An Introduction to Medical Terminology
I. Greek and Latin Derivations*

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There is hardly any other aspect of medicine that is so discouraging for the beginning student as medical terminology. The first impact of the long, unfamiliar words is decidedly depressing. A French essayist of the 16th Century made the apt remark that "The language of medicine is an idiom foreign to the general speech and of discordant sound."[1] The same criticism could very well apply to present-day medical language, which sounds just as "discordant" to the uninitiated.

Although medical terms have been drawn from many languages, a large majority are from Greek and Latin. Some familiarity with the meaning of the most frequently used roots, prefixes, and suffixes will clarify the whole field. With a little study, it will be found that the long and formidable sounding medical terms are a combination of words which describe parts of the body, a function, or a condition. The basic terms occur over and over again in various combinations. A knowledge of the meaning of the roots, prefixes, and suffixes enables the student to analyze the medical terms into component parts. This is of the greatest aid in learning to understand the vocabulary of medicine. Some names of diseases given by the ancients and still used to-day are, in many instances, simply descriptions of the outstanding symptoms; for example, *hydro-phobia*—fear of water—for rabies, because the inability to drink is an early, characteristic sign of the disease.

I. GREEK IN MEDICAL TERMINOLOGY

It is estimated that about three-fourths of our medical terminology is of Greek origin. The main reason for this is that the Greeks were the founders of rational medicine in the golden age of Greek civilization in

*Abbreviations: AS—Anglo-Saxon; E.—English; Fr.—French; G.—German; Gr.—Greek; L.—Latin.

[1] Quoted without source by Stedman, T. