheel** (note that the letter sequence "wh" in E almost always reflects the sound sequence /hw/) + L **col**/ere "to turn [soil]" (> E **cul**t/ure + **cul**t/iv/ate + **col**on/y, etc.) + **coll**/um "neck" (> E **coll**/ar, etc.) + G **pol**/os "pivot" (> E **pol**/e + **pol**/ar + **Pol**/ar/is + **pull**ey, etc.) + **pal**in "again" (> E **pal**in/ode + **pal**in/drome) + probably **kol**p/os (> E **col**p/o "vagina" [10.45]); for the occasional cognate equivalence of L /k/ and G /p/ see on 1.39 ; "circle" is unrelated; American E **Ku Klux** Klan probably < **kukl**/os clan "family circle" (the transformation of /s/ to /ks/ [written "-x-"], made for the sake of euphony, is seen also in "xer/ox" < G xer/os "dry," while a similar impulse probably lies behind "made-up" names such as "Kleenex" [probably < "clean"]); "cycl/o" denotes the ciliary body (which surrounds the iris; see also on 2 below) because of its circular shape as seen from the front or rear

    bi/cycl/e "a [machine with] two wheels;" **cycl/o/pleg/ia** "the paralysis of the ciliary body"

27. **cili/o, cili/ar/o:** < L **cili**/ar/is "p.t. a **cili**/um or the **cili**/a" < L **cili**/um "eyelid" (> L [> E] **cili**/a "eyelashes;" here "tiny hair-like outgrowths of certain cells") perhaps < IE **kel-**"to cover, conceal" > L **cell**/a "small room, hut" (> E **cell** + con/**ceal** + **cla**ndestine + oc/**cul**t, etc.) + G **kal**ypt/ein "to cover" (> E apo/**cal**yps/e + **Kal**ypso) + E **hall** + **hell**

+ **hull** + Vall/**hall**/a "hall of the slain;" the ciliary body, a muscle which surrounds and controls the shape of the lens, is attached to it by thin ligaments which look like a large number of hairs radiating out from the lens

super/cili/ous "p.t. [the part] above (13.47) the eyelids," hence "characterized by raised eyelids, disdainful or contemptuous;" **cili/o/stat/ic** "p.t. the stopping of [the movements of] the ciliary body"

28. **chor/oid/o, chori/o:** shortened < G **khor/oid**/es chiton "tunic resembling afterbirth" < G **khori**/on "afterbirth" (> E **chori**/on); the inner part of the middle layer of the eyeball is so called because, as a vascular membrane, it resembles the vascular membrane (or "chorion") enveloping a fetus (see also on 24 above, and note that "choroid" is sometimes used to refer to the whole of the vascular layer, including the ciliary body [26-27 above], the iris [25 above] and the uvea [24 above]; in this naming system "uvea" is then in turn restricted to the inner part)

neur/o/chor/oid/it/is "the inflammation of the choroid and a nerve"

29. **con/junct/iv/o:** > Late L **con/junct/iv**/a shortened < L membran/a **con/junct/iv**/a "a joining-together (13.28) membrane;" denotes the mucous membrane which lines the inner surface of the eyelid and covers the front part of the eyeball, therefore "joining together" the eye and its socket; L **junct-** (a past participle) < L **iung**/ere "to bind together" (> E **join** + **joint** + **junct**/ion, etc. + L **junct**/ur/a) < IE **yug**o- > E **yok**e + G (> E) **zeug**ma + **zyg**/on (> E **zyg**/ote + **zyg**omat- [8.11]) + Sanskrit (> E) **yog**/a "union" + **yog**/i "uniter" + L **iug**/um "yoke" (> E con/**jug**/al, etc.)

con/junct/ion "a joining together;" **con/jug/al** "yoked together;" **scler/o/con/junct/iv/it/is** "the inflammation of the conjunctiva and sclera"

30. **canth/o:** < Modern L < G **kanth**/os < IE **kantho-** "corner, bend" > Late L **canth**/us > E **cant** "corner, tilt" + **cant**/i/lever + **cant**een "corner [of a military camp, serving food and drink]," hence "small flask [originally a piece of military equipment]" + **cant**/on "corner [or district, hence state of the Swiss Republic];" in Medical Terminology, a canthus is either "corner" of the eye

canth/o/plast/y "the surgical repairing of a canthus"

31. **phac/o:** < G **phak**/os "lentil," so called from the shape; an interesting parallel is E "lens" < L lens, lent/is "bean" (> Late L lent/i/cul/a "small [6.27] bean" [> E lent/il])

phac/ec/tom/y "the cutting out of the lens"

32. **dacry/o:** < G **dakry**/on < IE dakru- > E **tear** + Old L **dacru**ma (> L lacrim/a [33 below] > E **lacri**m/ose, etc.); the Latin shift from /d/ to /l/ is also seen in L lingu/a "tongue" (7.12) < IE dnghwa > E tongue, as well as in L Ulysses < G Odysseus and L pilot/es (see on 2.34) < G pedot/es

    lacrim/ose see on 33 below; **rhin/o/dacry/o/lith** "a calculus, involving tears, of the nose"

33. **lacrim/o (= lachrym/o):** < L **lacrim**/a "tear" (see on 32 above); the spelling "lachry-" is probably a "learned alteration" on the analogy of G "dakry-"

    lacrim/os/e (= lachrym/ose) "full of tears;" **lachrym/at/or** "something which [produces] tears" (= "tear gas"); **sunt lacrim/ae re/rum** (Vergil, Aeneid 1.462) "tears are of things," hence "tears are [an inherent aspect] of circumstances"

34. **dacry/o/cyst/o:** < G **dacry**/on (32 above) + **kyst**/is "sac, bladder" (10.15) "a cyst or sac of tears"

    dacry/o/cyst/ec/tas/ia "the distention of a tear sac"

35. **tympan/o:** < G **tympan**/on "drum" (> E **tympan** + **tympan**/um + **tympan**/i + **timb**re, etc.) < G **tup**t/ein "to strike" (> E **typ**/e + stere/o/**typ**/e, etc.) < IE **(s)teup-** "to strike, butt, hit, chop" > E **steep** + **stub** + **stab** + **stoop** + **step** + **stamp** + **stump** + **stub** + **stem** + **stun**t + **sto**ck + **staf**f + **to**il + L **stup**/ere "to be struck senseless" (> E **stup**/id + **stup**/or + **stup**/i/fy + **stup**/end/ous, etc.) + L **stu**d/i/um "zeal" (> E **stu**d/y + **stu**d/ent, etc.; for the metaphor, cf. perhaps "to beat an idea to death") + apparently G **staph**yl/e > E **staph**yl/o "uvula" (see on 7.15); the term "middle ear" usually denotes the whole "drum", but the word "eardrum" is sometimes mistakenly used to refer to the tympanic membrane (39 below)

    timpan/i (< Italian < L < G tympan/on) "drums" (specialized to designate "kettle-drums," especially a set of variously piched ones used in symphonic orchestras); timbrel "little drum;" **oste/o/tympan/ic** "p.t. the middle ear and bones"

36. **malle/o:** < L **malle**/us "hammer" > E **malle**/able + **mall**/et + **malle**/ol/us + **maul**; the hammer of the Norse God Thor is called **Mjol**nir, the first part of which may or may not be related

    malle/able "able to be easily hammered;" **mallet** "a little hammer;" **malle/ol/us** "[a bone shaped like] a little (6.30) hammer;" **tympan/o/malle/al** "p.t. the hammer and middle ear"

37. **incud/o:** < L **incus**, **incud**/is "anvil" < L **in/cud**/ere "to strike onto" < **in-** (13.32) + **cud-** < IE **kau-** "to hew, strike" > E **hew** + **hay** + L **caud**/ex "[tablet made by] splitting [wood]" (> E **cod**ex + **cod**/i/cil + **cod**e, etc.)

    malle/o/incud/al "p.t. the anvil and hammer"

38. **sta/ped(i)/o:** < L **sta/pes**, **sta/ped**/is "foot-stand or stirrup" < L **sta-** (< **st/a**r/e "to stand" < IE **sta-** [see 1.53]) + **ped-** (< L **pes**, **ped**/is "foot" < IE **pod-** [see 2.34])

    syn/desm/os/is tympan/o/sta/ped/i/a ("-i/a" is a variant of "-e/a" [1.86]) "a ligament p.t. the stirrup and middle ear"

39. **myring/o:** > G **myrinx** "tympanic membrane"

    myring/o/dermat/it/is "the inflammation of skin and the tympanic membrane"

ETYMOLOGICAL NOTES — CHAPTER 5

1. **hem(at)/o:** < G **haima**, **haimat**/os

    hem/o/rrhag/e < hem/o/rrhag/ia "the rapid flowing of blood;" **hem/o/phil/i/ac** "having a propensity to (11.24) [lose] blood"

2. **sangu/in/o, sangu/i:** < L **sanguis**, **sanguin**/is; one of the ancient "four humors" (the others were phlegm, black bile and yellow bile [for "bile" see 9.38]), blood was associated with confidence and hope, and in medieval times reddish complexions were felt to be associated with a preponderance of the humor and therefore of those mental qualities; hence **sanguin**e + **sang**-froid, etc.

    sangu/in/e "bloody," hence "passionate and cheerful;" **sang- froid** (< French < L) "cold blood," hence "cool dispositions;" **sangu/i/fer/ous** "bearing (8.23) blood"

3. **hem/o/glob/in/o:** < **hem**/o (1 above) + L **glob**/ul/us + **-in** (1.13) > E **hem/o/glob/in** "a substance, which is globular, of blood;" L **glob**/ul/us "a little (6.26) ball"- < L **glob**/us < IE **gloi-** (see on 4.11); hemoglobin, found in red blood cells, is the compound of iron and amino acids which carries oxygen from the lungs (and carbon dioxide back to them), and which gives blood its red color

    globe "a ball;" **hem/o/glob/in/o/metr/y** "the measurement of hemoglobin"

4. **plasm(at)/o, plasm/a:** < G **plasma**, **plasmat**/os "something molded" (> E **plasma**) < G **plass**/ein "to form" (see on 1.45); the word plasma is specialized in Medical Terminology to designate the fluid part of blood (as distinct from the corpuscles) which carries substances other than oxygen and carbon dioxide through the body

    plast/ic "molded" (see 1.45); **plasm/ap/her/es/is** "the removal of (8.28) plasma [from blood]"

5. **thromb/o:** < G **thromb**/os "clot" < IE **dherebh-** "to coagulate" (see on 1.17); clotting is a natural and useful response whenever a blood vessel begins to leak (as when a cut stops bleeding), but when a clot forms internally it may break away and move through the blood system, possibly causing a dangerous blockage in any part of the body

   thromb/oid "resembling a clot;" **thromb/o/plast/in** "a substance which forms of clots"

6. **thromb/o/cyt/o:** < E **thromb/o/cyt/e** "a cell [involved in the formation] of clots;" such cells, which are found in blood but contain no hemoglobin, are round or oval discs called "plate/let/s" ("little plates") from their share (for the etymology of "plate" see on 1.45)

   thromb/o/cyt/ic "p.t. platelets;" **thromb/o/cyt/o/pen/ia** "a deficiency of platelets"

7. **sphygm/o:** < G **sphygm**/os "throbbing, pulse" possibly < IE **spheig-** (see on 9.33)

   sphygm/o/meter "an instrument for measuring the pulse;" **sphygm/o/gram** "a record of the pulse [rate]"

8. **card(i)/o:** < G **kard/i**/a < IE **kerd-** > L **cor**, **cord**/is (> E **cordi**/al "[good-hearted" or "[a] hearty [drink]" + **cord**/ate + [through Old French] **cor**e) + E **heart**; though W.B. Yeats was reputedly a poor Latinist, the juxtaposition of the last two words of "The Lake Isle of Innisfree" is perhaps intentional: "... I heard it in the deep **heart**'s **cor**e"

   cardi/ac "p.t. the heart;" **cardi/o/vas/cul/ar** "p.t. the vessels (15 below) and heart"

9. **aort/o, aort/ic/o:** < G **aorter-** "strap, hanger" < G **air**/ein "to raise, attach" > (probably) L **arteri**/a (> E **arter**/y [16 below]); the medical usage of the words "aorta" and "artery" comes either from the idea that the vessels so named "raise" blood from the heart, or (more likely) because they were thought to be tubes from which the heart "hangs;" these vessels were originally thought to contain only air (hence both G aort/a and L arteri/a originally designated the windpipe), because they are empty of blood in dead bodies; when their actual function was understood, G aort/a was specialized in Medical Terminology to designate the main vessel which carries oxygen-rich blood from the heart to the other arteries for distribution to the rest of the body

   cardi/o/aort/ic "p.t. the aorta and heart"

10. **valv(ul)/o:** < L **valv**/a "door-leaf" (> E **valv**e) + **valv**/**ul**/a "a little (6.26) valve" < IE **wolg-** "to turn, roll" > E **walk** + L **volv**/ere "to turn, roll" (> E **vaul**t + con/**volu**t/ion + e/**volv**/e + in/**volv**/e + re/**volv**/e, etc. + L [> E] **vulv**/a [10.48]) + G (> E) **hel**ix (> E

helic/o/pter) + **hel**minth "worm" (> E **hel**minth/o); in Medical Terminology the force of the diminutive in "valv/**ul**/a" is not felt, so that the words "valv/e" and "valv/ul/a" are used interchangeably, without reference to size

valv/ul/ar "p.t. a valve;" **cardi/o/val/ul/it/is** "the inflammation of valves of the heart"

11. **ventr/i/cul/o:** < L ventr/i/cul/us "a little (6.27) belly" < L **venter**, **ventr**/is (see also 9.3) < IE **udero-** "belly" > L (> E) **uter**/us (10.42) + probably G **hyster**/a (> E **hyster**/o [10.40]); the lower chambers of the heart, which pump blood into the arteries, are called "little bellies" because of their shape

    ventr/i/log/ist "one who speaks [from] the belly;" **ventr/i/cul/o/scop/e** "an instrument for examining ventricles"

12. **peri/card(i)/o:** < Modern L (< G) peri/cardi/um "a [part] surrounding (13.7) the heart (8 above)"

    peri/meter "the measurement of [a line] surrounding [something];" **peri/scop/e** "an instrument for examining [one's] surrounding;" **stern/o/peri/cardi/al** "p.t. the pericardium and sternum"

13. **my/o/card(i)/o:** < (probably on the analogy of peri/cardi/um [12 above]) Modern L **my/o/cardi**/um "the [part of the] heart [which is] muscular"

    my/o/cardi/o/graph "an instrument for recording the myocardium"

14. **angi/o:** < G **ang**/os "vessel"

    angi/o/gram "a record of the vessels;" **angi/oma** "a tumor (12.73) involving the vessels"

15. **vas/o, vas/cul/o:** < L **vas** "vessel, container"(> E **vas**e + probably **va**gin/a [10.46]) + **vas**/cul/um "a little (6.27) vessel" (> E **vess**el); the force of the diminutive in the combining form "vas/cul/o" is not usually felt, except when it is used in the words and phrases of the *Nomina Anatomica*, when it is always observed

    vas/e "a container;" **vas/ec/tom/y** "the cutting out of a vessel [usually the one which carries semen from the testes, called the vas deferens (10.25)];" **cardi/o/vas/cul/ar** "p.t. the vessels and heart (8 above)"

16. **arter(i)/o:** < L **ar/ter/i**/a probably < G **air**/ein "to raise, attach" (see on 9 above); an alternative etymology derives the word < G **aer** "air" (12.3) + "**-ter**" (perhaps on the analogy of the last syllable of the word "ure**ter**" ["urine carrier;" 10.14]), on which theory the vessels would be so called because the ancients, seeing them empty in

corpses, assumed that they were "air-carriers" or "air-pipes" (but this is probably a "false [or 'popular'] etymology"); arteries, necessarily strong because blood is pumped into them, have four layers including one made of tough elastic tissue

vertebr/o/arteri/al "p.t. arteries and vertebrae;" **ligament/um arteri/os/um** "a ligament p.t. an artery"

17. **phleb/o:** < G **phleps**, **phleb**/os "vein" < IE **bhel-** + **bhle-** "to blow, blow up, swell" > E **blow** + **bla**st + **bla**dder + **ball** + **boll** + **bowl** + **blo**at + L **flu**/ere "to flow" (> E **flu**/ent + **flu**id + in/**flu**/ence + in/**flu**/enz/a [a virus formerly thought to be the cause of evil things, or "in/flu/ences," which "flow in" though open windows at night], etc.) + **fl**/are "to blow" (> E **fla**t/ulent + de/**fla**te + in/**fla**te, etc.) + **foll**/is "bellows" (> E **fool** + **foll**y + **foll**/i/cle) + G **phall**/os (> L [> E] **phall**/us [10.30]); probably related is IE **bhle-** "to swell, sprout" > E **bla**de + **bloo**m + **bli**ster + **bloo**d + **blee**d + **bloa**t + L **flo**r, **flo**r/is (> E **flou**r + **flow**er + **flou**rish, etc.) + G (> E) **phyll**/on; by contrast to arteries, veins have only three layers and also feature valves to keep the lower-pressured blood which flows through them moving in the right direction

phleb/it/is "the inflammation of veins" (this word became well-known during the final months of the presidency of Richard Nixon, when the affliction interfered with his ability to respond to charges concerning Watergate); **phleb/o/scler/os/is** "the hardening of [the walls of] the veins"

18. **ven/o:** < L **ven**/a (> E **vein**) probably < IE **wegh-** "to go" (see on 4.14)

veh/i/cl/e "a little (6.27) carrier;" **intra/ven/ous** "inside (13.16) a vein"

19. **cap/ill/ar/o:** shortened < L vas (15 above) **cap/ill/ar**/i/um "a vessel p.t. little (6.29) hairs;" the adjective has undergone a change of function to become an English noun denoting any of the tiny, hair-like vessels connecting arteries and veins

chori/o/cap/ill/ar/i/us "p.t. capillaries of the choroid"

20. **varic/o:** < L **varix**, **varic**/is "swollen vessel" probably < IE **wa-** "to bend, turn" (see on 4.14)

varic/os/e < L varic/o/us "full of varic/es;" **neur/o/varic/os/is** "an abnormal condition involving varices and nerves"

21. **cirs/o:** < G **kirs**/os "enlargement of a vein"

cirs/oid "resembling a varix;" **cirs/o/tom/e** "an instrument for cutting a varix"

22. **lymph/o, lymphat/o:** < L **lymph**/a (< Old L **limp**/a) "clear water" (> E **limp**/id "[perfectly] clear, clear [& simple]") + **lymph**/a/t/us "watered" (participle of lymph/are < **lymph**/a); the evolution of these combining forms seems to feature two separate cases of false or "popular" etymology: the Romans altered the spelling of

their word "limp/a" (or "lump/a"), meaning "spring of clear water," on the analogy of unrelated G nymph/e (10.50), because of the many mythical associations between nymphs and springs, while the modern use of "lymphat-" is on the analogy of words in "-mat-" (derma, dermat/os, for example); in Medical Terminology lymph is a clear, yellowish fluid which looks like blood plasma

hem/o/lymph "the lymph and blood (considered together)"

23. **lymph/angi/o:** (a modern coinage) "vessel (14 above) of lymph (22 above);" lymph vessels collect fluid from body tissues and carry it into the veins

    thromb/o/lymph/ang/it/is (note the coalescence < … angi-) "the inflammation of a lymph vessel, involving a clot"

24. **lymph/aden/o:** (a modern, and erroneous, coinage) "gland (29 below) of lymph (22 above);" what are now called "lymph nodes" (small structures along the lymph vessels, which produce lymphocytes and antibodies and serve as filters) were originally, but wrongly, thought to be glands

    lymph/aden/it/is "the inflammation of a lymph node"

25. **splen/o:** < G **splen** "milt, spleen" (> E **spleen**) < IE **sp(h)elgh-** > G **sphlankhn**/on "entrail" (> E **splanchn**/o [9.7]) + probably L **lien**, **lien**/is "milt" (> E **lien**/o [26 below]; alternatively L **lien** may derive directly from G **splen**; E "milt" is the milky fluid filling the reproductive glands of male fish; possibly applied to the spleen because of a real or imagined resemblance between the substances involved; the use of the word to describe a mental state, as in "full of spleen," derives from the medieval view that the organ was the source of ill-humour and irritability; hence "splen/et/ic")

    splen/et/ic (< splen/es/ia) "p.t. an abnormal condition involving the spleen;" **cardi/o/splen/o/pex/y** "the fixation of the spleen and heart"

26. **lien/o:** see on 25 above

    lien/o/malac/ia "the softening of the spleen"

27. **(endo)crin/o:** < G **endo-** "inside" (13.14) + G **krin**/ein "to separate" (> E **cris**/is); G **krin-** < IE **(s)krel-** "to sift, separate" < IE **(s)ker-** "to cut" > L **cern**/ere, cret- (> E dis/**cern** + dis/**cre**t/e + se/**cre**t/e + se/**cre**t/ion, etc.) + (probably) **scurr**/a "buffoon" (> E **scurr**/il/ous) + G **kri**t/ik/os (> E **cri**t/ic, etc.) + L **carn-** "flesh" (> E **carn**/age + **carn**/al + **carn**/at/ion + **carn**/i/val [< Medieval L **carn**/i/lev/ari/um "a

flesh-removing [festival]" but associated by popular etymology with "**carn**/em val/e" "flesh, farewell"] + **carr**/ion + **cron**e, etc.) + E **shear** + **shor**t + **harv**est + **scurf** "dry shed skin scales" (dandruff, e.g.; > **scurv**y)

endo/crin/e (note that the word is usually used as an adjective, due to confusion of its ending with the adjectival termination "-in/e" [1.8]) "secreting inside (13.14)" (specialized to describe ductless glands which produce secretions which go directly into the blood stream, as opposed to "ex/o/crin/e" glands, which "secrete outside [13.12]" through ducts); **endo/crin/o/log/y** "the study of secretions"

28. **hormon/o:** < G **horm**/on "urger, stimulator" (specialized to designate "a substance which excites a reaction in the body") < IE **ser-** "to flow" > L (> E) **ser**/um "whey" (12.17)

    hormon/o/therapy "treatment by means of hormones"

29. **aden/o:** < G **aden** "gland"

    aden/oid "resembling a gland;" **aden/oid/s** "several [growths of lymphatic tissue in the upper throat] resembling glands;" **dacry/o/aden/alg/ia** "pain in a gland involving tears"

30. **gland/ul/o:** < L **gland/ul**/a "a little (6.26) acorn" < L **glans**, **gland**/is (> E **gland** + **glans** [10.32]) < IE **gwel-**"oak, acorn" > G **balan**/os (10.32); for the occasional cognate relationship of L /g/ and G /b/ see on 1.39; the modern application of the word to what we now call "glands" is probably due to the fact that L glans came to denote any vaguely acorn-shaped nut or small fruit, which some glands in turn vaguely resemble; note that the force of the diminutive in "gland/ul/a" is not felt in Medical Terminology

    gland/ul/ar "p.t. a gland;" **gland/ul/a con/junct/iv/al/is** "a gland p.t. the conjunctiva"

31. **pine/al/o:** shortened < L gland/ul/a **pin/e/al**/is "a gland p.t. (in the sense of 'resembling') a [small] **pine**[cone];" L **pin/e**/al/is < L **pin**/us (> E **pin**e-tree + **pin**e/apple "fruit [resembling] a pine[cone]") < IE **pitsnus** < IE **pi-** "to be fat, distended" > E **fa**t + L **pix**, **pic**/is (> E **pitch**) + **pit**uit/a "phlegm" (> E **pit**uit/ar/y [32]) + G **pim**el/e "lard" (> E **pim**el/o "fat" [12.21])

    pine/al/o/path/y "a disease of the pineal gland"

32. **hypo/phys(e)/o:** < G **hypo/phys**/is "something which grows below (13.4) [the brain];" G **phys**/is (> **phys**/ic/s "things which have grown or become" [translating G ta **phys**/ik/a] + **phys**/ic/al + **phys**/i/o/therap/y, etc.) < G **phy**/ein "to grow" < IE **bheu-** "to grow become" > L **fi**/er/i "be made" (> E **fi**at, etc.) + E **be** + **bo**nd/age + G **phy**t/on "plant" (> E neo/**phy**t/e "a new plant or growth"); called the "pituit/ar/y gland"

("a gland p.t. phlegm [< L pituit/a; see on 31 above]") because it was once thought (erroneously) to secrete the mucus which is actually produced by exocrine glands in the respiratory tract

phys/i/o/log/y "the study of growth [and its results];" **phys/ic/al** "p.t. [that which has] grown," hence "natural;" **neur/o/hypo/phys/ec/tom/y** "the cutting out of the pituitary gland and nerves"

33. **par/ot(id)/o:** shortened < L gland/ul/a **par/ot**/id/e/a "a gland (30 above) beside [and in front of] the ear" < G **par**a "beside" (13.9) + G **ous**, **ot**/is "ear" (2.13); note that the parotid glands are actually exocrine, rather than endocrine, glands

    par/ot/it/is "the inflammation of the parotid glands" (a symptom of infection with mumps virus)

34. **thyr(oid)/o:** shortened < L gland/ul/a **thyr/oid**/e/a "a gland (30 above) resembling a shield;" L **thyr**/oid/e/a < G **thyr**/e/os "a [large shield shaped like a double] door" < G **thyr**/a "door" < IE **dwhor-** > E **door** + Old L **for**/a (> [through French] E **for**eign [originally "out-of-doors"] + **for**/close "shut the doors" + **for**feit); this gland, whose shape to modern eyes perhaps more readily suggests that of a butterfly, is located below the larynx and on both sides of the windpipe (for which see Chapter 6), across the front of which its two parts are connected by strands of tissue

    stern/o/thyr/oid "p.t. the thyroid gland and the sternum" (for "-oid" here translated "pertaining to" see the Notes to Chapter 8); **cartilago thyr/oid/e/a** "a cartilage p.t. the thyroid gland"

35. **para/thyr/o, para/thyr/oid/o:** shortened < L gland/ul/a **para/thyr/oid**/e/a "a gland (30 above) beside (13.9) [the gland] resembling a shield (34 above);" the parathyroids are located in or near the corners of the thyroid

    para/thyr/oid/ec/tom/iz/e "to cut out the parathyroid glands"

36. **thym/o:** < G **thym**/os, a word of uncertain meaning; possibly related to G **thym**/os "spirit, soul;" either or both might be related to G **thym**/a < **thu**/ein "make sacrifice" < IE **dheu-** "to smoke, be dark or murky" > L **fum**/us (> E **fum**e "smoke, gas") + E **dum**b + **du**ll + **dow**n "soft dust-like feathers" + **dwe**ll (< Old E **dwe**ll/an "to obscure"); given its location, it seems to match the Homeric **thym**/os; another meaning of G **thym**/os is "**thym**e," which also denotes a mixture of the herb with honey and vinegar, used in sacrifices—was the gland so used, or perhaps otherwise specially used, in sacrifices?; animal thymus, cooked, is called "sweetbread"

    thym/o/kin/et/ic "p.t. the movement of secretions from the thymus"

37. **ad/ren/o, ad/ren/al/o:** shortened < L gland/ul/a **ad/ren/al**/is "a gland at (13.27) the kidney (10.11);" the gland is more accurately "above" the kidney (see 38 below)

    ren/al "p.t. the kidney;" **ad/ren/al/in(/e)** "a substance [secreted by] the adrenal gland" (the word, spelled without the final "-e," coined in 1901 by the American chemist who first isolated the substance, Dr. J. Takamine, is a trade name held by Park-Davis; Takamine, who apparently added the final "-e" for use in general English, seems to have mixed things up [perhaps influenced by the last syllable of his own name?]; "ad/ren/al/in" [1.13] would be a suitable generic name, while the adjective "ad/ren/al/in/e" [1.8] would be more appropriate for a trade name; in any case the word, without the final "-e," is probably a good example of those trade names which have passed into the general vocabulary [cf., for example, the verb "to xerox"])

    sym/path/o/ad/ren/al "p.t. the adrenal glands and sympathetic nerves"

38. **supra/ren/o, supra/ren/al/o:** shortened < L gland/ul/a **supra/ren/al**/is "a gland (30 above) above the kidney (10.11)"

    supra/ren/o/trop/ism "the tendency to preferentially affect the adrenal glands"

39. **insul/o:** < L **insul**/a "island" (> E **isl**et + **insul**/ate + **isol**/ate, etc. [but not, surprisingly, "is-land," which is a native E word meaning "water-land"]); perhaps shortened from L terr/a **in sal**/o "land in salt[sea];" specialized in Medical Terminology to denote the tiny "island-like" glands in the pancreas (9.21) known, after histologist Paul Langerhans, 1847-88, as "the islets of Langerhans"

    insul/ar "p.t. an island;" **insul/at/e** "to [make into] an island" ("isol/at/e" is a variant form); **pen/insul/a** "an almost (1.29) island;" **insul/o/path/ic** "p.t. a disease of the islets of Langerhans"

40. **gonad/o:** < G **gon**/e "seed" (> E **gon**/ad "[the organ which] produces [offspring]") < IE **gen-** "to produce, bear" (see on 1.23); "gonad" is general word, denoting both the ovaries (10.37) and testes (10.23)

    gonad/o/therap/y "treatment by means of secretions from the gonads"

ETYMOLOGICAL NOTES — CHAPTER 6

1. **rhin/o:** see 2.14

2. **nas/o:** < L **nas**/us (> E **nas**/al + **nas**/turt/ium) < IE **nas** "nostril" > E **nose** + **nos**/tril "nose-hole" + Romany (= Gypsy) **nak** "nose" (> British Slang **nark** "informer" [> perhaps late 20th century North American Slang **narc** "undercover police officer specializing in drugs;" but "narc" may also be < "narc/ot/ic," for which see 11.9])

   nas/al "p.t. the nose;" **nas/turt/ium** < L nas/i/tort/ium "nose-twist" (from the pungent odor); **ocul/o/nas/al** "p.t. the nose and eye"

3. **sin(us)/o:** < L **sin**/us "a bending, curve, fold" (> E **sin/us** + **sin**/e + **sin/u**/ous + in/**sin/u**/ate, etc.); specialized in Medical Terminology to denote any cavity or hollow formed as if by bending or folding, especially (but not always) the cavities in the skull which open into the nasal passages

   sin/e "curve" (the meaning in mathematics derives from the "curve" produced by a graphic representation of the sine ratio); **sin/u/ous** "full of curves;" **in/sin/u/ate** "to [bring] in (13.32) [by means of a] curve [= 'indirectly'];" **dacry/o/sinus/it/is** "the inflammation of the sinuses, involving tears"

4. **sept/o:** < L **sept**/um "enclosure, hedge;" specialized in Medical Terminology to denote any "wall" or partition between two cavities or parts, especially (but not always) the one between the two nasal cavities

   sept/um nas/al/e "the septum p.t. the nose"

5. **antr/o:** < L **antr**/um < G antr/on "cave;" specialized in Medical Terminology to denote any cavity, especially (but not always) any of the nasal cavities

   pros/op/antr/it/is "the inflammation of something involving an antrum of the face"

6. **pharyng/o:** < G **pharynx**, **pharyng**/os "throat" < IE **bher-** "to scratch, cut with a sharp point; bore" (the connection presumably being because the throat, viewed from the top, looks a bit as though it had been "bored out" by a sharp tool) > L **for**/are "to bore" (> L [> E] per/**for**/ans + E per/**for**/ate "to bore through," etc., + **for**/amen "opening") + E **bore**; "pharynx" is specialized in Medical Terminology to denote the upper throat, specifically the part between the mouth and esophagus (including the opening into the larynx and trachea)

   pharyng/o/scop/e "an instrument for examining the pharynx"

7. **nas/o/pharyng/o, rhin/o/pharyng/o:** modern coinages (from 1, 2 and 6 above) designating the "nas/o/pharynx" (= "the part of the pharynx involving the nose," that is, the upper part of the pharynx, or, more specifically, the area above and forward from the pharynx proper, above the soft palate and behind the nasal passages)

   rhin/o/pharyng/it/is "the inflammation of the nasopharynx"

8. **epi/glott(id)/o:** < Modern L (< G **epi-** "upon" [13.2] + G **glott**is) "the part upon the glottis;" G (> E) **glott**is "the opening between the vocal cords" < G **glott**/a "tongue," hence "words, language" (Attic G variant of **gloss**/a > E **gloss** "words [added to a text]" + **gloss**/ary "place for words" + **gloss**/o- "tongue" [7.11]); the "glottis" is so called because the voice, originally associated with the tongue, actually originates between the vocal cords (cf. the concept of "voicing" in Linguistics); the "epi/glottis" is a thin triangular, or leaf-shaped, cartilaginous "lid" which covers the glottis and therefore the top of the wind-pipe during swallowing

   glott/al "p.t. the glottis" (as in "glottal stop," describing the medial sounds in the words "oh-oh" and [when pronounced with an Irish accent] "bottle"); **thyr/o/epi/glott/ic** "p.t. the epiglottis and the thyroid gland"

9. **laryng/o:** < G **larynx**, **laryng**/os, denoting the "voice box," or the muscular and cartilaginous structure containing the vocal cords (the outer part of which forms the "adam's apple")

   laryng/it/is "the inflammation of the larynx [often associated with a temporary loss of voice]"

10. **trach/e/o:** < L **trach/e**/a shortened < G arteri/a **trach/ei**/a "rough wind-pipe (see on 5.9);" G **trach-** "rough" < IE **dher-** "dark, dirty" > E **dra**b + **dar**k + **dir**t + **dre**gs; note that the adjective in the original phrase has become a noun, losing its own meaning and taking on that of the now-suppressed noun (see 4.4 for another example of this phenomenon); the windpipe is called "rough" because of the stiff rings of cartilage which make up its walls; note that "trache/o" in Medical Terminology very occasionally retains its original meaning of "rough"

    trach/e/o/tom/y "the cutting of the trachea [to make an opening to facilitate breathing];" **trach/e/oma** "a rough tumor (12.73) [of the cornea and conjunctiva]"

11. **bronch/o, bronch/i:** < Modern L < G **bronch**/os "wind-pipe;" the trachea (10 above) divides into two bronch/i (for the plural see 21 below); these further subdivide into numerous bronch/i/ol/es (for the diminutive see 30 below) which end in air sacs called alve/ol/i

    bronch/it/is "the inflammation of the bronchi;" **bronch/o/-pne/umon/ia** "an abnormal condition involving the lungs (12 below) and bronchi"

12. **pne/um(on)/o:** < G **pne/umon** "lung" < G **pn**/ein "to breathe" (> E **pne**/o "breathing" [19 below] + G **pne**/uma, **pne**/umat/os "breath" [20 below, > E **pne**/umat/ic, etc.]) < IE **pneu-** "to breathe, wheeze" > Old E **fneo**s/an "to sneeze" > E **snee**ze; initial "s-" in "**s**neeze" probably resulted from a "spelling-induced sound-change," by confusion of the letter "f", with the "long 's'" (which resembles "f") used

in 16th and 17th century books for the sound /s/ in initial and medial positions; notice that the "short form" of both "pneum(on)/o" and "pneum(at)/o" (20 below) is identical, which accounts for the secondary meanings ascribed to each in AMT

pne/umon/ia "an abnormal condition involving the lungs;" **pne/um/ec/tom/y** "the cutting out of a lung;" **pne/um/o/thorax** "the part of the chest involving the lungs"

13. **pulm(on)/o:** < L **pulmo**, **pulmon**/is "lung" < IE **pleumon** "floater, lung" < IE **pleu-** "to move forward, swim, float" < IE **pel-** "to flow, run" > E **fl**ow + **fl**oat + **fl**y + **fl**utter + **fl**eet + **fl**ood + **fl**it + **fl**ot/sam; from a different sense of the root **pel-** ("to flow, fill") come a host of other words (see on 3.25); an E dialectal word for "lungs" is "lights" (= "parts which are not heavy"), reflecting the IE observation that the lungs are lighter than other tissues (and E "lungs" + "light" [= "not heavy"] share a common IE root)

    pulmon/ary valv/o/tom/y "the cutting of a valve p.t. the lungs"

14. **pleur/o:** < G **pleur**/a "rib, side;" specialized in Medical Terminology to designate the thin serous double membrane which covers each lung and lines the chest cavity

    pleur/isy < Late L pleur/is/is < G pleur/it/is "the inflammation of the pleura;" **peri/cardi/o/pleur/al** "p.t. the pleura and pericardium"

15. **phren/o:** < G **phren**, **phren**/os "midriff, diaphragm; mind" (the Greeks felt that mental activity originated in the midriff [perhaps on account of phenomena such as the one we now sometimes call "butterflies in the stomach;" according to people who claim to have experienced "speaking in tongues," this phenomenon seems to emanate from the region of the diaphragm]) > E **phren**sy + **fren**zy + **phren**etic + **fren**etic; specialized in Medical Terminology to denote the diaphragm in some contexts and the mind (see 11.2) in others

    frenzy < Middle E fren/es/ie < Medieval L phren/es/ia < G phren/it/is "the inflammation of the diaphragm," hence "madness" ("phren/et/ic" has a similar etymology); **splen/o/phren/ic** "p.t. the diaphragm and spleen;" **cost/o/phren/ic** "p.t. the diaphragm and ribs"

16. **dia/phragm(at)/o:** < Late L **dia/phragma** (> E **dia/phragm**) < G **dia-** "through, across" (13.46) + **phragma**, **phragmat**/os "fence;" specialized in Medical Terminology to denote any partition, but especially the dome-shaped muscle that separates the thoracic and abdominal cavities and whose contractions partly control breathing

    cardi/o/dia/phragmat/ic "p.t. the diaphragm and heart"

17. **medi/ast/in/o:** < Medieval L **medi/ast/in**/us "in the middle" < L **medi**/us "middle" (> E **medi**/an + **medi**/ate + **medi**/um + **moi**ety) < IE **medhjo**- > E **mid** + **midd**le + G **mes**/os (> E **mesi**/o "mesial" [7.30] + **mes**/o "middle"); "mediastinum" designates in Medical Terminology either the partition or the space between the two pleural sacs

    hem/o/medi/ast/in/um "a collection of blood in the mediastinum"

18. **spir/o:** < L **spir**/are "to breathe" (> E **spir**it + a/**spir**/e + ex/**spir**/e + in/**spir**/e + per/**spir**/e + re/**spir**/e + tran/**spir**/e, etc.); "spire" + "spir/al," etc. are unrelated (see 3.17)

    re/spir/at/ory "p.t. breathing again [and again] (13.37);" **spir/it** "breath" (believed by the ancients to be the chief manifestation of life and soul; cf. G psych/e [11.1]); **sin/o/spir/al** "p.t. breathing and the sinuses"

19. **pne/o:** < G **pn**/ein "to breathe;" see 12 above

    sneeze (see on 12 above); **pne/o/cardi/ac** "p.t. the heart, involving breathing"

20. **pne/um(at)/o:** < G **pne/uma**, **pne/umat**/os < G **pn**/ein "to breathe;" see 12 above

    pne/umat/ic "p.t. air;" **pne/umat/o/card/ia** "an abnormal condition involving the heart and air"

21-25. Plural Endings

Latin plural endings may mystify and frighten students who have not noticed that they have already unconsciously mastered a far more complex system in English (they never confuse in speech, for example, /s/, /z/ and /iz/ [three phonetically conditioned allomorphs of the plural morpheme written "s," as in "cats," "dogs" and "dishes"], and have no difficulty with, for example, the following pairs: foot, feet; mouse, mice; child, children; fish, fish).

21. **-i:** Latin masculine nominative plural ending for most nouns and all adjectives whose singulars end in "-us" (1.82)

    muscul/i cardi/ac/i "[several] cardiac muscles"

22. **-ae:** Latin feminine nominative plural ending for most nouns and all adjectives whose singulars end in "-a" (1.83)

    ven/ae cardi/ac/ae "[several] cardiac veins"

23. **-a:** Latin neuter nominative plural ending for all nouns and adjectives whose singulars end in "-um" (1.84) or "-on" (1.85), and for all other neuter words regardless of their singular form

    crani/a "[several] skulls"; **gangli/a cardi/ac/a** "[several] cardiac ganglia" [or] "[several] cardiac ganglions"; **oss/a** "[several] bones" (as opposed to one "os"); **vas/a cardi/ac/a** "[several] cardiac vessels" (as opposed to one "vas cardi/ac/um")

24. **-es:** Latin masculine or feminine plural ending for all nouns and adjectives whose singulars end in "-is," and for other nouns of various singular endings

    neuros/es "[several] abnormal conditions involving the nerves;" **ped/es** "[several] feet"

25. **-ia:** Latin neuter plural ending for all adjectives (and a few nouns) whose singulars end in "-e"

    oss/a crani/al/ia "[several] cranial bones" (as opposed to one "os crani/al/e")

26-30. Diminutives

The diminutives presented here are all variants of a Latin ending "-l/us," "-l/a," "-l/um" regularly used to form verbal adjectives (for example, L bib/ul/us "thirsty" < bib/ere "to drink"); when added to nominal stems the specialized force of the diminutive came to be felt fairly consistently in Latin (an English parallel is "-ish," which has a general adjectival force in a few words like "book/ish," but has a specialized diminutive sense in many others ["new/ish," "green/ish," "peck/ish," for example]). Originally adjectival, these diminutives tended to become nouns in Latin, and most of those found in Medical Terminology are so considered.

Among English diminutives, "-let" (in words like "plate/let") is partly derived from L -ell/- (see on 28 below), while E "-l-" in "-l/ing" (as in "finger/l/ing," "duck/l/ing" and "hire/l/ing") and "-le" (in words like "spark/le" < "spark" and "freck/le" [probably < "freak"]) is probably cognate with the L forms.

26. **-ul/-:** Latin diminutive suffix > E **-ul**/e

    valv/ul/e "a little valve" (5.10)

27. **-(i)cul/-:** Latin diminutive suffix > E **-cul**/e + **-i/cl**/e; the /k/ of this form is probably in origin "transferred" from an unrelated adjectival ending in "-c/us" (words like Grae**c**/ul/us, for example, might have been morphologically misunderstood)

    minus/cul/e "a little less;" **ventr/i/cl/e** "a little belly (5.11)"

28. **-ell/-:** Latin diminutive suffix > E **-ell-** + **-l**/et; "-l/et" (in "ring/l/et" and "book/l/et," etc.) is a "double diminutive," since the "-et" (< French –et + -et[t]e) is itself a diminutive ending (seen, for example, in "isl/et" and "statu/ette")

    umbr/ell/a "a little shadow;" **cereb/ell/um** "a little brain (4.3)"

29. **-ill/-:** Latin diminutive suffix > E **-il**

    pup/ill/a (> E pup/il) "a little doll (4.19);" **quadr/ill/e** "a little four[-sided dance or game]"

30. **-ol/-:** Latin diminutive suffix > E **-ol**/e

    cabr/i/ol/et < Italian capr/i/ol/a (< L caper, capr/i "goat" [> E caper + capr/i/corn]) "little goat [cart]" (> the clipped form "cab"); **bronchi/ol/e** "a little bronchus (11 above)"

ETYMOLOGICAL NOTES — CHAPTER 7

1. **gnath/o:** < G **gnath**/os "jaw" < IE **genu-** "chin, jawbone" > E **chin** + G **gen**ys "chin" (> E **gen**i/o [4 below]); IE **gheluna-** "jaw" (see on 8 below) may be related

    gnath/o/plast/y "the surgical repairing of the jaws;" **pro/gnath/ous** "having the jaws in front of (13.17) [the rest of the face]"

2-3. Note that in a context involving bones rather than body parts, maxill/o + manibul/o denote the bones called the maxilla and mandible; these are presented at 8.15 and 8.16, respectively.

2. **max/ill/o:** < L **max/ill**/a "little jaw" probably < IE **menth-** "to chew" > L **mand**/ere "to chew" (> E **mand**ible [3 below]) + **mand**uc/are "to eat" (> [through Old French] E **man**ger + **man**ge + **mun**ch) + G **mast**ax "mouth" (> E **mas**tic/ate) + E **mouth**

    manger "a [place for] eating;" **antr/um max/ill/ar/i/um** "an antrum p.t. the upper jaw"

3. **mand/i/bul/o:** < Modern L singular **mand/i/bul**/a < Late L plural < L **mand**/i/bul/um "a jaw" < **mand**/ere (see on 2 above); for **-i/bul**/um cf. acet/a/**bul**/um (3.31); originally "the jaws," "mandibula" has been specialized in Medical Terminology to denote the lower jaw, and the confusion of number implicit in the ending "-a" may be due to the fact that this bone is actually made up of two fused bones

    corne/o/mand/i/bul/ar reflex "a reflex p.t. the lower jaw, involving the cornea" (the tendency of the lower jaw to move to the side away from an irritated cornea when the open mouth is relaxed)

4. **geni/o:** < G **geny**/s "chin" < IE **genu-** (see on 1 above)

   geni/o/plast/y "the surgical repairing of the chin"

5. **ment/o:** < L **ment**/um "chin" < IE **men-** "to project" > L **min**ac-"projecting, threatening" (> E **men**ace) + **min**/ere "to project" (> E e/**min**/ent + im/**min**/ent + pro/**min**/ent, etc. + L e/**min**/ent/i/a) + **mons**, **mont**/is "hill, mountain" (> E **moun**t + **moun**tain, etc. [but probably not "mound"]) + probably L **ment**/ul/a "penis"

   spin/a ment/al/is "a spine p.t. the chin"

6. **stom(at)/o:** < G **stoma**, **stomat**/os (see on 1.59)

   stomat/o/log/y "the study of the mouth"

7. **or/o:** < L **os**, **or**/is "mouth" > L **or**/are "to speak" (> E **or**/ate + **or**/at/cry + **or**/acle, etc.) + **os**ti/um "opening" > perhaps **Os**ti/a [the port city of ancient Rome]

   nas/o/-or/al "p.t. the mouth and nose;" **pharyng/o/-or/al** "p.t. the mouth and pharynx"

8. **cheil/o:** < G **cheil**/os "lip, edge" < IE **gheluna-** "jaw" > E **gill**; IE **genu-** "jawbone" (see on 1 above) may be related

   cheil/o/plast/y "the surgical repairing of the lips"

9. **labi/o:** < L **labi**/um (> E **labi**/a, etc.) < IE **leb-** "to hang loosely; lip" > E **lip** + **lap** + **lab**el + **limp** + **sleep** + L **lab**/i "to slip, fall" + **laps**/us "a slip, fall, error" (> E **laps**e + e/**laps**e + col/**laps**e + pro/**laps**e + re/**laps**e, etc.) + **lob**/us (> E **lob**/e) + probably **lab**or, **lab**or/is "work" (> E **lab**or + **lab**or/at/ory + e/**lab**or/ate, etc.) + possibly G **lip**ar/os "loose, slack" (> E **lap**ar/o "abdominal wall" [9.4])

   labi/al "p.t. the lips;" **labi/o/dent/al** "p.t. the teeth and lips"

10. **bucc/o:** < L **bucc**/a "cheek" > L **bucc**/in/are "to blow a trumpet" (> E **bucc**/in/at/or "[the muscle which compresses the] cheek [and retracts the corner of the mouth]") + Italian **bocc**/acci/o "big mouth" or "ugly mouth" (> E **bocc**accio [a Pacific rockfish])

    bucc/al cavity "the cavity p.t. the cheeks" (= "the mouth cavity"); **antr/o/bucc/al** "p.t. a cheek and an antrum"

11. **gloss/o:** < G **gloss**/a "tongue" hence, because it is one of the chief articulators of speech "words, language" (cf. E usage in phrases like "the mother tongue"); see on 6.8

    gloss/ary "a place for words;" **gloss/o/lal/ia** "an abnormal condition involving speaking 'in tongues' [= 'unknown languages']" (= "the uttering of unintelligble sounds"); **pharyng/o/gloss/al** "p.t. the tongue and pharynx"

12. **lingu/o:** < L **lingu**/a "tongue" hence (for the process, see on 11 above) "language" (> E **lin**go + **lingu**/ist/ics, etc. + [through Old French] **langu**age) < Old L **dingu**/a < IE **dnghwa-** > E **tongu**e; a parallel consonant shift in L from /d/ to /l/ may be seen in the group "**l**acr-" + "**t**ear" < IE **d**akhru- (4.32)

    langu/age "a tongue;" **lingu/ist** "one who specializes in tongues;" **lingu/al hem/o/rrh/oid** (in place of "hem/o/rrh**e**/oid") "[a mass of dilated veins] resembling [the result of] the flowing of blood, p.t. the tongue"

13. **palat/o:** < L **palat**/um > E **palat**/e "the roof of the mouth" but not "palette"

    palat/able "able to be [endured by the] palate;" **nas/o/palat/in/e** "p.t. the palate and nose"

14. **uran(isc)/o:** < G **ouran/isk**/os "p.t. the sky" < G **Ouran**/os "the moist [one]" (> Late L **Uran**/us > E **Uran**/us [the planet] > **uran**/i/um) < IE **ur-** (> G **our**/ein + L **ur**/in/are [both meaning "to make water"] > E **ur**ine, etc. [see on 10.5-9, 10.14 and 10.17]) < IE **awer-** "to moisten, flow" > E **wa**ter + **we**t + G **hydor** (> E **hydr**/o [12.1]) + Russian (> E) samo/**var**; G Ouranos "the moist one" was the name of the first sky-god of G mythology, applied probably in recognition of the fertilizing power of the sky in his rainy aspect; Hesiod's story of the continual impregnation of Gaia ("Earth") by Ouranos, without respite even for the birth of her children, may reflect this original meaning, while his vivid account of the "harvesting of the genitals" of Ouranos by his son Kronos with his sickle (explaining why the god sprang as far away as possible from the earth) certainly explains why the name came to mean "sky;" the planet Uranus was named after the god (cleverly, as the sequence of Uranus, Saturn [identified with Kronos] and Jupiter [identified with Zeus] follows that of Hesiod's genealogy), while the element uranium (discovered not long after the planet) is named for the planet; the application of the name to the palate reflects a metaphorical notion of the "roof" of the mouth being its "sky" (an interesting connection to the G metaphor here may be seen in the fact that E "ceil/ing" derives from L "cael/um" "sky" [> E cel/estial, etc.])

    uran/isc/o/rrhaph/y "the suturing of the palate"

15. **staphyl/o:** < G **staphyl**/e "bunch of grapes" < IE **stebh-** "post, pole" apparently < IE **(s)teup-** "to strike" (see on 4.35) > E **staff** + **step** + **stump** + **stamp** + **ste**m; for the application of the word to the uvula, see on 16 below

    staphyl/o/rrhaph/y "the suturing of the uvula"

16. **uv/ul/a:** < L **uv/ul**/a "little grape" < **uv**/a "grape" (see on 4.24); applied metaphorically to the soft fleshy projection hanging from the middle of the soft palate

    uv/ul/o/pt/os/is "the downward displacement of the uvula"

17. **cion/o:** < G **kion** "pillar;" applied metaphorically to the uvula, which looks a bit like a pillar in the center of the back of the mouth when the tongue is depressed

    cion/ec/tom/y "the cutting out of the uvula"

18. **odont/o:** < G **odous**, **odont**/os < IE **edont-** (> L **dens**, **dent**/is [19 below; > E **dent**/ist, etc. + al **dent**/e "to the tooth; chewy"] + E **tooth**) < IE **ed-** "to eat" > L **ed**/ere "to eat" (> E **ed**/ible) + E **eat** + **etch**

    orth/odont/ist "one who [makes] teeth straight;" **odont/o/graph** "an instrument for recording [the surface irregularities of] teeth"

19. **dent/o, dent/i:** < L dens, dent/is (see on 18 above)

    dent/ist "one who specializes in teeth;" **dan/de/lion** "tooth of a lion" (< Old French dent de lion < L dens + de [13.29] + leo, leon/is "lion")

20. **peri/odont/o:** < Modern L **peri/odont**/i/um "the part [= gums, connective tissue and bone] surrounding (13.7) the teeth (18 above)"

    peri/card/i/um (5.12) "the part surrounding the heart;" **peri/odont/o/path/y** "a disease of the periodontium"

21. **gingiv/o:** < L **gingiv**/ae "gums" < IE **geng-** "lump, ball" > G **gongr**/os (> E **cong**er [a type of eel])

    gingiv/it/is "the inflammation of the gums"

22. **ul/o:** < G **oul**/on "gum"

    ul/o/trips/is "the rubbing of (8.32) the gums"

23. **dent/in/o:** "a substance of the teeth" < L **dens**, **dent**/is (19 above); in Medical Terminology "dentin" is specialized to designate the hard dense bone-like tissue forming the body of a tooth, covered above the gum-line by the enamel

    oste/o/dent/in/oma "a tumor (12.73) involving dentin and bone"

24. **(en)amel/o:** < Anglo-French **en/amayll**/er (> E **en/amel** "a glaze on [a tooth]") < en- (13.32) + **amayl**; **amayl** < Old F **esmail** < Germanic **smalts** "glaze, melted substance" (> E **smelt** "to melt ore") < IE **(s)mel-** "to crush, grind fine (see on 1.31); enamel (which covers the dentin on the visible part of teeth) is the hardest substance produced by the body

    amel/o/dent/in/al "p.t. the dentin and enamel"

25. **a/damant(in)/o:** < G **a/damas**, **a/damant**/os "untamed" hence "hard" (> E **a/damant** + **diamond**) < G **a-** "without, lack of, not" + **dam**/an "subdue;" G **dam**/an < IE **dom-** > E **tam**e + L **dom**/are (> E in/**dom**/it/able "not able to be tamed"); "dominate" and "domesticate" are probably from a different root (see on 13.14)

    a/damant "untamed;" **membran/a a/damant/in/a** "a membrane p.t. the enamel"

26. **pulp/o:** < L pulp/a (> E pulp) "flesh" (hence "fleshy" part of a tooth, containing nerves and blood vessels)

    pulp/o/tom/y "the cutting of the pulp"

27. **cement/o:** < L **caement**/um "rough stone, chipping" (> E **cement**) < L **caed**/ere, **caes**/um "to cut, kill" (the second meaning was natural in a culture whose most effective weapons had sharp cutting points and edges) > E con/**cise** + ex/**cise** + in/**cis**/ive + in/**cis**/al (31 below) + pre/**cis**e, etc. + **-cid**/e (> E pest/i/**cid**e + hom/i/**cid**e + gen/o/**cid**e, etc.) + **chis**/el ("a little cutting [tool]") + L in/**cis**/ur/a + (because the Romans believed, probably erroneously, that the name Caesar came from this root) **Caes**ar/ian section; cementum covers the dentin of the roots of teeth, attaching them to the jawbones

    oste/o/cement/um "the part of the cementum involving bone"

28. **axi/o:** < L **ax**/is "axis, axle" (> E **ax**/is + **ax**/le/tree [> **ax**/le]) < IE **ag-** "to drive" > G (> E) **ax**on + **ag**og/as (> E **-ag**og/u/e) + L **ag**/ere "to do" (> E **ag**/ent + **ag**/end/a + **ac**t, etc.) + G (> E) **ag**r/a "seizure" (1.36)

    ax/is "[a real or imaginary straight line] driven [through an object, and around which that object might rotate];" **axi/al** "p.t. an axis;" **bucc/o/axi/al** "pertaining to or formed by the buccal and axial walls of a tooth cavity".

29. **dist/o:** < L **di/st**/are "to stand (see on 1.53) apart (13.30)" > E **di/st**/ant + **di/st**/ance

    di/st/ant "standing apart;" **di/st/al** "standing [farthest] apart from [the centre or point of origin];" **axi/o/dist/al** "p.t. or formed by the axial and distal walls of a tooth cavity"

30. **mesi/o:** < G **mes**/os "middle" < IE **medhjo-** (see on 6.17)

    mesi/al "[nearer to the] middle [of the arch formed by the cutting and chewing surfaces of the teeth];" **mesi/o/dist/al** "p.t. or formed by the mesial and distal surfaces of a tooth"

31. **incis/o:** < L **in/cis-**, past participle of L **in/cid**/ere "to cut (see on 27 above) into (13.32)"

    in/cis/ion "a cutting into;" **in/cis/al** "p.t. [the edge of a tooth which] cuts into [food];" **in/cis/or/s** "things which cut into [food]" (referring to the four upper and four lower front teeth, with narrow cutting edges); **labi/o/incis/al** "p.t. or formed by the labial and incisal surfaces of a tooth"

32. **oc/clus/o:** < L **oc/clus-**, past participle of L **oc/clud**/ere "to shut (see on 3.5) against (13.33)"

    oc/clus/ion "a shutting against;" **oc/clus/al** "p.t. [a tooth surface which] shuts against [another];" **mal/oc/clus/ion** "a [condition in which the teeth] shut badly against [one another];" **lingu/o/-occlus/al** "p.t. or formed by the lingual and occlusal surfaces of a tooth"

33. **-cervic/o:** < L **cervix**, **cervic**/is "neck" (2.17); applied metaphorically in a dental context to the "neck" of a tooth

    cervic/al cavity "a cavity p.t. the neck [of a tooth];" **cervic/al cancer** "a cancer p.t. the neck [of the uterus (10.43)];" **labi/o/cervic/al** "p.t. the labial surface of the cervix of a tooth"

34. **labi/o-:** see on 9 above

    labi/o/cervic/al (see 33 above)

35. **bucc/o:** see on 10 above

    bucc/o/axi/al (see 28 above)

36. **lingu/o:** see on 12 above

    lingu/o/-occlus/al (see 32 above)

37. **gingiv/o:** see on 21 above

    axi/o/gingiv/al "p.t. or formed by the axial and gingival walls of a tooth cavity"

38. **pulp/o:** see on 26 above

    lingu/o/pulp/al "p.t. or formed by the lingual and pulpal walls of a tooth cavity"

ETYMOLOGICAL NOTES — CHAPTER 8

1. **front/o:** < L frons, front/is "forehead" > (by extension of meaning) "front" (> E **front** + **front**/ier + con/**front** + ef/**front**ry, etc.) < IE **bhren-** "to project" > Old E **brant** "steep, high" + possibly **brunt**; the original meaning, "forehead," is applicable in most of the derivative E word's many metaphorical uses (e.g., brave front, cold front, left front, united front, front man)

   os front/al/e (literally "the bone [3.2] [which is] the forehead") "the frontal bone;" **nas/o/front/al** "p.t. the frontal bone and nose" or "p.t. the frontal bone and nasal bones (see 14 below)"

2. **pariet/o:** < L **paries**, **pariet**/is "wall" < IE **(s)per-** "a bar, spear" > probably E **spear** + **spar** "a pole;" "paries" denotes any partition in Medical Terminology, but in the context of the head the word is specialized to refer to one of the two large upper bones, behind the forehead and forming the rear part of the top of the skull

   oss/a pariet/al/ia (literally "the bones [3.2] p.t. [in the sense of resembling] a wall") "the parietal bones;" **pariet/o/front/al** "p.t. the frontal bone and parietal bones"

3. **oc/cipit/o:** < Modern L **oc/ciput** "the [part] against the head" < L **ob-** "against" (13.33) + **caput**, **capit**/is "head" (> E **capit**/al, etc. + [through French] **chief** + **chef** + prin/**cip**/le, etc. + [through Italian] **cap**/rice "frizzled-head"); L **caput** < IE **kaput-** "cup-shaped," hence "head" (> E **head**) < IE **keu-** "to bend, curve" > IE **keup-** (> E **hive** + L **cup**/a "tub" [> E **cup** + **coop**]) + IE **kumb-** (> E **coomb** "ravine") + IE **keub-** (> E **hip** + **hop** + L **cub**/are [> E **cub**it/o; 3.10] + **cumb**/ere "to recline" [> E in/**cumb**/ent + re/**cumb**/ent, etc.] + G **kub**/os [> E **cub**/e])

   capit/al "p.t. the head;" **os oc/cipit/al/e** (literally "the bone [3.2] against [the back of] the head") "the occiput;" **cervic/o/-oc/cipit/al** "p.t. the occiput and neck"

4. **atl(ant)/o:** < G Atlas, **Atlant**/os (the Titan forced by Zeus to carry the sky (or "heavens") on his shoulders; he stood at the Western end of the Mediterranean in North Africa > **Atlas** Mountains [Perseus having in anger shown him the Medusa's head] + **Atlant**/ic [> **Atlant**/is] Ocean) > **atlas** "[a book of maps, often in early editions depicting] Atlas [on its cover];" metaphorically applied in Medical Terminology to the top cervical vertebra, as "supporting" the head; G **Atlas** < **atlas**, **atlant**/os "bearing" < G **tl**/an "to bear" < IE **tel-**, **tla-** "to lift" > L **tol**er/are "to bear" (> E **tol**er/ate, etc.) + **toll**/ere "to raise up" (> E ex/**tol** "to lift out") + G **tel**/os "tax" (> E **toll**)

   Atlant/ic "[the ocean] p.t. Atlas;" **atlant/o/-oc/cipit/al** "p.t. the occiput and atlas"

5. **tempor/o:** < L **tempus**, **tempor**/is "span or portion of time; a fitting or important time" > L **tempor**/a "an important place; the 'temple' of the head" (> Vulgar L **tempul**/a > E **templ**es) + L **temper**/are "to observe proper measure," hence "to

mix, regulate, forbear" (> E **temper** + **tamper** + **temper**/ment + **temper**/ate + **temper**/at/ure) + E **tempor**/ary + con/**tempor**/ary + **tempo** + **tempor**/al + contre/**temp**s + L **temp**estas "period of time, weather" (hence "storm" [> E **temp**est + **temp**est/uous]) < IE **temp**/or- "span" (< IE **temp-** "to pull, stretch" [> L **tempt**/are > E **tempt**, etc.] < IE **ten-**[for which, see on 1.44]) > L **templ**/um "area, space marked out" (> E **templ**/ate) hence "sanctuary" (> E **temp**le); for another set of derivatives of IE **ten-** see on 1.44; E "time" is unrelated

tympan/o/tempor/al "p.t. the temporal bone and the middle ear"

6. **mast(oid)/o:** < G **mast**/**oid**/es "something resembling a breast" < **mast**/os (see on 2.27); specialized in Medical Terminology to denote a large outer projection at the bottom of each temporal bone

   mast/oid pro/cess (literally) "a projection resembling a breast;" **antr/um mast/oid/e/um** "an antrum p.t. the mastoid process"

7. **styl/o, styl/oid/o:** < L **stil**/us "pointed stick" (> Italian [> E] **still**/etto "small pointed dagger;" the stilus was used for writing on clay tablets > E **styl**/us + **styl**/e [the spelling influenced by unrelated G "styl/os" "pillar"]) < IE **(s)tei-**"pointed" (> L [> E] **sti**mul/us) probably < IE **steig-** "a point" > E **stick** + **stak**e + **steak** + **th**istle + G (> E) **stig**ma "a [mark cut into the flesh of a criminal by means of a] point" + L in/**stig**/are "to stick into (13.32)" hence "to stimulate, as if by a sharp point" (> E in/**stig**/ate) + **sting**u/ere "to prick" (> E di/**sting**u/ish + di/**stinc**t + in/**stinc**t) + Iranian **tig**r/a (> [through G + L] E **tig**er); usually in Medical Terminology specialized to designate the pointed slender inner projection at the bottom of the temporal bone

   styl/us "a pointed [thing used for writing];" **styl/oid pro/cess** (literally) "a projection resembling a stylus;" **styl/o/mast/oid** "p.t. the mastoid process and styloid process"

8. **petr/o, petr/os/o:** < G **petr**/a "a rock" + **petr**/os "a stone" (> G **Petr**/os [translating Aramaic Kepha "a rock"] > E **Peter** + French **Pierre** + Spanish **Pedr**o) > E **petr**/i/fy + **petr**/ole/um, etc.; in Medical Terminology specialized to denote the "rocky" part of the temporal bone, which surrounds and protects the middle ear

   petr/i/fy "to make [into] rock;" **petr/ole/um** "an oil (12.38) of rock;" **petr/o/glyph** "a carving in rock;" **salt/petr/e** "rock salt;" **petr/o/pharyng/e/us** "p.t. the pharynx and the petrous part of the temporal bone"

9. **squam/o, squam/os/o:** < L **squam**/a "scale, husk" > E (in Biology) **squam**/ate "scaly" + **squam**/ul/os/e "having small scales," etc.; perhaps related to IE **(s)kel**- > E **scal**e + **shell**; specialized in Medical Terminology to designate the thin scale-like part of the temporal bone

   mast/o/squam/ous "p.t. the squamous part of the temporal bone and the mastoid process"

10. **sphen/o, sphen/oid/o:** < G **sphen** "wedge" < IE **spe**- "flat piece of wood" > E **spoo**n + **spa**de + G **spa**th/e "flat blade" (> E **spa**the "flat leaf-like flower part" + [through L and Old French] **spay** "to [cut with a] blade" [specialized to mean "to cut out the ovaries"] + L [> E] **spa**t/ul/a "little flat blade"); the sphenoid bone is so called because each end of it, as seen between the frontal bone and parietal bone on each side, is shaped a little like a wedge

    sphen/o/gram "a record [made by means] of a wedge" (i.e. "a cune/i/form [='wedge-shaped'] character"); **oss/a sphen/oid/al/ia** (literally "bones resembling a wedge") "the sphenoid bones;" **tempor/o/sphen/oid** "p.t. the sphenoid bone and the temporal bone"

11. **zygomat(ic)/o:** < G **zygoma**, **zygomat**/os "yoke" < G **zyg**/on (> E **zyg**/ote) < IE **yugo**- (see on 4.29); the zygomatic bone "yokes" the maxilla (15 below) to the zygomatic process of the temporal bone; it is also called the malar (or "cheek") bone

    os zygomat/ic/um (literally "a bone p.t. a yoke") "the zygomatic bone;" **ocul/o/zygomat/ic** "p.t. the zygomatic bone and the eye"

12. **ethm(oid)/o:** < G **ethm**/os sieve" < G **eth**/ein "to strain;" G **eth**/ein "to be accustomed" (> G [> E] **eth**os) < IE **swedh**- "essential quality or character" is probably not related; the term designates in Medical Terminology the perforated bone forming part of the back of the eye socket

    os ethm/oid/al/e (literally "a bone p.t. a sieve") "the ethmoid bone;" **antr/um ethm/oid/al/e** "an antrum p.t. the ethmoid bone"

13-16. See, respectively, on 4.33, 6.2, 7.2 and 7.3; note that these combining forms designate bones only when the context is appropriate; examples follow

13. **ethm/oid/o/lacrim/al** "p.t. the lacrimal and ethmoid bones"

14. **front/o/nas/al** "p.t. the nasal and frontal bones"

15. **max/ill/o/ethm/oid/ec/tom/y** "the cutting out of the ethmoid bone and [part of] the maxilla"

16. **styl/o/mand/i/bul/ar** "p.t. the mandible and a styloid process"

17. **sut/ur-:** < L **su/t/ur**/a "sewn [line], seam" < L **su**/ere < IE **siw-** "to sew" > E **sew** + **sea**m + Sanskrit **su**tra "thread, string" hence "threaded [narrative]" (> E **su**tra "a precept or scriptural narrative") + G (> E) **hy**men (10.51)

    sut/ur/ae crani/al/es "sutures p.t. the skull"

18. **hy/o:** < E **hy**/oid < G **hy**/oid/es "resembling [the G letter] –**U**- ('upsilon');" designates in Medical Terminology a small U-shaped bone at the base of the tongue

    os hy/oid/e/um (literally "a bone resembling 'U'") "the hyoid bone;" **geni/o/hy/oid** "p.t. the hyoid bone and chin"

19-33. More Terminations

Note that these forms are found less frequently in Medical Terminology than are the ones presented in Chapter 1

19. **-aux/is:** < G **aux**/ein "to increase" < IE **aweg-**, **aug-** "to multiply, increase" > L **aug**/ere (> E **aug**/ment + **aux**/ill/ary + **auth**/or, etc. + probably L [> E] **aug**ur + L **Aug**ust/us [> E **aug**ust + **Aug**ust]) + E **ek**e + **wax** "to grow"

    aux/ill/ary "increasing" hence "helping, supplementing;" **aux/in** "a substance which [promotes plant] growth;" **en/cephal/aux/e** "the enlargement of the brain"

20. **-cirrh/os/is:** Modern L < G **kirrh**/os "tawny, orange-yellow;" named by R.T.H. Laennee (died 1826) because of the appearance of the diseased liver; generalized (with a change of concept) in Medical Terminology to denote a degenerative disease characterized by excess formation of connective tissue and subsequent contraction and hardening of the organ affected, which becomes covered with a hard fibrous tissue

    cirrh/os/is of the liver "the hardening of the liver"

21. **-cleis/is:** < G **kleist**/os "closed" < IE **kleu-** (see on 3.5)

    ot/o/cleis/is "the closure of the ear"

22. **-(h)elc/os/is:** < G **helk**/os "abscess, wound" < IE **elkos-**"abscess" > L **ulcus**, **ulcer**/is (> E **ulcer** "open sore, other than a wound")

    kerat/o/helc/os/is "the ulceration of the cornea"

23. **-i/f er/ous:** < L **fer**/re "to bear" (> E con/**fer** + de/**fer** + dif/**fer** + ef/**fer**/ent + in/**fer** + pre/**fer** + re/**fer** + suf/**fer** + trans/**fer**, etc. + Luc/i/**fer** "bearer of light" [note that "phos/phor/us," 12.69, means the same thing;] L Lucifer was the morning star, later a name for Satan) < IE **bher-** "to carry, bring" > E **bear** "carry, bring forth" + **bir**th + G

pher/ein "to bear" (> E o/o/**phor**/- [10.36] + phos/**phor**/us "a bearer of light" [12.69]) + L **fur** "one who carries [off]; thief" (> E **fur**/t/ive + **ferr**et) + **fer**t/il/is (> E **fer**t/il/e + **fer**t/il/iz/e, etc.)

con/i/fer/ous "bearing cones;" **splend/i/fer/ous** "bearing splendor;" **cost/i/fer/ous** "bearing ribs"

24-27. -tox-: < G t**ox**/ik/on "arrow[-poison]" < G **tox**/ik/os "p.t. a bow" < **tox**/on "bow" (note the change of concept, or "sideways leap of meaning," whereby the term denoting an arrow came to denote something only incidentally associated with an arrow)

tox/ic "p.t. poison"

24. **para/thyr/o/tox/ic/os/is** "the poisoning of the parathyroid glands"

25. **cardi/o/tox/ic** "poisonous to the heart"

26. **cyt/o/tox/in** "a substance poisonous to cells"

27. **neur/o/tox/ic/ity** "the ability to poison nerves"

28. **-ap/her/es/is:** < G **ap/hair**/ein "to take away from" (> E **ap/-her**/es/is "the taking away [of an initial sound or sounds] from [a word]" [as in "'scuse" for "excuse"]) < G **apo-** "away from, off" (13.43) + **hair**/ein "to take" (> E **her**/es/y + **her**/et/ic [both from the idea of "taking" or selecting some, but not all, church doctrines])

plasm/ap/her/es/is "the removal of plasma [from blood]"

29. **-(en/)chys/is:** < G **en-** "in" (13.32) + **chys**/is "a pouring;" G **chys**/is < G **che**/ein "to pour" (> E **chy**le [9.37] + **chy**me [9.36] + probably al/**che**m/y [> **che**m/istry, etc.; see below]) < IE **gheu-** > L **fu**nd/ere "to pour, melt"(> E **fou**ndry), past participle **fus**/us (> E **fus**e "melt [together]" + dif/**fus**e + in/**fus**e + pro/**fus**e + trans/**fus**/ion, etc.) + E **gu**t + **gu**st; E al/**che**m/y < Medieval L al/**che**m/ia < Arabic al-**ki**miya probably < G **chy**m/ia < **che**/ein

derm/en/chys/is "the injection of fluid into the skin"

30. **-camps/ia:** < G **kampt**/ein "to bend, curve" < IE **kamp-** > IE **kamp**/os "a corner, cave" > L (> E) **camp**/us "field" (the E meaning in phrases like "university campus" probably stems from the Roman practice of training soldiers on a particular field, the Campus Martialis ["Field of Mars"]) > E **camp** + **camp**aign (for the metaphors implicit in the last two words, cf. E "in the field")

oste/o/camps/ia "the curvature of a bone"

31. **-camp:** see 30 above

    oste/o/camp "an instrument for bending bone"

32. **-trips/y:** < G **trib**/ein "to rub" < IE **ter-** "to rub, bore" [= "make a hole by means of circular rubbing"] > Old E **thra**w/an "to twist" (> E **thro**w) + E **threa**d "twisted [fibers]" (+ perhaps **tre**ss) + **thre**sh (> **thra**sh) + **thre**sh/old + **thro**e "pang of pain" + G (> E) **trau**ma "wound" + **try**p/an "to bore" (> E **tre**pan "a boring [tool]") + L **ter**/ere (past participle trit/us) "to rub" (> E **tri**te "rubbed [out, or into dust]" + **tri**t/ur/ate "to rub [into powder]" + de/**tri**/ment "a rubbing away [13.29]" + de/**tri**t/us + at/**tri**t/ion + con/**tri**te, etc.) + **tri**/bul/um "threshing sledge" (> E **tri**/bul/at/ion; but "tribute" is unrelated)

    cleid/o/trips/y "the crushing of the [fetal] collar bone [to facilitate delivery]"

33. **-trib/e:** < G **trib**/ein; see on 32 above

    tri/bul/at/ion "a threshing, or a wearing down;" **angi/o/trib/e** "an instrument for crushing a vessel"

ETYMOLOGICAL NOTES — CHAPTER 9

1. **celi/o:** < G **koili**/a "body cavity" < G **koil**/os "hollow" < IE **keu-** "swelling, arch, cavity" > E **holl**ow (see on 1.39); "coel-" is an alternate spelling

   my/o/celi/alg/ia "pain involving the abdomen and muscles"

2. **abdomin/o:** < L **abdomen**, **abdomin**/is "belly"

   thorac/o/abdomin/al cavity "the cavity p.t. the abdomen and thorax"

3. **ventr/o:** < L **venter**, ventr/is "belly" (see on 5.11)

   ventr/i/loqu/ist "one who speaks [as if from] the belly;" **ventr/o/pt/os/ia** "the downward displacement of the abdomen"

4. **lapar/o:** < G **lapar**/a "flank, or 'loose' part of the body, between the ribs and hip" < G **lipar**/os "loose, slack" possibly < IE **leb-** "hang loosely" (see on 7.9); specialized in Medical Terminology to designate the abdominal wall

   lapar/o/tom/y "the cutting of the abdominal wall"

5. **peri/ton(e)/o:** < Late L **peri/ton**/e/um < G **peri/ton**/ai/on "the part stretched around" < G **peri-** "surrounding, around" (13.7) + **tein**/ein "to stretch" (see on 1.44); specialized in Medical Terminology to designate the membrane lining the abdominal cavity, and covering the visceral organs

   peri/ton/it/is "the inflammation of the peritoneum;" **peri/ton/e/o/cent/es/is** "the surgical puncturing of the peritoneum"

6. **mes/enter(i)/o:** < Medieval L **mes/enter/i**/um < G **mes**/os "middle" (7.30) + **enter**/on "intestine" (22 below); specialized in Medical Terminology to designate a membrane supporting or enfolding an internal organ, and attaching it to the body wall or another organ; especially, a double thickness of peritoneum enfolding most of the small intestine and attaching it to the spinal wall of the abdominal cavity

   mes/enter/i/o/pex/y "the fixation of the mesentery"

7. **splanchn/o:** < G **splanchn**/on "entrail" < IE **sp(h)elgh-** (see on 5.25)

   neur/o/splanchn/ic "p.t. the viscera and nerves"

8. **viscer/o:** < L **viscus**, **viscer**/is "innard, gut" probably < IE **weis-** "to flow" (used of foul or bad-smelling liquids) > L **visc**/um "birdlime" (> E **visc**/uous + **visc**/os/ity) + **vir**/us "slimy liquid, poison" (> E **vir**/us) + E **ooz**e + probably **weas**el "[an animal which] oozes [a foul odor]" + **bis**on; in an interesting parallel evolution, E "gut" comes from IE "gheu-s" "to pour"

   visc/os/ity "stickiness;" **viscer/al reaction** "a reaction p.t. the guts [as opposed to the mind];" **pleur/o/viscer/al** "p.t. the viscera and pleura"

9. **es/o/phag/o:** < G **ois/o/phag**/os "something which bears [what is] eaten, the eating-carrier" < G **ois**/ein "to bear" + **phag-** (see on 1.22)

   pharyng/o/es/o/phag/e/al "p.t. the esophagus and pharynx"

10. **gastr/o:** < L **gaster**, **gastr**/i < G **gaster**, **gaster**/os "stomach"

    gastr/ic "p.t. the stomach;" **gastr/o/intestin/al** "p.t. the intestines and stomach"

11. **stomach/o:** < G **stomach**/as "throat, gullet" < **stoma** "mouth" (see on 1.59)

    stomach/o/scop/y "the examination of the stomach"

12. **cardi/o:** < G **kardi**/a (see on 5.8); the combining form, in a gastrointestinal context, refers to the part of the stomach connecting with the esophagus, or the part "p.t. the heart" in terms of location; cf. use of E "heartburn" to describe the sensation caused by a backflow of acidic stomach contents into the esophagus

    es/o/phag/o/cardi/o/my/o/tom/y "the cutting of a muscle involving the cardiac part of the stomach and the esophagus"

13. **oment/o:** < L **o/ment**/um "fat skin, adipose membrane" < L **o-** + noun-forming suffix **-ment**/um; L **o-** < IE **eu-** "to put on [clothing]" > L ind/**u**/ere "to put on [clothing]" (> E ind**u**e) + ex/**u**/ere "to strip off" (> E ex/**uv**i/ae); specialized in Medical Terminology to designate a fold of peritoneum connecting the stomach and some other visceral organs

    cardi/o/-oment/o/pex/y "the fixation of [part of] the omentum to the heart"

14. **epi/pl/o, epi/plo-:** < G **epi/plo**/os "membrane lining the entrails" < G **epi-** "upon" (13.2) and **-pl-** "fold;" cognate with L **-pl-** > E du-**pl**ex, im-**pl**ic-ate, etc.

    epi/pl/o/rrhaph/y "the suturing of the omentum"

15. **pyl/or/o:** < Late L **pyl/or**/us < G **pyl/or**/os "gate-guard" < G **pyl-** "gate" (> E **pyl**/on + G [> E] Therm/o/**pyl**/ae [see below]) + **our**/os "guard;" G **our**/os probably < IE **wer-** "to take heed" > E **war**e + **war**y + be/**war**e + a/**war**e + **war**d + **guar**d, etc. + L **ver**/eri "to fear" (> E re/**ver**/e + re/**ver**/ent + re/**ver**/end + re/**ver**/ence)

    Therm/o/pyl/ae "the hot gates" (the Greek seaside mountain pass made famous by the Spartans in 480 B.C. was so named because of a hotspring); **antr/um pyl/or/ic/um** "an antrum p.t. the pylorus"

16. **du/o/den/o:** < L **du/o/den**/i "twelve each" < L **du/o/dec**/im "twelve (> E **dozen**) < L **du**/o "two" + **dec**/em "ten;" the first twelve finger-breadths of the small intestine is so named

    antr/o/du/o/den/ec/tom/y "the cutting out of [part of] the duodenum, involving an antrum"

17. **chol/e/cyst/o:** < Modern L **chol/e/cyst**/is "a bladder of bile" < G **chol**/e "bile" (38 below) + **cyst**/is "bladder" (10.15)

    pleur/o/chol/e/cyst/it/is "the inflammation of the gallbladder and pleura;" **chol/e/cyst/ec/tom/y** "the cutting out of the gallbladder"

18. **chol/e/doch/o:** "a duct for bile" < G **chol**/e "bile" (38 below) + **doch**/os "receptacle" (44 below); the combining form has been specialized to denote the common bile duct, formed by the junction of a bile duct from the gallbladder and two others which come from the liver

    chol/e/doch/o/chol/e/doch/o/stom/y "the making of an opening between two parts of the common bile duct"

19. **chol/angi/o:** "a vessel of bile" < G **chol**/e "bile" (38 below) + **ang**/os "vessel" (5.14)

    chol/angi/o/chol/e/cyst/o/chol/e/doch/ec/tom/y [one of the longest words in Medical Terminology] "the cutting out of the common bile duct, the gallbladder, and a bile duct"

20. **hepat/o:** < G **hepar**, **hepat**/os "liver;" the largest internal organ, the liver performs many functions, including the purification of blood, the production of bile (which contains waste material but is also essential to digestion), and the storage and release of nutrients obtained from the blood after digestion

    hepat/it/is "the inflammation of the liver;" **hepar/in** "a substance [found especially in] the liver"

21. **pan/cre(at)/o:** < G **pan/kreas**, **pan/kreat**/os < G **pan** "all" (neuter of **pas** < IE **keu-** "to swell, curve, arch" [see on 1.39]) + **kreas** "flesh;" G **kreas** (> E **cre**/o/sot/e "flesh-saver") < IE **kreu-** "congealed [blood]" > G **kry**/os "frost" (> E **cry**stal [12.56]) + L **cru**d/us "raw" (> L **cru**d/el/is [> E **cru**el] + E **cru**de) + **cru**st/a (> E **cru**st + **cru**st/ac/e/an) + E **raw**; the pancreas produces not only insulin (and other substances involved in the body's use of sugar) but also a watery "pancreatic juice" (secreted through a duct into the duodenum) involved in the digestion of fats, carbohydrates and proteins

    pan/the/ism "a [belief in] all gods;" **splen/o/pan/creat/ic** "p.t. the pancreas and spleen"

22. **enter/o:** < G **en/ter**/on "intestine" < IE **en/ter/o-** "inner" (> E **inner**), comparative of IE **en-** "in" (see on 13.32) > L intus "within" (> L **in**test/in/us "inward" [> E **in**testine; for the semantic change cf. E "innards" < E "in/ward"]); in addition to the duodenum (16 above), the small intestine (which, at a little less than seven metres long, is called "small" because of its diameter rather than because of its length) includes the jejunum (23 below) and the ileum (24 below)

    inn/er "more in;" **lymph/enter/it/is** "the inflammation of the (small) intestine, involving lymph"

23. **jejun/o:** < Medieval L **jejun**/um "the empty [part]" (either because the middle section of the small intestine, between the duodenum and the ileum, was anciently believed to be always empty after death, or because it features the highest rate of absorption of food material into the blood system) < L **jejun**/us "empty, dry, barren" > E **jejun**e "barren, dull" (the meaning "childish" is probably due to confusion with "juvenile" and/or French "jeune") + Late L **jejun**/are "to fast" (> Vulgar L dis/**jejun**/are "to be away from [13.30] fasting" > Old French dis**n**er > E di**n**e + di**nn**er); note that the letter, "-j-" was not used in Latin ("-i-" being used instead) and that the pronunciation of this so-called "consonantal -i-" was like that of "-y-" in "yes" (= /j/, the prepalatal semivowel)

    jejun/o/es/o/phag/o/plast/y "the surgical repairing of the esophagus, involving [the use of part of] the jejunum"

24. **ile/o:** < L **ile**/um < L **ili**/a "flanks, entrails" (see on 3.26), by confusion of that term with G eil/ein "to twist" and eily/ein "to creep along" (> E **ile**/us "a [condition caused by intestinal obstruction resulting in the] creeping along [of intestinal contents]"); by specialization of meaning the combining form denotes the lower part (and the longest one, at nearly four meters) of the small intestine, between the jejunum and cecum

    lapar/o/ile/o/tom/y "the cutting of the ileum, through the abdominal wall"

25. **col/o, col/on/o:** < L **col/on** < G **kol/on** "large intestine" < IE **(s)kel-** "to bend, be curved" (see on 3.37); the colon, extending from the cecum to the anus, is about a metre and a half long

    sangu/i/col/ous "p.t. the colon and blood"

26. **cec/o:** shortened < L intestin/um **caec**/um "blind intestine" (for the peculiar designation, cf. E "blind alley," which the cecum, into which the ileum runs, may be said to resemble); the Latin name **Caec**ilius (> E **Cec**il + **Cec**ilia) is probably < L **caec-**

    jejun/o/cec/o/stom/y "the making of an opening between the cecum and jejunum"

27. **typhl/o:** < G **typhl**/on < **typhl**/os "blind;" for the anatomical application, see on 26 above; note that "typhl/o-" very, very occasionally retains its orignal meaning, "blind," in current Medical Terminology (as in "typhl/o/log/y" "the study of blindness")

    typhl/o/megal/y "the enlargement of the cecum"

28. **ap/pend(ic)/o:** < L **ap/pendix**, **ap/pendic**/is < **ap/pend**/ere "to hang [on] to (13.27)" (> E **ap/pend** + **ap/pend**/age) < **pend**/ere "to hang or weigh" (the original method of "weighing" was by hanging in a balance; > E **pend** + **pens**/ive + ex/**pend** [> s**pend**] + ex/**pens**/ive + im/**pend**, etc.) < IE **(s)pen(d)-** "to pull, spin" > E **spin** + **spin**dle

+ **spin**ster + **span** + **span**gle; the appendix, a vestigial organ with no apparent function which seems to "hang [on]to" the cecum, is about nine centimetres long; it is properly called the "verm/i/form (= worm-shaped) appendix"

ap/pend/age "a [thing which] hangs [on] to [something else];" **ap/pend/ic/it/is** "the inflammation of the appendix"

29. **sigm/oid/o:** < G **sigm/o/eid**/es "resembling a '**sigma**'" < G **sigma** (the name of the 18th letter in the G alphabet, representing the voiceless alveolar fricative /s/, ancestor of the L [> E] letter "-s-") > E **sigma**t/ism "the [noticeable or excessive] use of '-s-' [or similar alveolar and prepalatal fricatives]" (as in Shakespeare's "When to the **s**e**ss**ion**s** of **s**weet **s**ilent thought/ I **s**ummon up remembran**c**e of thing**s** pa**s**t..." [Sonnet 30.1-2]); the uncial form of sigma was a semicircle (a bit like E "-c-")

col/o/sigm/oid/o/stom/y "the making of an opening between the sigmoid fold and [another part of] the colon"

30. **proct/o:** < G **prokt**/os "anus;" generalized in Medical Terminology to designate the part of the digestive tract including the lower colon, the rectum and/or the anus

proct/o/scop/e "an instrument for examining the rectum;" **proct/o/log/y** "the study of the anus and rectum"

31. **rect/o:** < L (> E) **rec/t**/um, shortened < intestin/um **rec/t**/um "straight intestine" < L **rec/t**/us "straight" (> E **rect**/angle + **rect**/i/fy + **rect**/itude + **rect**/or + cor/**rect** + di/**rect** + e/**rect**, etc. + L e/**rect**/or) < L **reg**/ere "to keep straight" hence "to rule" (> E **reg**/ion + **reg**/iment + reign) < IE **reg-** "to stretch out, direct" > L **rex**, **reg**/is "king" (> E **reg**/al + **reg**/ent + **reg**/ul/ate + [through French] **roy**al, etc.) + E **righ**t (orignally "straight") + **rich** (< Old E **ric** "reign, kingdom") + **rak**e + **reck**on + Sanskrit **raj** (> E **raj** + rajah) + German (> E) **Reich**

di/rect "straight from (13.30) [some source];" **pelv/i/rect/al** "p.t. the rectum and pelvis"

32. **an/o:** < L **an**/us "ring" hence "anus" > E **an(n)**/ul/o- "ring" and possibly L **ann**/us "year" (> E **ann**/ual + bi/**enn**/ial, etc.)

ischi/o/an/al "p.t. the anus and ischium"

33. **sphincter/o:** < G **sphinkter** < G **sphing**/ein "to draw close" (> G **sphinx**, **sphing**/os "strangler" [> E **sphinx**]; G **sphygm**/os "pulse" [5.7] is possibly related) < IE **spheig-** < IE **spei-** "to flourish, expand, grow thick" (possibly related to IE **spe-** "to extend" [see on 1.41]) > E **spee**d + **spa**re (perhaps originally "allow to flourish") + L **spa**ti/um (> E **spa**ti/al + **spa**ce, etc.) + **spe**s "hope" + **spe**r/are "to hope" (> E de/**sper**/ate + de/**spair**, etc.); the use of "sphincter" in the *Nomina Anatomica* as if it were an adjective (as in "musculus sphincter") is probably due to confusion of the G noun

ending with the endings of L adjectives like "dex**ter**" and "sinis**ter**;" although there are many sphincters in the body, including one at the pylorus, the combining form usually indicates the anal sphincter; sphincters consist of rings of muscular fiber at the entrances or exits of organs, which when contracted either narrow or block the opening involved

sphincter/o/tom/e "an instrument for cutting the sphincter"

34. **sial/o:** < G **sial**/on "saliva" < IE **(s)p(h)yeu-** > E **spew** + **spi**t + **spi**ttle + L **spu**/ere "to vomit" (> E **spu**t/um) + G **pty**/ein "to spit"(> E **pty**al/o [35 below]); saliva, secreted by three pairs of salivary glands in various parts of the mouth, is a lubricating mixture of fluid and mucus which also contains a digestive enzyme and various cells which work against infection

    sial/o/angi/ec/tas/is "the distention of a vessel involving saliva"

35. **ptyal/o:** < G pty/ein < IE **(s)p(h)yeu-** (see on 34 above)

    ptyal/o/lith/ias/is "the abnormal presence of calculi involving saliva"

36. **chym/o:** < G **chym**/os "juice" < G **che**/ein "to pour" (see on 8.29); the thick, mushy, semi-fluid mass resulting from the action upon food of salivary and gastric enzymes, chyme passes from the stomach into the small intestine

    chem/ist/ry originally "the science of fluids" (for the etymology, see on 8.29); **chym/o/[du/o/]den/in** "a substance involving the duodenum and chyme"

37. **chyl/o:** < G **chyl**/os "juice, fluid" < G **che**/ein "to pour" (see on 8.29); formed by the addition to chyme of bile and pancreatic juice in the duodenum, chyle is the substance from which nutrients are absorbed by capillaries into the blood system

    chyl/o/pne/um/o/thorax "a collection of air and chyle in the chest"

38. **chol/e, chol/o:** < G **chol**/e "bile" (> L **chol**/er/a "bilious [diarrhea]" [> E **chol**/er/a] + E **chol**/er/ic "p.t. [excessive] bile" hence [because of the association of the fluid with the emotion in the "doctrine of humors;" see also on 5.22] "characteristically angry" + melan/**chol**/y "an abnormal condition involving black bile" hence [because in the "doctrine of humors" black, as opposed to yellow, bile was associated with depression] "characteristically sad or depressed" + **chol**/e/ster/ol [12.24]) < IE **ghel-** "to shine, be yellow" (as of the sun, or of fire) > a large number of (mostly) E words in "**gl-**" which each reflect only one of the original meanings of IE **ghel-**: "to shine" > E **gl**eam + **gl**immer + **gl**isten + **gl**itter + **gl**int + **gl**ass (further proof that early glass was not particularly transparent) + **gl**aze + **gl**oss "sheen" + **gl**ossy + **gl**ade (originally "bright space") + **gl**ow + **gl**oaming + **gl**oom (the last two originally from the idea of the "glowing" of twilight; notice in the case of "gloom" a semantic shift from "light" to "dark") + (from the idea of the eyes "shining" upon something, whether in a neutral,

negative or positive sense) **gl**ance + **gl**are + **gl**ower + **gl**oat + **gl**ad (William Blake's painting, "Glad Day," leads me to believe that he was aware of the etymology of "glad") + (from the idea that a thing looked at is "shone" upon by the eyes) **gl**impse + **gl**ean; also probably **gl**ide (cf. "glance" above) and possibly (through German) **gl**itch

"yellow" > E **yell**ow + **yol**k + **gall** + **gol**d (+ **gil**d + **gil**t) + G **chl**or/os "light green" (> E **chl**or/o/phyll "green shoot"); bile, also called gall, is a bitter, yellow-brown or greenish-yellow fluid secreted by the liver and stored in the gallbladder; it aids in the digestion of fats

gall "yellow [fluid], bile" hence (via the "doctrine of humors") "bitterness, rancor, impudence;" **hem/o/glob/in/o/chol/ia** "an abnormal condition involving bile and hemoglobin"

39. **bil/i-:** < L **bil**/is "gall"

    bil/i/ous "full of bile" hence (via the "doctrine of humors" [see on 38 above]) "bad-tempered;" **hemat/o/bil/ia** "an abnormal condition involving bile and blood"

40. **copr/o:** < G **kopr**/os "dung" > E **copr**/o/lit/e "a [fossilized] feces-stone"

    copr/o/stas/is "the stopping of [the passage of] feces"

41. **fec-:** < L **faec**/es (plural of **faex**) "dregs, lees;" applied metaphorically (and perhaps euphemistically) to excrement; some students may be interested to know that a currently popular comment upon the nature of human existence can be rendered in Latin as "fiunt faeces"

    fec/al "p.t. excrement;" **hema[t/o/]fec/ia** "an abnormal condition involving feces and blood"

42. **sterc(or)/o:** < L **stercus**, **stercor**/is "dung" > E **stercor**/ac/e/ous "p.t. feces"

    stercor/o/lith "a calculus involving feces"

43. **scat/o:** < G **skor**, **skat**/cs "excrement" (> E **scat** "excrement [left by an animal]") < IE **sker-** "defecate;" the root is perhaps related to IE **skei-** "to cut, separate" (see on 1.16); IE **(s)ker-** "to cut" may or may not be related to one or both of these roots; E **sh**it (< Germanic **sk**it) may also be related

    scat/o/log/ic/al "p.t. the [result of an apparent] study of [or morbid interest in] excrement;" **scat/o/scop/y** "the examination of excrement"

44. **-doch/o:** < G **doch**/os "receptacle" < G **dech**/esth/ai "to take or receive;" almost certainly unrelated to L duc/t/us "leader" (> E **duct**) < **duc**/ere "to lead" (> L **dux**, **duc**/is [> E **duk**e + **duch**ess, etc.] + E con/**duct** + de/**duct** + e/**duce** + in/**duce** + pro/**duc**e + re/**duc**e + se/**duc**e, etc.+ L ab/**duct**/or + ad/**duct**/or) < IE **deuk-** "to pull"

> E **te**am + **tug** + **tuck** ("to gather up"); on the other hand, G -doch- and L duct- are used almost interchangeably in Medical Terminology, indicating that a relationship between the two words was once felt to exist

duke "leader;" **sial/o/doch/it/is** "the inflammation of a duct involving saliva"

45. **-o/stom/a:** < G **stoma**, **stomat**/os "mouth;" see on 1.59 gastr/o/stom/a "an opening made in the stomach"

ETYMOLOGICAL NOTES — CHAPTER 10

1. **lumb/o:** < L **lumb**/us "loin" > (through Old French) E **loin**; designates the lower part of the back, between the ribs and hipbones

   lumbago (probably < lumb/agr/a) "gouty pain in the loins;" **lumb/odyn/ia** "pain in the loins"

2. **inguin/o:** < L **inguen**, **inguin**/is "groin"

   ventr/o/inguin/al "p.t. the groin and abdomen"

3. **peri/ne/o:** < Modern L (> E) **peri/ne**/um < G **peri/ne**/on (< G **peri** "surrounding" [see on 13.7] + **in**/ein "to discharge, defecate") "the part surrounding [the organs of] discharge;" specialized in Medical Terminology to denote the "pelvic floor," the area bounded by the thighs, the anus and vulva or scrotum

   peri/cardi/um "the part surrounding the heart;" **abdomin/o/peri/ne/al** "p.t. the perineum and abdomen"

4. **gen/it/o:** < L **gen/it**/al/ia, shortened < organ/a **gen/it**/al/ia "the organs p.t. production" > E **gen/it/al**/s (a "translated plural"); for the etymology of "genitalia" see on 1.23

   gen/es/is "production;" **abdomin/o/gen/it/al** "p.t. the genitals and abdomen"

5. **ur/o, ur/on/o:** < G **our/on** "urine" < **our**/ein < IE **ur-** (see on 7.14)

   Uran/us "the moist one" (see on 7.14); **ur/o/gen/it/al** "p.t. the genitals and urinary tract"

6. **ur/in/o:** < L **ur/in**/a < IE **ur-** < IE **awer-** "to moisten, flow" > E **wa**ter (see on 7.14); "-ur/ia," originally "an abnormal condition involving urine," has been specialized to

mean "the abnormal presence of [something] in the urine;" "-ur/es/is," originally a variant of "-ur/ia," has been specialized to mean "the passage of [something] in the urine"

water "moist and flowing [substance];" **enter/ur/ia** "the abnormal presence of urine in the intestine"

7. **ur/at/o:** < **ur**/o (5 above) + **-at**/e (a suffix used in chemistry to designate a salt made from an acid with a name ending in "-ic") "a salt of ur/ic acid"

   ur/at/os/is "an abnormal condition involving urates"

8. **ur/e/a-, ur/e/o:** < Modern L **ur/e**/a < French **uree** < G **our**/on (5 above); designates a highly soluble crystalline solid found in urine and other body fluids such as blood and milk

   ur/e/a/gen/et/ic "p.t. the production of urea"

9. **ur/o/bil/in/o:** < **ur**/o (5 above) + **bil**/i- (9.39)" substance of bile [found sometimes] in the urine"

   ur/o/bil/in/oid "resembling urobilin"

10. **nephr/o:** < G **nephr**/os "kidney" < IE **neqwhros** "kidney, testicle" > possibly E kid/**nev** (with "kid-" probably < E "cod" [= "scrotum;" cf. "cod-piece"]); it is tempting, but probably wrong, to relate the G word to G **neph**/os "cloud" < IE **nebh-** "vapor, cloud" > G (> E) **napth**a + L (> E) **neb**/ul/a "little cloud"

    nephr/it/is "the inflammation of the kidney"

11. **ren/o:** < L ren, **ren**/is "kidney;" the archaic E "reins" (Late Middle E for "kidneys") may be influenced by a fancied resemblance between the straps used for guiding horses and the shape formed by the kidneys and ureters

    ad/ren/al "at (13.27) the kidney" (see 5.37); **sangu/i/ren/al** "p.t. the kidneys and blood"

12. **pyel/o:** < G **pyel**/os "basin, trough" < IE **pel-** "container" (see on 3.25); either because of the shape of this inner part of the kidney, or because of its function as a "basin" in the collection of urine

    hem/o/pyel/ec/tas/is "the distention of a renal pelvis, involving blood"

13. **pelv(i)/o, pelv/i:** < L **pelv**/is "basin" < IE **pel-** (see on 3.25); specialized in a uro-genital context to designate the renal pelvis (see on 12 above)

    ren/i/pelv/ic "p.t. the renal pelvis and kidney"

14. **ureter/o:** < Modern L (> E) **ureter** < G **oureter** < **our**/ein (5 above); the syllable "**-ter-**" may be related to the second part of the word ar/**ter**/y, or one of these words may have influenced the formation of the other (see on 5.16)

    typhl/o/ureter/o/stom/y "the making of an opening between the ureter and cecum"

15. **cyst/o, cystid/o:** < Modern L **cystis**, **cystid**/is < G **kystis** "sac, bladder" < IE **(s)keut-** "to cover" (see on 2.5;) usually specialized in Medical Terminology to denote the urinary bladder

    chol/e/cyst (9.17) literally, "a bladder [containing] bile;" **lapar/o/cyst/ec/tom/y** "the cutting out of the bladder through the abdominal wall"

16. **vesic/o:** < L **vesic**/a "bladder" > L **vesic**/ul/a (> E **vesic**le [26 below]); usually specialized in Medical Terminology to denote the urinary bladder

    enter/o/vesic/al "p.t. the bladder and intestine"

17. **urethr/o:** < Late L (> E) **urethr**/a < G **our**/ein; the syllable "**-thr-**" is perhaps related to "**-ter-**" in "ure/**ter**" (see on 14 above); the urethra in the male is about ten times as long as in the female, which is one reason that cystitis (so-called "honeymoon disease") is much more frequent in women than in men

    rect/o/urethr/al "p.t. the urethra and rectum"

18. **sperm(at)/o:** < G **sperma**, **spermat**/os "seed, germ" (> E **sperm**) < G **speir**/ein "to sow" < IE **sp(h)er(e)-** "to strew, sprinkle, spread" > E **spr**ead + **spar**k + **spr**inkle + **spr**out + **spr**awl + **spr**ay + **spr**ig + G **spor**/a "seed" (> E **spor**e + **spor**ad/ic)

    spermat/o/zo/on (literally) "an animal seed;" **hemat/o/spermat/o/cel/e** "the protrusion of something involving semen and blood"

19. **semin/o, semen/o:** < L **semen**, **semin**/is "seed" (> E **semen** + **semin**/al + **semin**/ary) < IE **sei-** "to cast, let fall" > E **see**d + **s**ow + L **sin**/ere, **si**t- "to place, lay" (> E **si**t/e + **si**t/u/at/e, etc.)

    semin/al idea "an idea p.t. the seed [of a new or original thought];" **semin/ary** "a place for seeding [young minds]" (for "-ary" see on 37 below); **semin/i/fer/ous** "bearing semen"

20. **osche/o:** < G **osche**/on "scrotum"

    hemat/osche/o/cel/e "the protrusion of something through the scrotum, involving blood"

21. **scrot/o:** < L (> E) **scrot**/um < IE **(s)kreut** (> E **shred**) < IE **(s)ker-** "to cut" > E **shear** + **shar**d + **shar**p + **shor**t + **shar**e + **har**vest ("cutting time") + L **cor**tex "bark" + **car**o,

carn/is "flesh" (> E **car**n/al + **car**n/at/ion + **car**n/age + **car**n/iv/al + **car**n/i/vor/e + **car**r/ion); the scrotum is presumbably so called because it is "cut" during castration (and cf. the use of "cut" = "castrate" in rural E)

abdomin/o/scrot/al "p.t. the scrotum and abdomen"

22. **orchi/o, orchid/o:** < Modern L **orchis**, **orchid**/os < G **orchis** "testicle" (> E **orchid**)

    orchid "a [plant with roots shaped like] testicles;" **orchid/o/rrhaph/y** "the suturing of a testis"

23. **test/o, test/i/cul/o:** < L **test**/is "witness; testicle" (> E **test**/ament + **test**/i/fy + at/**test** + in/**test**/ate + pro/**test**, etc. + L **test**/i/cul/us) + **test/i/cul**/us (> E) "**testicl**e;" the word "testis" came to designate the male gonads because they were sworn by in court, or (less likely) because their possession was a necessary prerequisite to bearing legal witness

    test/i/cl/e (literally) "a little witness;" **test/o/path/y** "a disease of the testes"

24. **epi/didym/o:** < Modern L (> E) **epi/didymis**, **epi/didymid**/is "the part upon the twins" < G **epi-** "upon" (13.2) + **didym**/os "double, twinned;" G **didym**/os (> E **-didym**/us) is reduplicated < G **dy/o- "two"** < IE **dwou-**; the "epididymis" is a structure attached to the rear upper surfaces of both testes, and consisting mostly of their excretory ducts, which lead into the vas deferens

    orchi/o/epi/didym/it/is "the inflammation of the epididymis and testes"

25. **vas/o:** see on 5.15; the vas de/fer/ens ("the vessel [which is] bearing [8.23] away [13.29]") carries semen from the epididymis to the urethra

    vas/ec/tom/y "the cutting out of the vas deferens"

26. **vesic/ul/o:** see 16 above; L vesic/ul/a "a little bladder" is specialized in Medical Terminology to denote a small cavity filled with fluid, and in a uro-genital context denotes a seminal vesicle, or "a little cavity filled with semen"

    vesic/ul/ec/tom/y "the cutting out of a seminal vesicle"

27. **gon/e/cyst/o:** a modern coingage, literally "a bladder (15 above) of [materials involved in] production (1.23)"

    gon/e/cyst/it/is "the inflammation of a seminal vesicle"

28. **spermat/o/cyst/o:** a modern coinage, literally "a bladder (15 above) of semen (18 above)"

    spermat/o/cyst/o/tom/y "the cutting of a seminal vesicle"

29. **pro/stat/o:** < Medieval L **pro/stat**/a < G **pro/stat**/es "one standing before" < G **pro-** (13.19) + **stat-** (< IE **sta-** "to stand;" see on 1.53); presumably so-called because it "stands before" the penis; it is a gland (occurring only in males) which surrounds the urethra just below the bladder and excretes an alkaline fluid which is a component of semen

    pro/stit/ute "one who stands before;" Roman prostitutes "stood before" brothels at arches (= L "fornic/es" > E fornic/at/ion "an [action at the] arches"); **pro/stat/o/megal/y** "the enlargement of the prostate"

30. **phall/o:** < L **phall**/us < G phall/os < IE **bhel-, bhle-** "to swell, inflate" (see on 5.17)

    phall/ic "p.t. the penis;" **phall/o/plast/y** "the surgical repairing of the penis"

31. **pen/o:** < L **pen**/is "tail, penis" > L **pen**/i/cill/us "a little tail" (> E **pen**/i/cill/in "a substance [with features resembling] little tails") hence "a brush" (> E **pen**/cil)

    pen/cil (originally) "a [brush for writing, resembling a] little tail;" **pen/it/is** "the inflammation of the penis"

32. **balan/o:** G **balan**/os "acorn" < IE **gwel-** "oak, acorn" (see on < 5.30) the "glans pen/is" (= "acorn of the penis"), which is the "head" of that organ, is presumably so-called from its appearance

    balan/o/plast/y "the surgical repairing of the glans penis"

33. **o/o:** < G **oi**/on "egg" (> E **o**/o/phor/o- [36 below]) < IE **owjom-** "of a bird" (> L **ov**/um [34 below; > E **ov**/um + **ov**/ary (37 below) + **ov**/al, etc.+ (through French l'**oeuf**, by "false etymology") l**ov**e "a score of zero in tennis"]) < IE **awei-** "bird" > L **av**/is (> E **av**/i/at/ion, etc. + **av**/i/ary "place for birds" + **av**/i/an + **o**strich) + probably E **e**gg

    av/i/at/ion "the [act of resembling a] bird;" **o/o/gen/ic** "producing eggs"

34. **ov/o:** < L (> E) **ov**/um < IE **owjom-** (see on 33 above)

    ov/ary (literally) "a place for eggs" (for "-ary" see on 37 below); **ov/o/gen/ous** "produced by an egg"

35. **men/o, em/men(i)/o:** < G **men** (> E **mon**th + **moon**) + G **em/men**/a "**men**s/es" (< **en-** [13.15] + **men** "in a month") < IE **me-** "to mark off, measure" (see on 1.63)

    em/men/agog/u/e "something which stimulates [the flow of] menses;" **men/o/paus/e** "the stopping of menstruation"

36. **o/o/phor/o:** < Modern L (> E) o/o/phor/on "something which carries eggs" < G **oi**/on "egg" (33 above) + **phor**/os; G **phor**/os < **pher**/ein "to bear, carry" < IE **bher-** "to carry, bring" (see on 8.23)

    o/o/phor/aux/e "the enlargement of the ovary"

37. **ov/ar(i)/o:** < L **ov/ari**/um "place for eggs" (> E **ovary**) < L **ov**/um "egg" (34 above) + < L **-ari**/um "place for" (notice that this form is unrelated to L -ar/is "pertaining to" [1.5], despite the fact that "-ary" is a derived form of both); cf. E libr/**ary**, gloss/**ary**, etc. as well as aqu/**ari/um** + terr/**ari/um**, etc.

    ov/ari/an "p.t. the ovaries"

38. **salping/o:** < G **salpinx**, **salping**/os "war-trumpet, trump;" used in Medical Terminology metaphorically to denote any structure resembling a "tube" (see 39 below for what is probably the origin of this "translated" or imitated metaphor), but especially the uterine tubes, which carry ova from the ovaries to the uterus; they are often called the oviducts ("ducts for eggs") or the Fallopian tubes (after the Italian anatomist Gabriello Fallopio [1523-62], credited with first describing them)

    celi/o/salping/ec/tom/y "the cutting out of the uterine tubes through the abdominal wall"

39. **tub/o:** < L **tub**/us "tube, pipe" (> E **tub**/e) probably < L **tub**/a "trumpet," especially "war-trumpet" (which was straight rather than curved); like G "salpinx," tub/o is used metaphorically in Medical Terminology (see on 38 above)

    ov/ari/o/tub/al "p.t. the uterine tubes and ovaries"

40. **hyster/o:** < G **hyster**/a "uterus" probably < IE **udero-** "belly" (see on 5.11)

    hyster/ia originally "an abnormal condition involving the uterus;" the use of the term in psychology is due to an ancient misconception (see also 41 below); **hyster/ec/tom/y** "the cutting out of the uterus"

41. **metr/o:** < G **metr**/a "uterus" < G **meter, metr**/os "mother" (> E **metr**/o/pol/is "mother city," etc.) < IE **mater** > E **mother** + L **mater**, **matr**/os (> E **mater**n/al, etc.) possibly from an echoic IE root **ma-** denoting the sound of a infant suckling > IE **mamma** (> G **mamm/a** > E **mamm**/o- "breast;" see on 2.28); the notion of the

uterus as "mother" is reflected in a Shakespearean passage which alludes to the Medieval idea of the "creeping mother" (= "wandering uterus") to denote madness or "hyster/ia", a mental condition thought to originate in the uterus (see on 40 above):

> Lear: O, how this mother swells up toward my heart
> Hysterica passio, down, thou climbing sorrow,
> thy element's below. *King Lear* II.iv.55-57

(Note that "hyster/ic/a passio" means "the suffering p.t. the uterus")

endo/metr/it/is "the inflammation of the inside (13.14) [layer of] the uterus"

42. **uter/o:** < L **uter**/us "womb" < IE **udero-** "belly" (see on 5.11)

uter/in/e tube "a tube p.t. the uterus;" **uter/o/meter** "an instrument for measuring the uterus"

43. **cervic/o:** see on 2.17

cervic/al cancer (literally) "cancer p.t. the neck[-like part of the] uterus;" **uter/o/cervic/al** "p.t. the cervix of the uterus and the [whole] uterus"

44. **trachel/o:** see on 2.18

trachel/it/is (literally) "the inflammation of the neck[-like part of the] uterus;" **lapar/o/trachel/o/tom/y** "the cutting of the cervix of the uterus through the abdominal wall"

45. **colp/o:** < G **kolp**/os "fold" (> E **gulf**) probably < IE **kwel-** "to turn" (see on 4.26)

celi/o/colp/o/tom/y "the cutting of the vagina through the abdominal wall"

46. **vagin/o:** < L **vagin**/a "scabbard, sheath" probably < L **vas** (see on 5.15); the anatomical use in a uro-genital context, rare in surviving Latin texts (Plautus, *Pseudolus* 4, 7, 85), probably began as a particularly violent piece of military slang; note further that the original meaning, "sheath," is retained in the *Nomina Anatomica*

vagin/ism/us "a spasm of the vagina"

47. **clitor(id)/o, clitor/i:** < Modern L **clitoris**, **clitorid**/is < G **kleitoris** < G **klit**/ys "hill" < IE **klei-** "to bend, lean" > E **lea**n + **la**dder + G **kli**n/ein "to bend, lean" (> G **kli**n/e "bed" > E **cli**n/ic) + **kli**max, **kli**mact/os "ladder" (> E **cli**max + **cli**mact/ic) + **kli**ma, **kli**mat/os (> E **cli**mate) + L **cli**n/are "to bend, lean" (> E de/**cli**n/e + in/**cli**n/e + pro/**cli**v/ity + re/**cli**n/e, etc.)

clitor/o/plast/y "the surgical repairing of the clitoris"

48. **vulv/o:** < L **vulv**/a "wrapper, covering" < IE **wolg-** (see on 5.10)

    peri/ne/o/vulv/ar "p.t. the vulva and perineum"

49. **epis(i)/o:** < G **episi**/on "pubic region"

    episi/o/tom/y "the cutting of the vulva [and perineum]"

50. **nymph/o:** < L (> E) **nymph**/a (> E **nymph** + **nymph**et, etc.) < G **nymph**/e "young woman, bride; pupa" < IE **sneubh-** "to marry" > L **nub**/ere "to marry" (> E **nub**/ile + **nup**t/ial + con/**nub**/ial, etc.)

    nymph/o/tom/y "the cutting of the nymphae"

51. **hymen/o:** < G **hymen** "membrane," hence "[god of] marriage" < IE **syumen-** "seam" < IE **siw-** "to sew" (see on 8.17)

    hymen/e/al "[a] wedding [song];" **hymen/it/is** "the inflammation of the hymen"

ETYMOLOGICAL NOTES — CHAPTER 11

1. **psych/o:** < G **psych**/e "breath," hence "spirit" (for the idea of the "breath" being the "soul" see on 6.18) < IE **bher-** "to blow, cool;" the pretty (late G) myth of Psyche and Eros (or Cupid), involving personifications (G Eros = "sexual desire" [5 below], L Cupid/us [> E Cupid] = "desire" [> E cupid/ity + con/cup/isc/ent]), is almost an allegory: a jealous Aphrodite/Venus (= "sexual love;" > E Aphrodisiac + vener/e/al) torments Psyche until she is reunited with Eros/Cupid and made immortal, as if "soul" can only escape "love's" tormentings by union with "desire"

    psych/o/log/y "the study of the mind;" **psych/e/del/ic** "p.t. the manifestation of the mind;" **psych/o/therap/y** "treatment by means of the mind"

2. **phren/o:** see on 6.15

    schiz/o/phren/ia originally "an abnormal condition involving a split mind," the term is now used to describe a disease, with diverse symptoms, having nothing to do with a "split mind;" **phren/o/log/y** "the study of the mind [by means of examination of the lumps of the skull]" (popular in the early 19th century and long since discredited, the basic concept found expression Brodmann's areas); **phren/o/trop/ic** "preferentially affecting the mind"

3. **ide/o:** < L (> E) < G **ide**/a "form, appearance" < IE **widswo-** < IE **weid-** "to see, know" (see on 1.10); by an interesting twist "idea" came to designate what exists in the mind as opposed to what is merely seen (> E "ideal" "p.t. a perfect archetype or pattern existing only in the mind")

   ide/o/log/y "[a set of doctrines derived from] the study of ideas;" **ide/o/gland/ul/ar** "p.t. [the effect upon] glands [caused by] ideas"

4. **neur/o:** see 4.7

   neut/ot/ic "p.t. an abnormal condition involving the emotions;" **neur/o/psych/o/path/y** "a disease involving the mind and emotions"

5. **er(ot)/o:** < eros, **erot**/os "love, desire;" personified in later G mythology as the son of Aphrodite, goddess of sexual love or infatuation (although Hesiod names him as one of the very first offspring of Gaia) and equated with L Cupid/us (see on 1 above)

   erot/ic "p.t. sexual desire;" **erot/ic/a** "[things] p.t. sexual desire;" **erot/o/path** "one with a disease involving sexual desire"

6. **nyct/o:** < G **nyx**, **nykt**/os < IE **nekwt-** > E **night** + L **nox**, **noct**/is (> E **noct**urn/al); see also on 1.32

   nocturn/al "p.t. the night;" **nyct/o/phil/ia** "a morbid fondness for (20 below) the night"

7. **hypn/o:** < G **hypn**/os "sleep" < IE **swep-** > L **sop**or "sleep" (> E **sop**or/i/fic "producing sleep") + **somn**/us "sleep" (> E in/**somn**/ia + **somn**/ambul/ist "one who walks [in] sleep" + **somn**/olent "sleepy")

   hypn/os/is (literally) "an abnormal condition involving [induced] sleep;" **hypn/o/gen/ic** "producing sleep"

8. **oneir/o:** < G **oneir**/os "dream"

   oneir/o/crit/ic "p.t. the interpretation of dreams;" **oneir/o/mancy** "prophecy by means of dreams;" **oneir/odyn/ia** "pain involving dreams"

9. **narc/o:** < G **nark**/e "numbness, stupor" < IE **nerk-** (> G **narc**iss/os > **Narc**iss/os, a boy in G myth who died of self-love and became the flower [> L > E **narc**iss/us + **Narc**iss/us]) < IE **(s)ner-** "to twist, entwine" > E **snar**e + **snar**l "to tangle" + **narr**ow; E "narc" is widely felt as a clip of "narc/ot/ic agent," but note British Slang "nark" (= "informer") < Romany (= Gypsy) "nak" (= "nose") < IE "nas" (= "nostril;" see on 6.2)

   narc/ot/ic "p.t. an abnormal condition involving stupor;" **narc/ot/iz/e** "to [induce] an abnormal condition involving stupor;" **hyster/o/narc/o/leps/y** "a seizure involving (30 below) stupor and hysteria (15 below)"

10. **pharmac/o:** < G **pharmak**/on "drug, medicine, poison"

    pharmac/ist "one who specializes in drugs;" **pharmac/o/gnos/y** "the knowing of [the sources of] drugs;" **pharmac/eut/ics** (< G pharmak/eu/ein "to use drugs") "the science [relating to] drugs"

11. **esth/es(i)/o** [= **aesthes(i)**/o]: < G **aisth/es**/is "perception" < IE **awis-** "to perceive" > L **aud**/ire "to hear" (> E **aud**/it + **aud**/it/ion + **aud**/i/ence + **aud**/it/ory + **aud**/it/ori/um, etc.)

    esth/et/ics (= aesth/et/ics) "the science of perceived [beauty];" **esth/et/e** (= aesth/et/e) "[one who] perceives [beauty];" **esth/es/i/o/meter** "an instrument for measuring perception"

12. **an/esth/es(i)/o** [= **an/aesth/es(i)**/o]: < G **a-**, **an-** "without, lack of" + **esth/es(i)**/o (11 above)

    an/esth/et/ic (= an/aesth-) "p.t. the loss of perception;" **an/esth/et/iz/e** "to [cause] loss of perception"

13. **hallucin/o:** < L **hallucin**/are < G **alu**/ein "to be confused"

    hallucin/o/gen/ic "producing hallucinations;" **hallucin/at/ory** "p.t. hallucinations"

14. **nos/o:** < G **nos**/os "disease;" the word is unrelated to E "nausea" (< G naus/ia "an abnormal condition involving ships" < G naus "ship" [> E naut/ic/al, etc.]; L nav/is "ship" [> E nav/al, etc.] is cognate) but the coincidence of similarity of sound and meaning may provide a useful mnemonic device

    nos/o/graph/y "the recording [in writing] of [symptoms of] diseases;" **nos/o/log/y** "the study of diseases"

15. **hyster/o:** hysteria, an exhibition of uncontrollable emotion occurring when one is under extreme stress or anxiety, has of course long been known to have nothing to do with the uterus; see on 10.40

    hyster/o/psych/os/is "an abnormal condition involving the mind and hysteria"

16. **epi/lept/o:** < G **epi/leps**/is "a seizing upon" < G **epi-** "upon" (13.2) + **lamb**/an/ein "grasp, seize;" G **lamb-** (> E **-leps**/y "a seizure" [30 below]) < IE **(s)lagw-** "to seize" > E **latch** + perhaps **lock** + G (> E) **lem**ma "a grasped [idea]" (hence "proposition assumed or proven to be true") + di/**lem**ma "double proposition;" like a large and increasing number of disorders traditionally regarded as psychological, epilepsy is now known to be a result of physiological problems

    epi/derm/is "something upon the skin;" **epi/lept/ic seizure** "a seizure seizing upon [the mind];" **epi/lept/o/gen/ic** "producing epilepsy"

17. **pseud/o:** < G **pseud**/ein "to deceive"

    pseud/o/nym "a false name;" **pseud/o/psych/ot/ic** "falsely p.t. an abnormal condition involving the mind"

18-19. -phob-: < G **phob**/os "fear;" specialized in Medical Terminology to designate an abnormal (hence "morbid") fear which is unrealistic and results in exteme anxiety (for example, fear is normal and perhaps even useful during an airplane crash, but fear of flying in general may be a phobia)

18. **claustr/o/phob/ia** "a morbid dread of [being] closed (see 3.5) [in]"

    erot/o/phob/ia "a morbid dread of sexual desire"

19. **xen/o/phob/e** "one with a morbid dread of strangers"

20-24. -phil-: < G **phil**/os "loved, loving;" specialized in Medical Terminology to denote an abnormal (hence "morbid"), sometimes uncontrolable, attraction or obsession

20. **claustr/o/phil/ia** "a morbid fondness for [being] closed (3.5) [in]"

    pharmac/o/phil/ia "a morbid fondness for drugs"

21. **claustr/o/phil/ic** "p.t. a morbid fondness for [being] closed [in]"

22. **bibli/o/phil/e** "one with a morbid fondness for books"

    scop/o/phil/e "one with a propensity to examine (1.62) [naked bodies]"

23. **cyt/o/phil** "something with an affinity for cells"

24. **hem/o/phil/i/ac** 1) "one with a propensity to [lose] blood [= to bleed];" 2) "having a propensity to bleed"

25-27. -man-: < G **man**/ia "madness, frenzy, enthusiasm" < G **man**than- "learn" probably < IE **men-** "to think" > E **min**d + L **men**s, **men**t/is (> E **men**t/al, etc.) + Sanskrit (> E) **man**tr/a + G (> E) **man**t/is "prophet" (> E necr/o/**man**cy "divination by means of dead bodies" + oneir/o/**man**cy, etc.); literally "an abnormal condition of the mind," "man/ia" has been specialized in Medical Terminology into a synonym for "-phil/ia"

25. **klept/o/man/ia** "a morbid fondness for stealing"

26. **nos/o/man/ic** "p.t. a morbid fondness for [being] diseased (14 above)"

27. **klept/o/man/i/ac** 1) "p.t. a morbid fondness for stealing;" 2) "one with a morbid fondness for stealing"

28. **-esth/es/ia:** see 11 above

    trich/o/esth/es/ia "the perception of the hair [being touched]"

29. **-an/esth/es/ia:** see 12 above

    trich/o/an/esth/es/ia "the loss of perception of the hair [being touched]"

30. **-leps/y:** see 16 above

    narc/o/leps/y "a seizure involving stupor"

31. **-lagn/ia:** < G lagn/os "lustful, salacious"

    klept/o/lagn/ia "sexual gratification involving stealing;" in 1993 there was a (possibly fake) news report about a woman who was acquitted of a shoplifting charge when this (presumably rare) condition was diagnosed

ETYMOLOGICAL NOTES — CHAPTER 12

1. **hydr/o:** < G **hydor**, **hydr**/os "water" < IE **ur-** (see on 7.14)

   hydr/o/gen "a substance which produces water [when it reacts with oxygen];" **hydr/o/electr/ic** "p.t. electricity [generated by] water"

2. **hygr/o:** < G **hygr**/os "moist, fluid" < IE **wegw-**, **ugw-** "moist" > E **wak**e "[track left by a boat in] water" + L **hum**/ere > E **hu**m/id + L (> E) **hu**m/or "fluid;" the extreme shift of meaning indicated by a phrase like "sense of humor" occurred as a result of the ancient belief that temperament was determined by the relative amounts of the "four humors" (see on 5.2 and 9.38) found in an individual; compare "transitional" phrases such as "in a bad humor" and "good-humored"

   hygr/o/meter "an instrument for measuring moisture;" **hygr/o/therm/o/graph** "an instrument for recording heat and moisture"

3. **aer/o:** < G **aer** "air, mist" > E **air** + G (> L > E) **aur**/a

   aer/o/plan/e "a thing which soars on air;" **aer/o/naut/ics** "the science of sailing in air;" **aer/odont/alg/ia** "pain involving the teeth and involving air"

4. **phys/o:** < G **phys**/a "bellows" < IE **phus-** < IE **pu-**, **phu-** "to blow" > L **pu**st/ul/a (> E **pu**st/ul/e "a little blown [-up blister];" but "pus" [26 below] is apparently unrelated); G "phys/is" (= "growth;" see on 5.32) is unrelated

   phys/o/metr/a "a collection of gas in the uterus"

5. **sarc/o:** < G **sarx**, **sark**/os "flesh" > G **sark**az/ein "to [tear the] flesh" > E **sarc**ast/ic + **sarc**asm; it is interesting to note that G "sarx," E "flesh" and L "earn/is" (= "flesh") come from IE roots which, though not related to each other, all mean "to cut or tear off"

   sarc/o/phag/us "a thing which eats flesh"

6. **hist/o:** < G **hist**/os "loom, web;" specialized in Medical Terminology to denote groups of cells of the same general type, so that, for example, tendon, cartilage and bone (but not muscle and skin) all exhibit cellular similarities enabling them to be classified as "connective tissue"

   hist/o/log/y "the study of tissues"

7. **syn/ov(i)/o:** < Modern L (> E) **syn/ovi**/a (coined by the Swiss physician and alchemist Paracelsus [1493-1541]) probably < G **syn** "together, with" (13.24) + L **ov**/um (10.34) "a [substance] with the egg, egg-white;" used metaphorically in Medical Terminology to designate a transparent, viscid fluid, secreted by the synovium (or synovial membrane), as lubrication in joint cavities, tendon sheathes and bursae

   syn/ov/it/is "the inflammation of a syn/ovi/al [membrane]"

8. **epi/thel/i/o:** < Modern L (> E) **epi/thel/i**/um "a substance upon a nipple" < G **epi-** (13.2) + **thel**/o- (2.29); used in Medical Terminology to denote a major tissue category which includes the skin as well as the inner lining of most cavities

   epi/derm/is "something upon the skin;" **epi/thel/iz/e** "to [cover with] epi/thel/i/um"

9. **kary/o:** < G **kary**/on "nut, kernel" < IE **kar-** > E **har**d + G **kra**t/os "strength" (> E **-cra**t + **cra**cy, in e.g. dem/o/**cra**t + aut/o/**cra**cy) + (reduplicated) IE **kar-kar-** (> L **cancer**, **cancer**/is "crab" [> E **cancer** + **canker**] + G **karkin**/os "crab" [> E **carcin**/o/genic "producing cancer"); E "kernel" is unrelated; the nucleus of a cell is a central structure containing that cell's hereditary material (DNA)

   kary/o/kin/et/ic "p.t. the movement of nuclei"

10. **nucle/o:** < L (> E) **nucle**/us < Old L ***nuc/ul**/e/us "little nut, kernel" < L **nux**, **nuc**/is < IE **kneu-** "lump, nut" > E **nut**; the hypothetical (but etymologically inevitable) Old L word will please those criticized for pronouncing "nuclear" as if it were (by metathesis) "nucular"

    nucle/ar "p.t. the nucle/i [of atoms]"

11. **fibr/o:** < L **fibr**/a; perhaps related to L **fil**/um "thread" (> E **fil**/ament + **fil**e "[to arrange papers, originally by means of] threads"); fibres, along with elastic tissue (13 below), are the main components of muscle

    fibr/o/plas/ia "the formation of fibres"

12. **in/o, in/os/o:** < G **is**, **in**/os "muscle, fibre; strength" < IE **wei-** "to twist" > E **w**ire + **wi**the + L **vi**s "force" (> E **vi**m) + **vi**t/is "vine" (literally "twister") > E **vi**t/i/cult/ure + **vi**se)

    in/o/hymen/it/is "the inflammation of the hymen, involving fibres"

13. **elast/o, elast/ic/o:** < G **elast**/ik/os < G **elau**n/ein "to drive, beat out" < IE **ela-** "to drive, move, go" > probably E **la**ne + L **la**min/a "layer" (> E **la**min/at/e, etc.); elastic tissue and fibres (10-12 above) are the main components of muscle

    elast/o/rrhex/is "the rupturing of elastic tissue"

14. **muc/o, muc/i, muc/os/o:** < L (> E) **muc**/us "snivel" < IE **meuk**, **meug-** "slime, slippery, to slike" > G **myx**/a (15 below) + **myk**es, **myk**et/os "fungus" (> E **myc**/o, **myc**/et/o "fungus") + E **muck** + **meek** (originally = "soft, pliant"); mucus is a thick, slippery lubricant of mucous membranes, which line most of the body's passages and inner cavities, including those of the reproductive, urinary, digestive and respiratory tracts

    muc/ous "p.t. muc/us"

15. **myx/o:** < G **myx**/a (see on 14 above)

    myx/o/neur/os/is "an abnormal condition involving the nerves and mucus"

16. **blenn/o:** < G **blenn**/os "mucus"

    blenn/o/stat/ic "p.t. the stopping of [the flowing of] mucus"

17. **ser/o, ser/os/o:** < L (> E) **ser**/um "whey" (= the watery part of milk, left over after making cheese) < IE **ser-** "to flow" (see on 5.28); in Medical Terminology "ser/um" is the clear yellowish part of blood (containing the antibodies) left after solids are removed

    ser/o/muc/ous "p.t. mucus and serum"

18. **lip/o, lipar/o:** < G **lip**/os "fat" + **lip/ar**/os "[smeared with] fat, oily" < IE **leip-** "to smear with grease; stick to" > E **leav**e (originally "to let remain;" the current meaning, "to go [from a place]," develops from the idea of "leaving" the place itself) + **lef**t (but not "leaf") + perhaps **liv**er; IE **leip-** < IE **lei-** "slimy, sticky" > L **li**m/us (> E bird/**li**me) + G **lei**/os "smooth" (> E **lei/o-**); "lipid" refers to a large group of fatty or oily molecules

    lip/o/suct/ion "the [removal by] suction of fat;" **lip/o/lys/is** "the disintegration of fat"

19. **adip/o, adip/os/o:** < Modern L **adip/os**/us < L **adeps**, **adip**/is "soft fat" (a term which designates materials like butter and lard, as opposed to animal fats [which are called "hard fats"])

    adip/os/e tissue "tissue p.t. fat" (a type of connective tissue); **adip/os/ity** "the [state of being] fat;" **adip/o/hepat/ic** "p.t. the liver and fat"

20. **steat/o:** < G **stear**, **steat**/os "stiff fat, tallow, suet" < IE **stai-** "to become thick, stiffen, compress" > E **st**one + **st**iff + German (> E) **st**ein + L **st**ill/a "a drop" (> E **st**ill "dripping [apparatus]" + di/**st**il + in/**st**il, etc.) + **st**ip/are "to compress" (> E [through Portugese] **st**ev/edore "one who compresses [cargo]")

    steat/o/pyg/ia "an abnormal condition involving buttocks [which are] fat;" **steat/o/necr/os/is** "the death of fat[ty tissue]"

21. **pimel/o:** < G **pimel**/e "soft fat, lard" < G **pi**/on "plump" < IE **pi-** "to be fat" (see on 5.31)

    pimel/os/is "an abnormal condition involving fat"

22. **seb/o:** < L (> E) **seb**/um "stiff fat, tallow" (> [through French] E **su**/et) < IE **seib-** "to trickle, run out" > E **soap**; specialized in Medical Terminology to denote a thick, semifluid substance consisting of lipids and secreted by sebaceous glands in the skin

    seb/ac/e/ous gland "a gland p.t. sebum;" **seb/o/rrhe/a adip/os/a** "the flowing of sebum, p.t. fat"

23. **cer(umin)/o:** < Modern L **cer/umen**, **cer/umin**/is (> E **cerumen** "[ear-]wax") < L **cer**/a "wax" (> E **cer**/ement "waxed [cloth for burial]") < G **ker**/os "wax;" the combining form usually designates earwax

    cer/ac/e/ous "p.t. wax;" **adip/o/cer/e** "a [substance consisting of] wax and fat (19 above)

24. **chol/e/ster(ol)/o:** < G **chol**/e "bile" (9.38) + **stere**/o "solid" > E **chol/e/ster**/ol "a solid substance of bile;" so named presumably because it was first isolated in bile, but it occurs in all body tissues; when isolated, it is a white crystalline substance

    stere/o shortened < stere/o/phon/ic "p.t. solid sound;" **chol/e/ster/ol/ur/ia** "the abnormal presence of cholesterol in the urine"

25. **(h)idr/o:** < G **hidr**/os "sweat" < IE **sweid-** > E **sweat** + L **sud**or (> E **sud**or/i/fer/ous + **sud**/at/ori/um "place for sweating")

    men/hidr/os/is "an abnormal condition involving sweat and menstruation"

26. **py/o:** < G **py**/on < IE **pu-** "to rot, stink" > L **pu**s, **pu**r/is (> E **pu**s + **pu**r/ulent) + **pu**tr/id/us (> E **pu**tr/id + **pu**tr/i/fy) + E **fo**ul; a thick, yellow fluid produced by the body's defence reaction against bacterial invasion, pus consists of dead cells and bacteria as well as serum

    putr/id "p.t. pus;" **pur/ulent** "p.t. pus;" **py/o/pneum/o/peri/cardi/um** "a collection of air and pus in the pericardium"

27. **lith/o:** see 1.40; calculi, usually pebble-like hard masses which consist of crystallized calcium salts (hence "calculi," for which name see further on 59 below), can occur in many parts of the body; those occurring in the gallbladder (gallstones) are made mostly of cholesterol

    lith/o/graph/y (originally) "the recording of [prints made by means of a flat] stone;" **lith/o/tom/ist** "one who cuts out calculi"

28. **kerat/o** see 3.4 and 4.20-1

    kerat/in "a substance which [is the principle constituent of] horn [and horn-like tissues]" (in the human body it is a component of finger and toe nails and is also present in the hair and skin)

29. **alcohol/o:** < Medieval L < Arabic **alkuhl** "antimonic powder"

    alcohol/o/phil/ia "a morbid fondness for alcohol"

30. **alkal/o, alkal/i:** < Modern E **alkaly** < Arabic **al-qali** "ashes [of salt-wort]" < Arabic **qalai** "to roast in a pan" > E **kall**/o "potassium" (66 below); in the body, alkaline substances (which are bases, neutralizing acids) include blood, bile and pancreatic juice

    hem/o/alkal/i/meter "an instrument for measuring the alkali in blood"

31. **pur(in)/o:** < German **pur/in** (> E **pur/in**/e) blended < L **pur**/us + Modern L **ur**/ic/um "uric acid" + **-in** "a pure substance of uric acid;" L **pur**/us (> E **pur**/e + **pur**/i/fy + **pur**/ge, etc.) < IE **peu-** "to cleanse" > L **pu**t/are "to cleanse, prune, set in order" hence "think" (> E **pu**t/at/ive + com/**pu**t/e + im/**pu**t/e + re/**pu**t/at/ion, etc.); purine is·an organic base, which on oxidation forms uric acid

    pur/in/em/ic "p.t. the abnormal presence of purine in the blood"

32. **amyl/o:** < L < G **a/myl**/on "something not milled" (presumably because starch, a carbohydrate, [unlike flour, another carbohydrate] is not produced by milling) < G **a-** "without, lack of, not" + **myl**/e "mill;" G **myl**/e < IE **mel-** "to grind, crush" (see on 1.31)

    amyl/os/e "something p.t. starch;" **amyl/o/clast/ic** "p.t. the breaking [up] of starch [during digestion]"

33. **acid/o:** < L **ac/id**/us < ac/ere "to be sharp, sour" (see on 2.7); an acid is a substance which in reaction to a base forms salts and water; in the body, stomach fluids are acidic

    acid/o/phil "something with an affinity for acids"

34. **acet/o, acet/i:** < L **ac/et**/um (> E **ac/et**/on/e + **ket**/on/e + **acet**/i/sal/i/cyl/ic, etc.) < L **ac**/ere "to be sharp, sour" (see on 2.7)

    acet/ic "p.t. acid"

35. **keton/o:** < German **keton** < French **acet/on**/e < E **acet**/o (34 above); ketone is an organic compound in which two hydrocarbon groups are linked by a carbonyl group; ketone bodies, which contain ketones, are produced during the metabolism of fat

    ket/o/acid/ur/ia "the abnormal presence in the urine of acids and ketone bodies"

36. **galact/o:** < G **gala**, **galakt**/os "milk" (> E **galax**y) < IE **glak-** "milk" > L lac, **lact**/is (37 below; > E **lact**/at/ion, etc.)

    galaxy "the milky [part of the night sky]" (cf. E "Milky Way"); **galact/o/phag/ous** "p.t. the ingestion of milk"

37. **lact/o:** < L **lac**, **lact**/is "milk;" see on 36 above

    lact/at/ion "the [production of] milk;" **lact/o/gen/es/is** "the production of milk"

38. **ole/o:** < L **ole**/um (> E **oil** + petr/**ole**/um, etc.) < G **elai**/on "olive [oil]" < G **elai**/a "olive" (> L **oliv**/a [> E **oliv**/e])

    petr/ole/um: "oil of rock;" **lin/ole/um** "a [substance made partly from] oil of flax (= linseed oil);" **seb/o/rrhe/a ole/os/a** "the flowing of sebum, p.t. oil"

39. **glyc/o:** < G **glyk**/ys "sweet" (> E **glyc**/er/in) < IE **dlku-** "sweet" > probably L **dulc**/is "-sweet" (> E **dulc**/et + **dulc**/i/mer); Horace's line (*Odes* 3.2.13) "**dulc**/e et decorum est pro patria mori" ("a sweet and fitting thing it is to die for the fatherland") might be familiar

    glyc/er/in "a sugary substance;" **glyc/o/pex/is** "the fixation of sugar"

40. **sacchar/o:** < L **sacchar**/um "sugar" (> E **sacchar**/in) < G **sakchar**/on (ultimately, through Persian) < (note possible dissimilation) Sanskrit **sarkar** "grit, gravel" hence "granular [sugar]" (< Sanskrit **sarkarah** "pebble") > Persian **sakar** > Arabic **sukkar** > (through Old Italian > Old Spanish > Old French > Middle English) E **sugar**; etymology in this case is useful for what might be called "linguistic archaeology" in

that the Sanskrit (ca. 1700 B.C.) meanings demonstrate that sugar in its granulated form was known much earlier than could otherwise be suggested by physical archaeology or textual evidence

sacchar/in "a sugary substance" (ironically, the substance so called is chemically unrelated to sugar, being derived from coal tar and petroleum); **sacchar/i/fer/ous** "bearing sugar"

41. **opson(in)/o, opsin/o:** < G **opson**i/on "food, provisions;" specialized in Medical Terminology to denote an antibody which enables phagocytes in blood serum to more easily destroy foreign cells

    opson/iz/e "to [do the action of] opsonin"

42. **myelin/o:** < German (> E) **myel/in** < G **myel**/os "bone marrow" (see on 3.18); specialized in Medical Terminology to designate a lipid cellular material which coils to form sheaths around the axons of neurons to improved conductivity

    myel/in sheath (literally) "a sheath [made of] a substance of bone marrow;" **myel/in/o/lys/in** "a substance which disintegrates myelin"

43. **porph(yr)(in)/o:** < G **porphyr**/a "a shellfish [yielding purple dye]" (+ **-in**; > E porphyr/in "a purple substance") > L **purpur**/a > E (note dissimilation) **purpl**e; specialized in Medical Terminology to denote the derivatives of tetrapyrole which are found in all protoplasm and which form the basis for respiratory pigments

    copr/o/porphyr/in/o/gen "a substance which produces porphyrin in the feces"

44. **eos/in/o:** < G **e/os** "dawn" (+ **-in**; > E **eos/in** "a substance [the color] of dawn") < IE **awes-** "to shine" > L (> E) **aur**or/a + L **aur**/um "gold" (> E **aur**e/ate + **Au** [chemical symbol for gold] + L **aur**e/ol/us "little gold [crown]" [> E **aur**e/ol/e]) + E **eas**t + **eas**ter; specialized in Medical Terminology to denote any rose-colored dye or stain

    eos/in/o/phil/ic "having an affinity for eosin"

45. **gel(at)/o, gelat/i:** < L **gel/at**/a "frozen" < L **gel**/are "to freeze" (> E **gel**/id + [through French] **jell**y) < IE **gel-** > E **col**d + **cool** + **chill**; perhaps related to IE gel- "to clench" (see on 2.32)

    gelat/in (literally) "a frozen substance;" **gelat/i/gen/ous** "produced by jelly"

46. **zym/o, en/zym/o:** < German **en/zym** (> E **en/zym**/e) < Late G **en/zym**/os "leavened" < G **en-** "in" (13.15) + **zym**/os "leaven;" specialized in Medical Terminology to denote a substance produced and secreted by cells, which functions as an organic catalyst in the breaking down of complex substances into useable forms

    en/zym/o/log/y "the study of enzymes"

47. **peps/in/o, pept/in/o:** < G **peps**/is "digestion" (> E dys/**peps**/ia + **pept**/ic + **peps**/i + **peps**/in + **pept**/one [50 below]) < G **pess**/ein "to cook, digest" < IE **peqw-** > G **pep**/on "cooked, ripe" (> E **pump**kin) + L **coqu**/ere "to cook" (> E **cook** + [through Old English] **kitch**en + [through French] **cuis**/ine) + Hindi **pakk**a "ripe" (> E **pukk**a "good"); peps/in ("a substance [involved in] digestion") is a digestive enzyme, secreted by the stomach, which breaks down proteins

    dys/peps/ia "an abnormal condition involving defective digestion;" **peps/in/ia** "an abnormal condition involving pepsin"

48. **prot/e(in)/o:** < G **prot**/os "first" (+ **-in**; > E **prot/e/in** "first substance") < IE **pro-** "early, ahead" (see on 13.19); a protein is one of millions of different complex chemical compounds built up from combinations of twenty amino acids and making an essential part of every living cell; during digestion, proteins in food are broken down and the resultant amino acids travel via the blood to body tissues, where new proteins are built from them

    prot/o/type "a first type [or model]" (for "type" < G "typt/ein" ["to strike"] see on 4.35); **prot/e/o/lyt/ic** "p.t. the disintegration of proteins"

49. **album(in)/o:** < L **alb**/us "white" > E **alb**/in/o + **alb**/um "a [book with] white (= "blank") [pages]" + **album**en "[egg] white;" specialized in Medical Terminology to denote a protein found not only in eggs but also in milk, blood and muscle

    alb/in/o "[one who is] whitish;" **album/in/ur/et/ic** "p.t. the passage of albumin in the urine"

50. **pept(on)/o:** < G p**ept/on** "digested thing" < G **pept**/ein < G **pess**/ein (see on 12.47); specialized in Medical Terminology to denote a protein fragment produced during digestion

    pept/o/lys/is "the disintegration of peptone"

51. **colla/gen/o:** < G **koll**/a "glue" (> E **colla**/ge + prot/o/**col**) + **gen-** (see on 1.23); G "koll/a" is apparently not related to IE "gel-" ("to freeze;" see on 45 above), nor to IE "gel-" ("to clench;" see on 2.32); literally "a substance which produces glue," collagen (a protein which is the main component of connective tissues, including bones) is so named because its animal form, when burned, produces a key ingredient (gelatih) of glue

    colla/gen/o/cyt/e "a cell involving collagen"

52. **fibr/in/o:** < L **fibr**/a "thread," (see on 11 above) + G **-in** "a substance of thread;" specialized in Medical Terminology to denote an insoluble protein which resembles thread and is elastic

    fibr/in/o/scop/y "the examination of fibrin"

53. **tox/o, tox/ic/o:** < G **toxik**/on (see on 8.24)

    tox/ic/o/log/ist "one who specializes in the study of poisons"

54. **arsen/o, arsen/ic/o:** < G **arsen/ik**/on "yellow pigment of gold" perhaps < Persian **zar** "gold;" the Greeks (probably wrongly) associated the word with G **arsenik**/os (= "strong," hence "strong poison"), arsenic is a grey metallic element which turns yellow (then black) upon exposure to air, and whose mineral source is often found with gold; a white poisonous powder is prepared from it

    arsen/o/therap/y "treatment by means of arsenic"

55. **metall/o:** < L **metall**/um "mine, quarry," hence "metal" (> E **metal**) < G **metall**/on "mine, quarry"

    metall/ic "p.t. metal;" **metall/urg/y** "the working of metals"

56. **crystall/o:** < L **crystall**/um "ice," hence "crystal" (> E **crystal**) < G **krystall**/os < G **kry**/os "frost" (see on 9.21)

    crystall/ine "p.t. crystals;" **crystall/o/graph/y** "the recording of crystals"

57. **hyal/o:** < G **hyal**/os "glass"

    hyal/oid body "a body [of the eye] resembling glass [in being full of a transparent fluid];" **hyal/in/os/is** "an abnormal condition involving a substance [resembling] glass"

58. **vitr(e)/o:** < L **vitr/e**/us "glassy" (> Late L **vitr/e**/ol/us > E **vitr**/i/ol/e "a [substance which is a] little glassy" [an early name for sulphuric acid]) < L **vitr**/um "glass"

    vitr/i/ol/ic (originally) "p.t. to sulphuric acid" (hence "caustic or biting"); **vitre/ous** "p.t. glass"

59. **calci/o, calc/i:** < L **calx**, **calc**/is "limestone, calcium" (> E **calc**/i/um) > L (> E) **calc**/ul/us "a little limestone" hence "a little stone, pebble" > E **calc**/ul/at/e "to [count by means of] little pebbles;" calcium is an element which is part of one of the main mineral components of bones and teeth

    calc/ul/us 1) "a little stone" 2) (literally) "a [counting as if by means of] little pebbles;" **calc/i/fy** "to make [into] limestone;" **calc/i/pen/ic** "p.t. a deficiency of calcium"

60. **anthrac/o:** < G **anthrax**, **anthrac**/os "[burning] coal" hence "ulcer" (> E **anthrax** "a [disease characterized by black pustules which resemble] coal")

    anthrac/o/meter "an instrument for measuring carbon [dioxide]"

61. **cupr/i:** < Late L **cupr**/um (> E **copper** + **Cu** [the chemical symbol]) shortened < L **cypr**/i/um aes "Cypr/i/an bronze" < G **Kypr**/os (> E **Cypr**/us)

    Cu "copper" (the chemical symbol); **cerebr/o/cupr/e/in** "a substance involving copper and involving the brain"

62. **sider/o:** < G **sider**/os "iron;" "E sider/e/al" ("p.t. stars") is unrelated; in the body, iron is a necessary component of hemoglobin

    sider/ite "an [ore of] iron;" **sider/o/fibr/os/is** "an abnormal condition involving fibre and iron"

63. **ferr/o:** < L **ferr**/um "iron" > E **Fe** + L **ferr**/ari/us "iron worker" > E **farr**/ier

    Fe "iron" (the chemical symbol); **ferr/ous** "p.t. iron"

64. **stann/o:** < Late L **stann**/um "tin" > E **Sn**

    Sn "tin" (the chemical symbol); **stann/ic** "p.t. tin"

65. **thi/o:** < G **thei**/on "brim/stone" hence "sulfur;" "brim" in "brim/stone" (= "burning stone") < OE "bryn-" < IE "bhrenu-" > E "burn"

    thi/em/ia "the abnormal presence of sulfur in the blood"

66. **kali/o, kal/i:** < Modern L **kali**/um (> **K** [the chemical symbol for potassium]) < E **kali** < Arabic **qali** (> E al**kali**; see on 30 above); E "pot/ass/i/um" is similarly made, being a modern "Latinization" of older E "pot/ash;" potassium carbonate, a strongly alkaline material used in making soap and glass, was originally prepared by boiling dry a solution made by leaching wood ashes in iron pots

    K "potassium" (the chemical symbol); **kal/i/ur/es/is** "the passage of potassium in the urine"

67. **iod/o, iod/in/o, iod/i:** < G **i/od**/es "resembling violet" (> E **iod**/in/e "a substance which resembles violet") < G **i**/on "violet" (cognate with L **vi**ol/a [> E **vi**ol/et]) + **eid**/os "form" (see on 1.10); a small amount of iodine is needed in the diet to enable the functioning of the thyroid gland

    violet "purplish-blue; [a] purplish-blue [flower (of the genus **Vi**ol/a)];" **iod/o/therap/y** "treatment by means of iodine"

68. **a/zot/o:** < Modern French < G **a-** "without, the absence of" + **zo**/e "life" (> E **zo**/o/logy, etc.); so named because it is a gas which does not support life; the element is a part of all protoplasm, and is taken into the body only through plant foods, which contain it

    zo/o/log/y "the study of [animal] life;" **ur/o/a/zot/o/meter** "an instrument for measuring nitrogen in the urine"

69. **phos/ph(at)/o, phos/phor/o:** < F **phos/phor**/ate < G **phos/phor**/os "bringer of light" (note that L [> E] Luc/i/fer [see on 8.23] means exactly the same thing) < G **phos**, **phot**/os "light" (> E **phot**/o/graph/y, etc.) + **phor-** "bring" (< G **pher**/ein; see on 8.23, and compare o-/o/**phor**/o [10.36]); G **phos** < IE **bha-** "to shine, gleam" > G **phai**n/ein "to show, appear" (> E **fa**ncy + **fa**ntasy + **fa**ntast/ic + G **phai**n/o/men/on "appearance" [> E **phe**n/o/men/on]); E phos/phate denotes a salt of phosphoric acid, while E phos/phor/us is the name of the element, but in Medical Terminology the two combining forms are loosely used; in the body, phosphorus combines with calcium to form calcium phosphate, which is one of the important mineral components of bones and teeth

    phot/o/graph/y "the recording of [images, by means of] light;" **phos/phor/esc/ent** "beginning to bear light;" **phos/phor/hidr/os/is** "an abnormal condition involving sweat and phosphorus"

70. **hal/o:** < G **hals**, **hal**/os "salt; sea" < IE **sal-** "salt" > E **sal**t + L **sal** (> E **sal**/ine, etc.); "halo" ("surrounding ring of light") is unrelated

    hal/o/gen "a substance which produces salt" (designates a group of five non-metallic chemical elements that readily "produce salts" because of their unstable valence; **hal/oid** "resembling salt"

71. **oxy-, ox/i:** < G **ox**/ys "sharp, acid" < IE **ak-** (see on 2.7); the gas is called "oxy/gen" ("a substance which produces acid") because of certain chemical reactions; the use of only its first element to denote the whole of a compound word is rare; note that in Medical Terminology "oxy-" sometimes retains its literal meaning, as in "oxy/cephal/ic" "p.t. a sharp[-pointed] head"

    oxy/mor/on "a sharp-dull thing," hence "a self-contradictory word or phrase" (e.g. "friendly fire," a term made prominent during the Gulf War of 1991); **oxy/hem/o/glob/in/o/meter** "an instrument for measuring hemoglobin and oxygen"

72. **coni/o:** < L **con**/is "dust"

    coni/os/is "an abnormal condition involving [inhaled] dust"

73. **-oma, -om(at)/o:** Modern L probably from < G carcin/**oma**, carcin/**omat**/os

    carcin/oma "a tumor involving cancer;" **carcin/omat/ous** "p.t. a tumor involving cancer"

74. **onc/o, -onc/us:** < G **onk**/os "mass, bulk"

    onc/o/log/y "the study of tumors;" **onc/o/gen/e** "a gene which produces tumors"

ETYMOLOGICAL NOTES — CHAPTER 13

Prepositional prefixes are etymologically complex in that many of those found in Latin, Greek and English are variously interrelated. For that reason it can be useful to study much of the material in Chapter 13 in a different order. A list of related forms follows.

epi- (2) + **ob**- (33)
hypo- (4) + **sub**- (5, 39)
extra-, **ex**-, **ex**o-, **ect**o- (10-13)
hyper- (1) + **supra**- (3) + **super**- (47)
endo-, **en**-, **int**ra-, **ent**o- (14-17, + 32) + **int**er- (23)
peri- (7) + **par**a- (9) + **pre**- (18, 35) + **pro**- (19, 36) + **per**- (34)
post- (21) + **ab**- (26) + **ap**o- (43)
de- (29) + **di**s- (30) + **di**a- (46)
re- (37) + **re**tro- (20)
com- (28) + **con**tra- (45)
anti- (25) + **ante**- (42)

Note also that the forms discussed below contain many "relics" of comparative suffixes no longer felt as meaningful

1. **hyper-:** < G **hyper** "over, above" < IE **eks/up/er** > L **sup/er** (> E **sup/er** [47 below]) > L **sup/r/a** (> E **sup/r/a-** [3 below]); IE **eks/up/er** < IE **eghs** "out" (see on 11 below) + IE **uper** (< IE **upo-** "up from below" [see on 4 below])

   hyper (clipped < hyper/active) "excessively [active];" **hyper/ferr/em/ia** "the abnormal presence of excessive iron in the blood"

2. **epi-:** < G **epi** "at, on, upon, over, besides" < IE **epi**, **opi** > L **ob** (> E **ob-** "against, near" [33 below])

   epi/dem/ic "[coming] upon a neighbourhood" (i.e., "coming from outside and affecting a whole population"); **epi/derm/is** (literally) "something upon the skin;" **epi/nephr/ec/tom/y** "the cutting out of something upon the kidney"

3. **sup/r/a-:** < L **sup/r/a** (originally a comparative) < L **super**; see 1 above

   super "above;" **sup/r/a/sept/al** "above a septum"

4. **hypo-:** < G **hypo** "under, less than" < IE **upo** "up from below > E **up** + L **sub** (> E **sub-** [5 below]) + IE **up**/er (originally a comparative) > E **ov**er + IE eks/**up**er (see on 1 above)

   hypo/derm/ic "below the skin;" **hypo/gen/es/is** "insufficient production"

5. **sub-:** < L **sub** "under, below" < IE **upo** "up from below;" see on 4 above

   sub/mar/in/e "below the sea;" **sub/cost/al** "below a rib"

6. **inf/r/a-:** < L **inf/r/a** "below" < L **inf/er**/us "low, below" (> E **inf/er**/ior [originally a comparative] + [**inf/er**/n/al + **inf/er**/n/o, etc.) < IE **ndh/er/os** (> E **under**)

   inf/er/ior (originally) "more below," hence (by loss of comparative force) "below;" **inf/r/a/stern/al** "below the sternum"

7. **per/i-:** < G **peri** "around" < IE **per-** "a going beyond, forward;" see on 34 below

   peri/scop/e "an instrument for examining [one's] surroundings;" **peri/arthr/it/is** "the inflammation of something surrounding a joint"

8. **circ/um-:** < L **circ/um** "around, about" (> L > E **circ/a** "about) < L **circ**/us "ring" (> E **circ**/us + **circ**/le + **circ**/ul/ar, etc.) < G **kirk**/os < IE **kirk** < IE **(s)ker-** "to turn, bend" > L **cur**v/us (> E **cur**ve, etc.) + **cru**x, **cru**c/is (> E **cro**ss + **cru**c/i/fy + ex/**cru**c/i/at/e + **cru**s/ade "crossed [expedition]" + **crui**se + E **cru**c/i/at/e + **cru**c/i/form) + G **kor**on/os (> L **cor**on/a [> E **cor**on/a + **cor**on/at/ion + **cor**on/er "one who works for the **cr**own" + crown, etc.])

   circ/um/nav/ig/at/e "to drive a ship around [the earth];" **circ/um/nucle/ar** "around a nucleus"

9. **para-:** < G **para** "at the side of" < IE **para-** < IE **per-** "a going beyond" (see on 34 below)

   para/medic/al "beside [the regular] medical [people];" **para/nephr/oma** "a tumor involving something beside a kidney"

10. **ex/tr/a-:** < L **ex/tr/a** < L **ex/ter-** (originally a comparative; > E **ex/ter**n/al + **ex/ter**/ior); see on 11 below

    ex/tern/al "more outside;" **ex/tr/a/cardi/al** "outside the heart"

11. **ex-:** < L **ex** (= /**eks**/) > L (> E) **ex**/tr/a (10 above) + **ex**/ter/ior + E **ex**/tr/em/e, etc.; < IE **eghs** "out" > G **ex-** + G (> E) **ex**/o- (12 below) + IE **eghs**/tos (probably a superlative) > G **ekt**/os (> E **ect**/o; 13 below)

    ex/**clud**/**e** "to shut out;" **ex**/**an**/**ia** "an abnormal condition involving something outside the anus"

12. **ex**/**o-:** < G **ex**/o < IE **eghs** (see on 11 above)

    ex/**o**/**gam**/**y** "marriage outside [the group];" **ex**/**o**/**skelet**/**on** "a skeleton which is outside [the body]"

13. **ect**/**o-:** < G **ect**/os "outside" < IE **eghs**/**tos** (see on 11 above)

    ect/**o**/**zo**/**on** "an animal [parasite which lives on the] outside [of the host body];" **ect**/**o**/**retin**/**a** "something outside the retina"

14. **end**/**o-:** < G **en**/**d**on originally "in the house" < G **en** "in" (15 below; see on 32 below); **-don** probably < IE **dem-** "join together, build" > L **dom**/us (> E **dom**/e + **dom**/ain + **dom**/in/at/e + **dom**/in/i/on + **dom**/est/ic, etc.) + E **timb**er

    end/**o**/**gam**/**y** "marriage inside [the group];" **end**/**o**/**angi**/**it**/**is** "the inflammation of [a part] inside an artery"

15. **en-:** < G **en** "in" < IE **en** "in" (see on 32 below)

    en/**dem**/**ic** "inside the neighbourhood," hence "within a population;" **en**/**crani**/**al** "inside the skull"

16. **in**/**tr**/**a-:** < L **in**/**tr**/**a** "inside" < **in**/**ter** (23 below; > E **in**/**ter**n/al + **in**/**ter**/ior) < IE **en** "in" (see on 32 below)

    in/**tr**/**a**/**ven**/**ous** "inside a vein"

17. **ent**/**o-:** < G **en**/**t**os "within" < IE **en**/**t**os (probably a superlative) < IE en "in" (see on 32 below)

    ent/**o**/**zo**/**on** "an animal [parasite living] inside [another organism];" **ent**/**opt**/**o**/**scop**/**y** "the examination of the inside of the eye"

18. **pr**/**e-:** < L **pr**/**ae** (> E **pr**/**ae-** [a variant spelling of pre-]) < IE **pr**/**ai** < IE **per** "beyond, a going beyond" (see on 34 below)

    pre/**fix** "a [word element] fixed before [other word elements];" **pre**/**an**/**esth**/**et**/**ic** "before loss of perception"

19. **pr/o-:** < G (+ L) **pro-** < IE **pr/o** "forward" > L **pro**b/are "to test, prove" (> E **pro**b/e + **pro**b/at/e + re/**pro**b/at/e + **pro**ve, etc.) + G (> E) **pro**/t/os "first;" IE **pro** likely < IE **per** (see on 34 below)

    pr/o/spect "[a] looking before;" **pr/o/lact/in** "a substance [occurring] before milk"

20. **re/tr/o-:** < L **re/tr/o** "backward" (originally a comparative) < L **re-** (see on 37 below)

    re/tr/o/spect "[a] looking behind;" **re/tr/o/nas/al** "behind the nose"

21. **post-:** < L **post** "behind, after" < IE **pos** probably < IE **apo-** "away" (see on 26 below)

    post/date "to date after;" **post/epi/lept/ic** "after epilepsy;" **post/ocul/ar** "behind the eye"

22. **trans-:** < L **trans** "across, over" probably < L **tr**/are "to pass" < IE **ter-** "over, beyond" > E **thr**ough + **thor**ough + **thr**ill "a [feeling which goes] through" + nos/**tri**l "nose-hole"

    trans/fer "to carry through [to a destination];" **trans/thorac/ic** "through the chest"

23. **in/ter-:** < L **in/ter** (see on 32 below)

    in/ter/stell/ar "between stars;" **in/ter/ren/al** "between the kidneys"

24. **syn-:** < G **syn** "with"

    syn/chron/iz/e "to make [one measurement of] time [be] with [another one];" **syn/gnath/ia** "an abnormal condition involving the jaws [being joined] together"

25. **ant/i-:** < G **ant/i** "against" < IE **anti** "facing, opposite" > L **ant**/e "before" (42 below; > L [> E] **ant**/er/ior "more before")

    ant/i/bacteri/al "[operating] against bacteria;" **ant/i/odont/alg/ic** "against pain involving the teeth"

26-48. Note that these prefixes, while common in Standard English and in many technical words used in Medicine and other specialized fields, are only rarely joined with any of the combining forms presented in this book.

26. **ab-:** < L **ab** "away, from, off" < IE **apo-** "away" > E **of** + **off** + G (> E) **apo-** (43 below) + L **ap**er/ire "to open" (> E **ap**er/t/ur/e + **ap**er/t/if + L [> E] **op**er/cul/um "a little covering" + probably E **Ap**r/il) + probably IE **pos** > L (> E) **pos**t (21 above; > L [> E] **pos**t/er/ior "more behind")

    ab/duct "to lead away from;" **ab/or/al** "from the mouth"

27. **ad-:** < L **ad** "to, toward, at" cognate with E **at**; both are perhaps < IE **-do-** "upwards" > E **to** + **to**/ward/s

    ap/posit/ion "a putting against;" **ad/duc/e** "to lead to [a conclusion];" **ad/or/al** "to the mouth"

28. **com-:** < L **cum** "with" (> L [> E] **con**/tr/a- "against" [45 below; originally a comparative: "more with"]) < IE **kom** "close, next to" > G **koin**/os "common" (> E **koin**/e "common [speech]")

    com/**pos**/**e** "to put together;" **con**/**duct** "to lead together"

29. **de-:** < L **de** "away from, off" < L (> E) **di**s- "two" < IE **dwi**s-"twice, in two" > L (> E) **duo**, etc. + E **two** + G (> E) **di**a (46 below)

    de/**pos**/**e** "to put away from [a position of power];" **de**/**duct** "to lead away from [a total]"

30. **dis-:** < L **dis-** "two" (see on 29 above)

    dis/**pos**/**e** "to put apart"

31. **ex-:** see on 11 above

    ex/**pos**/**e** "to put outside"

32. **in-:** < L **in** < IE **en-** > E **in** + G **en-** (15 above; > **en**/don [14 above]) + **en**/tos (17 above) + L **in**/tus "within" (> E **in**/test/in/e + **in**/t/im/at/e, etc.) + IE **en**/ter/o "inner" > L **in**/tr/a "inside" (16 above; > L [> E] **in**/ter [23 above; literally "more in"] > L [> E] **in**/tern/al + **in**/ter/ior) + G **en**/ter/on (> E **en**ter/o "intestine" [9.22])

    im/**pos**/**e** "to put upon;" **in**/**duct**/**ion** "a leading into"

33. **ob-:** < L **ob-** < IE **epi**, **opi** (see on 2 above)

    op/**pos**/**e** "to put against"

34. **per-:** < L (> E) **per** "through; by means of" < IE **per** "a going beyond, forward, beyond, through" > G **peri** (7 above) + **par**a (9 above) + L **pr**/ae (> E **pre-**; 18 above) + E **far** + **for-** + **for** + **for**th + **for**e + be/**for**e + probably G (> E) **pro-** (see on 19 above); possibly related is IE **per-** "come over, transport" > L **por**t/are + > E **por**t + ex/**por**t, etc. + E **for**d + **far**e + G **por**/os (> E **por**e)

    per/**spir**/**at**/**ion** "the act of breathing through [the skin]"

35. **pre-:** see on 34 above

    pre/**posit**/**ion** "a [word] put before [a noun]"

36. **pro-:** see on 19 above

    pro/**pos**/**e** "to put before;" **pro**/**duc**/**e** "to lead for[th]"

37. **re-:** < L **re-**, **re**d- "back, backward" (> E **re**/tr/o- [20 above])

    re/**pos**/**e** "a [state of having been] put back;" **re**/**duc**/**e** "to lead back [to a previous state]"

38. **se-:** < L **se-** "apart" < IE **se-**, **swe-** "apart, alone" > Old E **swae**s "special, dear"

    se/**duc**/**e** "to lead away from"

39. **sub-:** see on 5 above

    sup/**pos**/**e** "to put under [consideration]"

40. **trans-:** see on 22 above

    trans/**pos**/**e** "to put across [to the opposite side]"

41. **ana-:** < G **ana** "up, on, again, apiece" < IE **an, ano** "obliquely toward, slanting toward" > E **on**

    ana/**tom**/**y** "a cutting up"

42. **ant**/**e-:** < L **ant**/**e** "before" < IE **anti** (see on 25 above)

    ant/**e**/**ced**/**ent** "going before"

43. **apo-:** < G **apo** < IE **apo-** "away" (see on 26 above)

    apo/**calyps**/**e** "a [taking] away [of the] cover"

44. **cata-:** < G **kata** "down"

    cata/**stroph**/**e** "a down-turn"

45. **con**/**tr**/**a-:** < L **con**/**tr**/**a** "against" (originally a comparative) < L **con-** < L **cum** (see on 28 above)

    con/**tr**/**a**/**dict** "to speak against"

46. **dia-:** < G **dia** "through, across" < IE **dis-** < IE **dwo-** "two" (see on 29 above)

    dia/**metr**/**ic** "p.t. a measuring through [the centre]"

47. **sup**/**er-:** < L **super** (see on 1 above)

    sup/**er**/**ced**/**e** "to go above"

48. **ul**/**tr**/**a-:** < L **ul**/**tr**/**a** < Old L **ul**/**ter** (> L [> E] **ul**/**ter**/ior [originally a comparative] + L **ul**/**t**/im/us [originally a superlative; > E **ul**/**t**/im/at/e + **ul**/**t**/im/at/um]) < IE **ol-, al**-"beyond, yonder" > E **all** + **el**se + L **al**ius "other" (> E **al**ien + **al**ias "at another [time]" + **al**/ibi [< L **al**ius ibi "elsewhere"] + E **all**/o/morph + **all**/o/phone, etc. + **all**erg/y)

    ul/**tr**/**a**/**son**/**ic** "beyond [perceived] sound"

Appendix 3

ANATOMICAL NOTES

ANATOMICAL NOTES FOR CHAPTER 3

The human musculoskeletal system (1-50) consists of more than the **bones** (1-2) of the **skeleton** (3); in addition to 206 individual bones and associated parts (4-39), it includes other connective tissues (40-50) such as **cartilage** (40-41), **muscles** (42-43), **tendons** (44-45) and **ligaments** (46-48). The system thus functions not only as a "frame" (to give the body shape and to form "cages" protecting organs), but also as a complicated set of levers and fulcrums allowing the movement of joints and limbs.

The **skull**, or cranium (4), itself consists of 22 bones (many of which are presented separately in Chapter 8). Most of the important remaining bones (with some associated anatomical terms) are presented in AMT (idiosyncratically) in four groups, as follows.

1. (5-14) Structures found when moving outward from the neck and down to the fingertips (roughly, the upper appendicular skeleton): the **collar bone**, or clavicle (5-6); two **processes** (7-8), or projections (of the shoulder blade), which form parts of the shoulder joint; the bones of the arm (9-11), wrist (13) and fingers (14).
2. (15-23) The spine and abdominothoracic "cage" (roughly, the axial skeleton), from back to front: the **shoulder blade**, or scapula (15); the **spine** (16-17), **spinal cord** (18) and **vertebrae** (19-20); the **ribs** (21) and **sternum**, or breastbone (22-23).
3. (24-31) The pelvis (roughly, the upper part of the lower appendicular skeleton): general terms (24-25); specific bones (26-30); the "cup" which articulates with the top of the leg (31).
4. (32-39) The legs and feet (roughly, the lower part of the lower appendicular skeleton): the **femur**, or thighbone (32); **knee-cap**, or patella (33); the bones of the lower leg (34-35); some of the parts of the ankle and heel (36-39).

A more anatomically logical grouping (and order of presentation), however, would be as follows.

1. The bones of the axial skeleton:
   - the **skull** (4)
   - the **spine** (16-17), consisting of the **spinal cord** (18) and **vertebrae** (19-20)
     - the **sacrum** (29), consisting of five fused vertebrae
     - the **coccyx**, or tailbone (30), consisting of four fused vertebrae
   - the ribcage, including the **ribs** (21) and **sternum**, or breastbone (22)
     - the **xiphoid process** (23) of the sternum

2. The bones of the appendicular skeleton:
   - the shoulder, formed by the junction of the **collar bone**, or clavicle (5-6) and the **shoulder blade**, or scapula (15)
     - projections of the shoulder blade: the **acromion** (7) and **coracoid process** (8)
   - the arm, including the **humerus** (9), **ulna** (11) and **radius** (12)
     - the **wrist** bones, or carpals (13)
     - the **phalanges**, or bones of the fingers (and toes) (14)
   - the pelvic girdle, or **pelvis** (25), formed by the junction of the sacrum and coccyx with two pelvic or hip bones, each of which consists of three fused bones:
     - the **ilium** (26), **ischium** (27) and **pubis** (28)
   - the leg, including the **femur**, or thighbone (32), the **patella**, or knee-cap (33), the **tibia** (34), and the **fibula** (35)
     - the **tarsals**, or ankle bones (36), including
       - the **calcaneus**, or heel bone (37)
       - the **talus** (38-39), or ankle bone

3. Some joints:
   - the **elbow**, or cubitus (10)
   - the **wrist**, or carpus (13)
   - the **hip**, or coxa (24)
     - the hip socket, or **acetabulum** (31), formed by the junction of the ischium, ilium and pubis
   - the **tarsus**, or ankle (36)

ANATOMICAL NOTES FOR CHAPTER 4

1. **Nervous System (1-14)**

The central nervous system includes the **brain** (1-3) and spinal cord, both of which are enclosed by a specialized **membrane** (4) called the **meninx** (plural **meninges**) (5), while another membrane, the **ependyma** (6) lines their inner cavities.

The peripheral nervous system includes the network of **nerves** (7-8) that connect at various locations along the spinal cord, the **ganglia** (9), which are masses of the cell bodies of nerve cells, or **neurons** (10), as well as supporting cells (the **neuroglia**, 11) and nerve parts such as their roots, or **radicles** (12). The peripheral nerves are mostly named according to the anatomical areas in which they attach to the spinal cord or according to the organs or parts to which they are connected, but some of them are referred to by other names, as for example the **sympathetic nerves** (13) and the **vagus nerve** (14).

2. **The Eye (15-34)**

The parts and tissues involved in the functioning of the eye may be subdivided for discussion in various ways. In AMT, three general terms for the **eye** (15-17) are presented first, followed by two of the organ's most prominent visible parts, the **pupil** (18-19) and the **cornea** (20-21).

Three concentric layers make up the outer part of the eyeball. The hardest, outermost layer is the **sclera**, or "white of the eye" (22), while the innermost layer is the **retina** (23), which is the only visible part of the central nervous system. The middle layer, the **uvea** (24), consists of the (visible, "colored part of the eye," or) **iris** (25), the **ciliary body** (26-27) and the **choroid** (28; note that the entire middle layer is sometimes referred to by this term); the pupil is actually delineated by a circular gap in the iris. Other parts are the **conjunctiva** (29), the **canthus** (30) and the **lens** (31), while the **tears** (32-33) are held within the **tear sac** (34).

3. **The Ear (35-39)**

Although the ear is usually discussed in terms of three subdivisions, the outer ear, middle ear and inner ear, combining forms denoting parts of the first and last of these are not frequently found in Medical Terminology.

The **middle ear** (35), also called the eardrum or tympanum, is a drum-like chamber, which includes three tiny descriptively-named bones, the malleus, or **hammer** (36), the incus, or **anvil** (37), and the stapes, or **stirrup** (38). Separating the outer and middle ears is the myrinx, or **tympanic membrane** (39). Note that, although the tympanic membrane is technically only the "skin" of the "drum," it is this "skin" which is often (and confusingly) being referred to when people (speaking in non-technical English) mention "the eardrum."

ANATOMICAL NOTES FOR CHAPTER 5

The circulatory system (1-21) involves the movement of **blood** (1-7), as pumped by the **heart** (8-13), through a complex system of **vessels** (14-21); some important components of blood are provided by the **lymphatic system** (22-26). One function of the blood system is to deliver the products of various **glands** (27-40). In addition, blood circulation is vital to, and linked in complex ways with, the functioning of all body systems including the respiratory, digestive and urinary systems (Chapters 6, 9, and 10 respectively).

1. **Cardiovascular System (1-21)**

Blood (1-2) is a complex substance, carrying oxygen and nutrients to body tissues, and waste materials away from them; among the "carrying" components of blood are **hemoglobin** (3) and **plasma** (4). The blood cells which cause it to form **clots** (5) are called thrombocytes or **platelets** (6). The movement of blood is accompanied by a **pulse** (7), or rhythmic contraction and expansion of certain vessels caused by the pumping action of the **heart** (8); it is felt in those vessels throughout the body that stem ultimately from the **aorta** (9), one of the vesels by which blood leaves the heart, and the one by means of which it is circulated through most of the body's tissues.

Blood circulation (in which the blood moves in a kind of "figure-eight" pattern: from the heart to the lungs, back to the heart, from the heart to the rest of the body, back to the heart, and so on) depends upon the blood always moving in only one direction through each section of the heart and the vessels attached to it; this is accomplished by means of **valves** (10), which open when pressured from one side but close when the pressure comes from the other side.

The heart itself has two distinct parts, each functioning as a double-chambered pump. The two upper chambers receive blood, while the two lower ones, or **ventricles** (11), pump it back out. More specifically, on the left side, oxygen-rich blood comes in from the lungs and is pumped out by the ventricle (through the aorta) to the rest of the body, while the right side receives the "used," deoxygenated blood and pumps it to the lungs, where the carbon dioxide it has picked up during circulation is exchanged for oxygen. A thin, tough membranous sac, the **pericardium** (12) surrounds and protects the heart, the walls of which consist of muscle called the **myocardium** (13).

Blood circulates through a complex, branching system of **vessels** (14-15) of three main types. The **arteries** (16), stemming from the aorta, carry blood away from the heart, while the **veins** (17-18) carry it back. At their target tissues the vessels of the arterial and venous systems become progressively smaller and are connected by means of systems of **capillaries** (19), tiny "hair-like" vessels; through their thin walls oxygen and nutrients are diffused out of the blood and into the cells of the body, while waste materials are diffused out of body cells and into the blood. Vessels are subject to various problems, one common one being when a vein becomes an abnormally twisted and swollen **varix** (20-21).

2. **Lymphatic System (22-26)**

A secondary, quasi-circulatory, system is that which moves the **lymph** (22), a colorless fluid which contains various immune components and cells, through **lymph vessels** (23) between body tissues and the blood stream. The lymphatic system contains numerous **lymph nodes** (24). Another lymphatic organ is the **spleen** (25-26).

3. **Glands (27-40)**

The endocrine, or glandular **secretion** (27), system depends upon the circulation of blood for the delivery of the complex chemicals, or **hormones** (28), which are produced by various ductless **glands** (29-30) and secreted directly into the blood. While the products of specific glands (31-40; presented in AMT roughly in order from the head down) are various and multipurposed, in each case the hormone causes specific effects in a particular "target organ," to which it is carried by the blood.

The **parotid glands** (33; located in front of and slightly below each ear), which have ducts through which they secrete saliva directly into the mouth, are not endocrine glands; they are by contrast exocrine glands. Of the true endocrine glands, the functions of the **pineal gland** (31), within the brain, are ill-understood; an overview of the functions of the other endocrine glands follows.

4. **Functions of Specific Endocrine Glands**

Called by some the "master gland," or "master switch," the peanut-sized **pituitary gland** (32), or **hypophysis**, located under the brain, produces hormones which affect the production of sections from at least three other glands (the gonads, the thyroid gland and the adrenal glands). In addition, it secretes other hormones which stimulate the growth of body tissues and the production of both milk and the pigment melanin, as well as several hormones involved in the regulation of urine production, the stimulation of uterine contractions during childbirth, and the regulation of blood pressure.

When stimulated by a hormone, from the pituitary gland, the **thyroid gland** (34), located at the top of the windpipe and just behind the larynx (for which, see Chapter 6), itself produces iodine-containing hormones, which regulate the body's metabolic rate and temperature, as well as growth and developmental processes. Another hormone secreted by this gland acts in conjunction with vitamin D and a hormone produced by the **parathyroids** (35), four pearl-sized glands located on the back of the thyroid, to regulate the body's use of calcium and phosphorus.

The **thymus** (36) is near the heart in the centre of the upper chest. It stimulates the development of lymphocytes such as "T cells" (from the first letter of "thymus"), which are involved in the rejection of foreign molecules and pathogens.

The grape-sized **adrenal glands** (37-38), or **suprarenal glands**, located on top of the kidneys (for which, see Chapter 10), produce hormones (including adrenaline and cortisol) that help to regulate the heartbeat, the blood pressure and the working of muscles, as well as a number of steroid hormones that control certain bodily chemicals and their reactions. They also produce precursors of sex hormones such as estrogen, progesterone and androgens, but these are mainly produced by the **gonads** (40), the ovaries in women, and the testes in men (for which, see Chapter 10).

Finally, insulin, a hormone that regulates the metabolism of macromolecules by promoting the reabsorption of sugar from the blood into cells, is produced by the **islets of Langerhans** (39), small clusters of cells located in various parts of the pancreas (for which, see Chapter 9).

ANATOMICAL NOTES FOR CHAPTER 6

The respiratory system (1-20) is the means by which we breathe air into the lungs, where oxygen from the air is exchanged with waste carbon dioxide from the blood, and then exhale it.

1. Organs and Parts (1-17)

Breathing regularly begins with the **nose** (1-2), a double passageway that is connected to skull cavities, or **sinuses** (3), and whose two main parts are separated by a cartilaginous wall, or **septum** (4). A general word, **antrum** (5), used in other contexts to refer to any body cavity, is specialized or restricted in a respiratory context to the designation of any of the nasal cavities.

The nasal passages join at the back with the oral cavity (for which see Chapter 7), forming the **pharynx** (6-7); a flap of skin, the **epiglottis** (8), located at the top of the **larynx** (9), or voice box (so-called because it contains the vocal cords), ensures that only air passes from the pharynx into the **trachea** (10), or windpipe (food, by contrast, passes from the pharynx into the esophagus [for which see Chapter 9]). At its bottom end, the trachea splits into two tubes, the **bronchi** (11), each of which enters a **lung** (12-13) within which it further subdivides into smaller and smaller branches.

The lungs are covered by a serous membrane, the **pleura** (14), which also lines the chest cavity. They are expanded and contracted partly by a specialized dome-shaped muscle, the **diaphragm** (15-16), which crosses the chest cavity just below them, and they are separted by the **mediastinum** (17), an area which contains, among other things, the heart and the esophagus.

2. The Process of Breathing (18-20)

Breathing (18-19); or the inhalation and exhalation of **air** (20), takes place because of the expansion and contraction of the lungs in response to the

actions of certain muscles. When the diaphragm contracts, the "dome" which it normally forms (bowed slightly upward under the lungs and mediastinum) is pulled downward; simultaneously, chest muscles between the ribs also contract, causing the ribs to move upward and outward. Both actions increase the size of the chest cavity, and when the lungs (which always fill the space available to them) consequently also expand, a slight vacuum is created, drawing air in through the nose and windpipe. Air is expelled when the diaphragm and rib muscles relax, and elastic recoil restores the chest cavity to its normal size and thereby causes the contraction of the lungs.

3. **External and Internal Respiration**

The purpose of breathing is to pull air into (and then push it out of) organs specially equipped to extract from it the oxygen which is necessary for the functioning of the body, in exhange for the carbon dioxide which is a waste product of that functioning.

This exchange is accomplished through some three hundred million tiny balloon-like structures called alveoli, which are found at the ends of the tiniest subdivisions of the bronchi and which form the light, spongy matter of each lung.

The very thin walls of the alveoli contain capillaries by means of which the actual exchange of gases takes place: oxygen depleted venous blood enters them, gives up its carbon dioxide, takes up oxygen, and is then delivered, via the heart and the arterial system, to all of the tissues of the body. A further exchange of gases (called "internal respiration" to distinguish it from the exchange which takes place through the alveolar walls, which is, strictly speaking, called "external respiration") takes place through the walls of all the non-alveolar capillaries, through which the oxygen-rich arterial blood passes before entering the venous system (now oxygen-depleted and bearing waste carbon dioxide) on its way back (again via the heart) to the lungs. (See the Anatomical Notes to Chapter 5 for an account of blood circulation.)

ANATOMICAL NOTES FOR CHAPTER 7

The oral-dental system (1-27) includes the jaws (1-5), the mouth and its parts (6-17) and the teeth and their parts (18-27).

1. The Jaws and Mouth (1-17)

The oral cavity is formed by the **jaws** (1). Of these, the **upper jaw** (2), or maxilla, consists of two bones, while the **lower jaw** (3), or mandible, though usually regarded as a single bone, is actually the result of the fusion of two separate ones; the front extremity of the lower jaw is the **chin** (4-5). The **mouth** (6-7), bounded in front by the flesh of the **lips** (8-9), is sometimes called the "buccal cavity" because it is bounded at the sides by the flesh of the **cheeks** (10). The **tongue** (11-12) is the most versatile muscle of the mouth, used not only for tasting, chewing and swallowing but also for speaking. The "roof" of the mouth, the **palate** (13-14), is mostly composed of bone covered by a mucous membrane (the hard palate), but towards the back it becomes a soft fold of muscular tissue (the soft palate or velum), which rises to block off the nasal passage during swallowing, breathing through the mouth, and the enunciation of non-nasal sounds; the **uvula** (15-17) is a projection which hangs from the middle of the back part of the soft palate.

2. The Teeth (18-27)

The **teeth** (18-19) are mostly covered by the **periodontium** (20), which includes the **gums** (21-22) as well as bone and other connective tissue. Each tooth is mostly made of a hard substance, **dentin** (23), which is covered above the gum-line by an even harder material, the **enamel** (24-25), and which itself covers the fleshy **pulp** (26), containing blood vessels and nerves. Below the gum line, the dentin is covered by **cementum** (27), a tissue which binds the tooth to the jawbone.

3. Special Note on Dental Locatives

The dental locatives (28-38) are used in combination with one another to pinpoint any location upon or within a tooth, in terms either of two dimensions ("line angles") or of three ("point angles"). Note that while the first three locatives presented, **axial** (28), **distal** (29) and **mesial** (30), are "purely geometric," **incisal** (31) and **occlusal** (32) are "functional" in that they refer to

the cutting edges and closing surfaces of teeth, respectively. **Cervical** (33), as used in dentistry (to describe the "neck" of a tooth), is a metaphorical use of an anatomic term, while the remaining terms (34-38) are "purely anatomic" in that each designates a location closest to a specific body part. Thus **labial** (34), indicating proximity to the lips, and **buccal** (35) referring to closeness to a cheek, both designate the outer side of a tooth; **lingual** (36), on the other hand designates the inner side of a tooth, facing the tongue, while **gingival** (37) denotes proximity to the gums and **pulpal** (38) indicates closeness to the innermost part of a tooth.

The rules for the usage of dental locatives are complex; the most important one, however, stating that a compound word containing "gingiv/o," "axi/o" or "pulp/o" will almost always refer to a wall of a tooth cavity rather than to a surface of a tooth, is simply explained: "axial" and "pulpal" by definition refer to the inside parts of teeth, while "gingival" refers to the gumline, which is the location of a large percentage of cavities. Less scientifically, but perhaps more usefully, one of my students last year remembered the rule by creating the evocative acronym **gap** (and a consequent phrase: "**gap** = cavity") as a mnemonic summary of these three terms.

ANATOMICAL NOTES FOR CHAPTER 8

Of thirty bones of (or closely associated with) the head (see **inventory of headbones** below), nineteen are presented here.

Behind the forehead, or **frontal bone** (1), which forms the front part of the top and sides of the skull, are two large bones, one on each side of the top of the head, called the **parietal bones** (2). They curve downward toward the back and join the occiput, or **occipital bone** (3), which forms the base of the back of the skull; the spinal cord enters the skull cavity through the topmost vertebra of the spinal column, which is the **atlas** (4), and then through an opening in the occiput.

In front of the occipital bone and the downward curving parts of the parietal bones (and below the front parts of the latter) are the two temples, or **temporal bones** (5), which form the upper and outer parts (at each side) of the base of the skull. Each temporal bone features a number of projections, including a rounded one, the **mastoid process** (6), and a pointed one, the **styloid process** (7); each

also has two parts in terms of types of bone tissue, a hard, "rocky" or **petrous part** (8), which surrounds and protects the middle ear, and (at the upper front) a "scaly" or **squamous part** (9), sometimes called the squamous bone.

Forming a rough wedge-shape (as seen from the side of the head) in front of each of the temporal bones, and passing across the front of the skull below the back part of the frontal bone and the front parts of the parietal bones (and thus behind the eye sockets), the large **spehenoid bone** (10) forms the base of the front of the skull. Two four-pointed **zygomatic** (or malar, or cheek) **bones** (11), in front of the sphenoid bone (one below each eye socket) partly frame the sieve-like, spongy, **ethmoid bone** (12), which itself forms part of the roof of the nasal cavities (and which contains a number of very small, thin-walled structures, called the ethmoidal air cells, which open into the nasal cavity).

Parts of the ethmoid, zygomatic, sphenoid and frontal bones together form part of the eye sockets (or orbits), at the inner side of each of which is one of the two **lacrimal bones** (13; so called because the lacrimal sacs are situated in them). Two **nasal bones** (14), projecting forward and downward from below the frontal bone and between the eye sockets, unite to form the bridge (or arch) of the nose.

Each zygomatic bone "yokes" or links the upper front part of one of the two **maxillae** (15), or upper jaw bones, with the zygomatic process of that maxilla and the zygomatic process of a temporal bone. The maxillae, in addition to providing the processes to which the teeth are attached (hence "jaw bone"), have other processes which form the floor of the eye socket, parts of the sides of the nasal cavities and parts of the roof of the mouth.

The horseshoe-shaped lower jaw, or **mandible** (16), actually consists of two fused bones. It is almost unique among bones of the head in that it is moveable, and in that it is not connected to one or more of the other bones by an immoveable joint, or **suture** (17). Other non-sutured bones of the head include the **hyoid bone** (18), at the base of the tongue, and the six ossicles of the middle ears (the hammers, anvils and stirrups [4.36-38 above]).

Finally, it should be noted that the combining forms designating the lacrimal and nasal bones (13 and 14), and those denoting the maxillae and mandible (15 and 16), are used here in specialized senses of the more general meanings

previously learned in each case. Thus, for example, very literally, the lacrimal bone is "the bone p.t. the tear sac" and a maxilla is "(one of the two bones which form) the upper jaw."

INVENTORY OF HEADBONES

CRANIAL BONES (8)	FACIAL BONES (14)	OTHER BONES (8)
1 frontal bone (8.1)	2 zygomata (8.11)	6 auditory ossicles:
2 parietal bones (8.2)	2 lacrimal bones (13)	2 hammers (4.36)
1 occipital bone (8.3)	2 nasal bones (8.14)	2 anvils (4.37)
2 temporal bones (8.5)	2 maxillae (8.15)	2 stirrups (4.38)
1 sphenoid bone (8.10)	1 mandible (8.16)	1 hyoid bone (8.18)
1 ethmoid bone (8.12)	2 turbinate bones	1 atlas (8.4)
	1 vomer	*[Note that the atlas is associated with the head, but is not part of it]*
	2 palatine bones	

Note that combining forms designating the 2 turbinate ("top shaped") bones, the vomer ("plough-shaped") and the 2 palatine bones are in each case not found in more than four words in Medical Terminology; therefore they are not presented in this book. All are small internal bones of the face: the turbinate bones and vomer are parts of walls of the nasal cavities, while each palatine bone forms part of the roof of the mouth.

ANATOMICAL NOTES FOR CHAPTER 9

The abdomen (1-6) contains most of the internal organs, or "guts" (7-8), including most of those involved in the digestion of food (9-24) and the elimination of solid wastes (25-33). Various substances (34-43) are involved in this process.

1. **Organs and Parts (1-33)**

The abdominal cavity, or **abdomen** (1-3), delineated by the **abdominal wall** (4), is lined by a membrane called the **peritoneum** (5), specialized parts of which, called the **mesenterium** (6), support and enfold the "guts," or **viscera** (7-8).

Food enters the abdomen from the mouth via the **esophagus** (9), through which it is moved by muscle contractions (a process which applies to the whole

digestive tract). It is churned into a half-digested mixture by the muscles of the **stomach** (10-11); the upper part of this organ is called the **cardiac part** (12), and the stomach is attached to other organs by a special fold of peritoneum called the **omentum** (13-14), or epiploon.

The mixture of food and gastric enzymes produced by the stomach is then forced through a valve (or sphincter; like circulatory valves, these allow material to move only in one direction), the **pylorus** (15), into the **duodenum** (16), where further enzymes are added to it. Some of these, stored in the **gallbladder** (17), enter the duodenum via the **common bile duct** (18), but ultimately come, via another **bile duct** (19), from the **liver** (20), where they are produced; others are produced by the **pancreas** (21).

Most nutrients are absorbed into capillaries while the food mixture passes through the duodenum and the other two parts of the (**small**) **intestine** (22), with the highest rate of absorption being from the middle part, the **jejunum** (23). The resulting material, which is mostly waste, passes from the third, very twisted, part of the intestine, the **ileum** (24), into the large intestine, or **colon** (25), through whose walls water is extracted from it.

The colon, a much thicker and shorter part of the intestinal tract than is the (small) intestine, begins with a kind of "blind alley," the **cecum** (26-27), from which hangs the **appendix** (28). From the cecum, it passes up the right side of the abdomen ("the ascending colon") before bending below the liver ("the hepatic flexure") to run across to the left side below the stomach ("the transverse colon"). It bends again near the spleen ("the splenic flexure") to pass down the left side ("the descending colon"). After a third bend, a "double flexure" called the **sigmoid fold** (29), it becomes the "straight colon," or **rectum** (30-31), from which waste material is periodically eliminated through the **anus** (32), the opening of which is regulated by two circular muscles called the **anal sphincters** (33).

2. **Substances (34-43)**

Digestion actually begins in the mouth, where enzymes in the **saliva** (34-35) are mixed with food during chewing. When the resulting mixture is further added to by gastric enzymes (in the stomach) it is called **chyme** (36); the same material is referred to as **chyle** (37) when **bile** (38-39), or gall (produced by the liver and stored in the gallbladder), and pancreatic fluid have been added to it

(in the duodenum). Finally, the solid waste excreted from the anus is usually referred to as **feces** (40-42), or (after excretion) **excrement** (43).

ANATOMICAL NOTES FOR CHAPTER 10

1. **General Terms (1-4)**

While the kidneys are situated in the back of the lower abdomen, in the **loin** (1), or lumbar region, the rest of the uro-genital organs are more to the front and even lower down, in the region of the **groin** (2), bounded at the base of the body trunk by the **perineum** (3), which is between the thighs, and between the external **genitals** (4) and the anus.

2. **Urinary System (5-17)**

The function of the urinary system is to collect wastes from the blood and eliminate them in the form of **urine** (5-6), a yellowish liquid which usually contains, among other things, **urates** (7), **urea** (8) and **urobilin** (9).

Circulating blood (which at this point has passed nutrients to the body cells and picked up wastes from them) is "filtered" by the **kidneys** (10-11); the resultant waste material, mixed with excess body water, drains in a continuous trickle from the **renal pelvises** (12-13) through the **ureters** (14) into the (**urinary**) **bladder** (15-16), from which it is periodically released by a sphincter muscle through the **urethra** (17), from where it is eliminated from the body.

3. **Male Genital System (18-32)**

Spermatozoa (18), or sperm cells, which mix with other substances to form a fluid called **semen** (18-19), are produced in the **scrotum** (20-21), a sac outside the body, by the male gonads, or **testes** (22-23). From the testes, spermatozoa are collected by the **epididymis** (24) and stored in a tube called the **vas deferens** (25), from which, during orgasm, they are forced into the urethra. On the way, fluid is added to them by the **seminal vesicles** (26-28) and the **prostate** gland (29), before the resultant semen passes through the **penis** (30-31) to be ejaculated from the urethral opening in the middle of the **glans penis** (32).

4. **Female Genital System (33-51)**

Egg cells, or **ova** (33-34), which if unfertilized are discharged as part of the **menses** during **menstruation** (35), are produced internally by the female gonads, or **ovaries** (36-37). During each period of ovulation, an ovum moves from one of the two ovaries through a **uterine tube** (38-39) connecting it to the womb, or **uterus** (40-42), which has become thickened and engorged with blood. If the egg has been fertilized, it attaches to the uterine wall and develops into an embryo; if not, the blood-filled uterine wall and the egg are discharged through the "neck" or **cervix** (43-44) of the uterus into the **vagina** (45-46), from which the menses are then discharged.

The external genitalia, which include the **clitoris** (47) in addition to the vaginal opening, are enclosed by two outer folds of tissue, the **vulva** (48-49), or labia majora ("larger lips"), and two inner ones, the **nymphae** (50) or labia minora ("lesser lips"). Until broken by sexual intercouse or other causes, a membrane called the **hymen** (51) usually partially closes the vaginal opening.

Index 1

GLOSSARY OF TERMINATIONS

The following list includes terminations that appear in this textbook (along with their respective chapter numbers) as well as other frequently used terminations in Medical Terminology. Note that only the most frequently found nominative and possessive noun endings are included. Please see Chapter 1 for adjectives that are formed from noun-terminations.

Index 2

GLOSSARY OF COMBINING FORMS

The following list includes non-terminal combining forms that appear in this textbook (along with their respective chapter numbers) as well as other combining forms that are frequently used in Medical Terminology. Note that where a Latin word is identical to the English word that translates it, or is formed by the addition of "-us," "-a," "-um," "-on," or "-is" to the combining form, that Latin word is not separately listed.

A

a- (1) from 13.26; (2) without; the absence of 1.49 & 50
ab, ab- from 13.26
abdomin-o- abdomen 9.2
abs- from 13.26
ac- to 13.27
acanth-o- thorn
acet-i-, acet-o- acid 12.34
acetab-ul-o- acetabulum 3.31
achill-o- Achilles' tendon 3.50
acid-o- acid 12.33
acin-o- acinus
acr-o- extremities 2.7
acr-om-i-o- acromion 3.7
ad, ad- to 13.27
a-damant(in)-o- enamel 7.25
aden-o- gland 5.29
adip-o-, adip-os-o- fat 12.19
ad-ren(al)-o- adrenal gland 5.37
aer-o- air; gas 12.3
af- to 13.27
ag- to 13.27
al- to 13.27
album(in)-o- albumin 12.49
alcohol-o- alcohol 12.29
alg(e)-o-, alg-es(i)-o- pain
alkal-i-, alkal-o- alkali 12.30
allerg-o- allergy
all-o- other
alve(ol)-o- alveolus
amb-i- two; both
ambly-o- feebleness; dullness
ameb-o- ameba
amel-o- enamel 7.24
amph-i-, amph-o- two; both
amyl-o- starch 12.32
an- (1) anus 9.32; (2) without; the absence of
ana- upon 13.41
ana-phylact-o- intense allergic reaction
ana-stom-os-is an opening
ancon-o- elbow 2.21
andr-o- male
an-esth-es(i)-o- loss of perception 11.12
angei-, angi- vessel 5.14
angin-o- severe pain
angi-o- vessel 5.14
an-is-o- unequal
ankyl-o- adhesion
an-o- anus 9.32
ant-e, ant-e- before 13.42
ant-er-o- (in) front
anthrac-o- carbon 12.60
anthrop-o- human 2.1
ant-i- against 13.25
antr-o- antrum 6.5
an-ul-o- ring
aort-ic-o-, aort-o- aorta 5.9
ap- to 13.27
apex, apic-o- apex

apo- off; from 13.43
apo-neur(os)-o- aponeurosis 3.49
ap-pend(ic)-o- appendix 9.28
ar- to 13.27
arsen-ic-o-, arsen-o- arsenic 12.54
arter(i)-o- artery 5.16
arthr-o- joint 2.6
art-i-cul-a-t-io, art-i-cul-o- joint
as- to 13.27
astragal-o- talus 3.39
astr-o- star
at- to 13.27
a-tel-o- incomplete (formation)
atl(ant)-o-, atlas atlas 8.4
a-tres-o-, a-tret-o- lack of a normal opening
atri-o- atrium
aur-i- ear
aut-o- one's own (self)
axi-o- axial 7.28
a-zot-o- nitrogen 12.68

B

b- life; living
balan-o- glans penis 10.32
bar-o- pressure
bas-i-, bas-il-o-, bas-i-o-, bas-o- (at the) base
bath-o-, bath-y- deep
ben-e well
bi- (1) two; both; (2) life; living
bil-i- bile 9.39
bin- two; both
bi-o- life; living
bis- two; both
blenn-o- mucus 12.16
blephar-o- eyelid 2.11
brachi-o- arm 2.20
brachy- (excessively) short
brady- slow
bronch-i-, bronch-o- bronchus 6.11
bucc-o- (1) cheek 7.10; (2) buccal 7.35
bulb-o- bulb
burs-o- bursa

C

cac-o- defective
calc- calcium 12.59
calcane-o- calcaneus 3.37
calc-i-, calc-i-o- calcium 12.59
calor-i- heat
canal-o- canal
canth-o- canthus 4.30
cap-ill-ar-o- capillary 5.19
capit-o- head
caps-ul-o- capsule
caput head
carcin-o-, carcin-om(at)-o- carcinoma
card- heart 5.8
card-i-o- (1) heart 5.8; (2) cardiac part of the stomach 9.12
card-o- heart 5.8
carp-o- wrist 3.13
cartilag(in)-o- cartilage 3.41
cata- down 13.44
caud-o- (at the) tail
cav-o- cavity
cec-o- cecum 9.26
celi-o- abdomen 9.1
cement-o- cementum 7.27
cent-i- one hundredth
centr-o- (at the) centre
cephal-o- (1) head 2.9; (2) (at the) head
cer- wax 12.23
cereb-ell-o- cerebellum 4.3
cerebr-o- cerebrum, brain 4.2
cer-o-, cer-umin-o- wax 12.23
cervic-o- (1) neck 2.17; (2) cervical 7.33; (3) cervix of the uterus 10.43
cheil-o- lip 7.8

cheir-o- hand 2.22
chir-o- hand 2.22
chlor-o- green
chol-, chol-e- bile 9.38
chol-angi-o- bile duct 9.19
chol-e-cyst-o- gall bladder 9.17
chol-e-doch-o- common bile duct 9.18
chol-e-ster(ol)-o- cholesterol 12.24
chol-o- bile 9.38
chondr-o- cartilage 3.40
chord-o- cord
chor-i-o-, chor-oid-o- choroid 4.28
chrom(at)-o- colored
chyl-o- chyle 9.37
chym-o- chyme 9.36
cili(ar)-o- ciliary body 4.27
cion-o- uvula 7.17
circ-um- around 13.8
cirs-o- varix 5.21
cistern-o- cistern
clav-i, clav-ic-i, clav-i-cul-o- collar bone 3.6
cleid-o- collar bone 3.5
clitor-i-, clitor(id)-o- clitoris 10.47
co- together 13.28
cocc-o- coccus
coccyg-o- coccyx 3.30
col- (1) colon 9.25; (2) together 13.28
coll-a-gen-o- collagen 12.51
col-on-o- colon 9.25
colp-o- vagina 10.45
com- together; with 13.28
con- together 13.28
condyl-o- condyle
coni-o- dust 12.72
con-junc-t-iv-o- conjunctiva 4.29
con-tr-a- against 13.45
copr-o- feces 9.40
cor- (1) pupil 4.18; (2) together 13.28
corac(oid)-o- coracoid process 3.8
cord- heart
cord-o- cord
cor-e-, cor-e-o- pupil 4.18
corn-e-o- cornea 4.21
cor-o- pupil 4.18
coron-o- crown
corpor-o-, corpus body
cortic-o- cortex
cost-i-, cost-o- rib 3.21
coun-ter- against 13.45
cox-o- hip 3.24
crani-o- skull 3.4
crin-o- secretion 5.27
crur-, crus (lower) leg
crym-o-, cry-o- coldness
crypt-o- hidden
crystall-o- crystal 12.56
cubit-o- elbow 3.10
-cul- (diminutive) 6.27
cum- together; with 13.28
cupr-i- copper 12.61
cyan-o- blue
cycl-o- ciliary body 4.26
cyst-ic-o- cystic duct
cystid-o-, cyst-o- bladder; cyst 10.15
cyt-o- cell 2.5

D

dacry-o- (1) tear 4.32; (2) tear sac
dacry-o-cyst-o- tear sac 4.34
dactyl-o- digit 2.23
de- away; about 13.29
dec-i-, decim-o- one tenth; ten
dens, dent-i- tooth 7.19
dent-in-o- dentin 7.23
dent-o- tooth 7.19
derma, derm(at)-o- skin 2.3
desm-o- ligament 3.46
dexter, dextr-o- (at the) right

E

F

G

galact-o- milk 12.36
gangli(on)-o- ganglion 4.9
gastr-o- stomach 9.10
gelat-i-, gelat-o-, gel-o- jelly 12.45
geni-o- chin 7.4
gen-it-al-ia, gen-it-o- genitals 10.4
ger-o-, geront-o- old (person); old age
gingiv-o- (1) gums 7.21; (2) gingival 7.37
gland-ul-o- gland 5.30
gli-o- neuroglia 4.11
glomer-o-, glom-o- glomus
gloss-o- tongue 7.11
glut(e)-o- buttocks 2.32
glyc-o- sugar 12.39
gnath-o- jaw 7.1
goitr-o- goiter
gon- knee 2.33
gon-ad-o- gonad 5.40
gon-e-cyst-o- seminal vesicle 10.27
gony-o- knee 2.33
gran-ul-o- granule
gyne-, gyn(ec)-o- female

H

haem-, haemat- blood 5.1
hal- salt 12.70
halluc-o- big toe
hallucin-o- hallucination 11.13
hal-o- salt 12.70
hect-o- one hundred
helminth-i- helminth
hem-, hemat-o- blood 5.1
hemi- half
hem-o- blood 5.1
hem-o-glob-in-o- hemoglobin 5.3
hepar liver 9.20
hepat-ic-o- hepatic duct
hepat-o- liver 9.20
hepat-o-chol-angi-o- hepatic duct
hepta- seven
herni-o- protrusion
herpes-, herpet-o- herpes
heter-o- different
hexa- six
hiat-o- opening
hidr-o- sweat 12.25
hist-i-, hist-o- tissue 12.6
home-o-, hom-o-, homoi-o- same
hormon-o- hormone 5.28
humer-o- humerus 3.9
hy- hyoid bone 8.18
hyal-o- glass 12.57
hydr-o- water; fluid 12.1
hygr-o- moisture 12.2
hymen-o- hymen 10.51
hy-o- hyoid bone 8.18
hyper- excessive; above 13.1
hypn-o- sleep; hypnotism 11.7
hypo- insufficient; below 13.4
hypo-phys(e)-o- pituitary gland 5.32
hyps-i-, hyps-o- high
hyster-o- (1) uterus 10.40; (2) hysteria 11.15

I

-i- (combining vowel) [see Notes to Chapter 3]
ichthy-o- fish
icter-o- jaundice
-i-cul- (diminutive) 6.27
ide-o- idea 11.3
idr-o- sweat 12.25
il- in; on 13.32
ile-o- ileum 9.24
ili-o- ilium 3.26
-ill- (diminutive) 6.29
im- in; on 13.32

membran-o- membrane 4.4
men-o- menses; menstruation 10.35
mening-o-, meninx meninges 4.5
men-i-sc-o- crescent
ment-o- chin 7.5
mes-o- (at the) middle
mes-enter(i)-o- mesentery 9.6
mesi-o- (1) mesial 7.30; (2) (at the) middle
metall-o- metal 12.55
metr-o- uterus 10.41
micr-o- (excessively) small
mill-i- one thousandth
mon-o- one
morph-o- form
muc-i-, muc-o-, muc-os-o- mucus 12.14
mult-i- many
mus-cul-o- muscle 3.43
my- muscle 3.42
mycet-o-, myc-o- fungus
myel- spinal cord; bone marrow 3.18
myel-in-o- myelin 12.42
myel-o- spinal cord; bone marrow 3.18
my-o- muscle 3.42
my-o-card(i)-o- myocardium 5.13
my-os-o- muscle 3.42
myring-o-, myrinx tympanic membrane 4.39
myx-o- mucus 12.15

N

nan-o- (excessively) small
narc-o- stupor 11.9
nas-o- (1) nose 6.2; (2) nasal bone 8.14
nas-o-pharyng-o- nasopharynx 6.7
nat-o- birth; born
ne-o- new
nem(at)-o- roundworm
nephr-o- kidney 10.10
nerv-i- nerve 4.8
neur-o- (1) nerve 4.7; (2) emotions 11.4
neur-o-gli-o- neuroglia 4.11
neur-on-o- nerve cell 4.10
nev-o- birthmark
noct- night
nod-o- node
non-i- nine
norm-(o)- normal
nos-o- disease 11.14
nucle-o- nucleus 12.10
null-i- no; none
nyct-o- night 11.6
nymph-o- nymphae 10.50

O

-o- (combining vowel)
o- egg; ovum 10.33
ob, ob- against; near 13.33
oc- against 13.33
oc-cipit-o- occiput 8.3
oc-clus-o- occlusal 7.37
oct-i-, oct-o- eight
ocul-o- eye 4.17
odont-o- tooth 7.18
of- against 13.33
-ol- (diminutive) 6.30
ole-o- oil 12.38
olig-o- few; little, small
oment-o- omentum 9.14
omn-i- all; every
om-o- shoulder 2.19
omphal-o- navel 2.30
onc-o- tumor 12.74
oneir-o- dream 11.8
onych-o- nail 2.24
o-o- egg; ovum 10.33
o-o-phor-o- ovary 10.36
op- against 13.33
ophthalm-o- eye 4.15
opsin-o- opsonin 12.41
opson(in)-o- opsonin 12.41

opt(ic)-o- eye 4.16
or-o- mouth 7.7
orchid-o-, orchi-o- testis 10.22
orth-o- straight; normal
os (1) bone 3.2; (2) mouth 7.7
osche-o- scrotum 10.20
oss(e)-o- bone 3.2
oste-o- bone 3.1
ot-o- ear 2.13
ov- egg; ovum 10.34
ov-ar-i-o- ovary 10.37
ov-o- egg; ovum 10.34
ox-i-, oxy- oxygen 12.71

P

pach-y- (excessively) thick
palat-o- palate 7.13
pal- repetition
pale-o- old
pal-i-, palin-o- repetition
pan- all; whole
pan-creat-ic-o- pancreatic duct
pan-creat-o- pancreas 9.21
pan-cre-o- pancreas 9.21
pant-o- all; whole
para- beside 13.9
para-sit-o- parasite
para-thyr(oid)-o- parathyroid gland 5.35
pariet-o- (1) parietal bone 8.2; (2) wall
par-ot(id)-o- parotid gland 5.33
pat-ell-o- knee-cap 3.33
pector- chest
ped-o- (1) foot 2.35; (2) child
ped-i-cul-o- louse
ped-un-cul-o- peduncle
pell-agr-o- pellagra
pelv-i- , pelv(i)-o- (1) pelvis 3.25; (2) renal pelvis 10.13
pen-o- penis 10.31
penta- five
peps-in-o- pepsin 12.47
pept- peptone 12.50
pept-in-o- pepsin 12.47
pept-on-o- peptone 12.50
per through; over 13.34
per- (1) through; over 13.34; (2) deformed; deformity
per-i- surrounding 13.7
per-i-card(i)-o- pericardium 5.12
per-i-ne-o- perineum 10.3
per-i-odont-o- periodontium 7 .20
per-i-ton(e)-o- peritoneum 9.5
per-o- deformed; deformity
pes foot 2.35
petr(os)-o- petrous part of the temporal bone 8.8
phac-o- lens 4.31
phalang-o- phalanges 3.14
phall-o- penis 10.30
pharmac-o- drug 11.10
pharyng-o- pharynx 6.6
phim-o- closed; closure
phleb-o- vein 5.17
phlog-o- inflammation
phon-o- sound
phos-ph(at)-o-, phos-phor-o- phosphate; phosphorus 12.69
phot-o- light
phren-o- (1) diaphragm 6.15; (2) mind 11.2
phthis(i)-o- wasting; tuberculosis
phys-o- gas 12.4
phyt-o- plant
pimel-o- fat 12.21
pine-al-o- pineal gland 5.31
plasm-a-, plasm(at)-o- plasma 5.4
platy- (excessively) broad; flat
pleur-o- pleura 6.14
plex-o- plexus
plic-o- fold

plur-i- many
pne-o- breathing 6.19
pne-um- (1) lung; air 6.12; (2) air; lung 6.20
pne-umat-o- air; lung 6.20
pne-um-o- (1) lung; air 6.12; (2) air; lung 6.20
pne-umon-o- lung; air 6.12
pod-o- foot 2.34
poikil-o- mottled; varied, variable
pol-i- grey
pollex, pollic- thumb
poly- many; much
por-o- pore
porph(yr)(in)-o- porphyrin 12.43
post- behind; after 13.21
post-er-(o)- behind
pr-e- before 13.18 & 35
presby-o- old (person); old age
pr-im-i- first
pr-o- (1) before 13.19; (2) for 13.36
proct-o- rectum; anus 9.30
pr-o-fund- deep
pros-op-o- face 2.15
pr-o-stat-o- prostate 10.29
pros-th-o- artificial
prot- first
prot-e(in)-o- protein 12.48
prot-o- first
prox-im-o- nearest
prur-it-o- itching
pseud-o- false; falsely 11.17
psych-o- mind 11.1
psychr-o- coldness
ptyal-o- saliva 9.35
pub-i-, pub-o- pubis 3.28
pulmo, pulm(on)-o- lung 6.13
pulp-o- (1) pulp 7.26; (2) pulpal 7.38
pulver- powder
pup-ill-o- pupil 4.19
pur(in)-o- purine 12.31
py- pus 12.26
pyel-o- renal pelvis 10.12
pykn-o- (excessively) thick
pyl-or-o- pylorus 9.13
py-o- pus 12.26
pyr(et)-o- fever; fire

Q

quadr-i- four
quint-i- five

R

rach-i-, rach-i-o- spine 3.16
radi- (1) radius 3.12; (2) radiation
radic- root
rad-i-cul-o- radicle 4.12
radi-o- (1) radius 3.12; (2) radiation
ram- branch
re- back; again 13.37
rect-o- rectum 9.31
red- back; again
ren, ren-o- kidney 10.11
retin-o- retina 4.23
re-tr-o- behind 13.20
rhabd-o- rod
rhach-i-, rhach-i-o- spine 3.16
rhin-o- nose 2.14 & 6.1
rhin-o-pharyng-o- nasopharynx 6.7
rub-, rube-, rub-o-, rubr-i-, rubr-o- red

S

sacc- sac
sacchar-o- sugar 12.40
sacc-o- sac
sacr-o- sacrum 3.29
salping-o- uterine tube 10.38
sangu-i, sangu-in-o- blood 5.2

T

U

Index 3

COMPLEX WORDS AND PHRASES DEFINED IN THIS BOOK

D

E

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U

V

X

Z

About Radix Antiqua Publishing

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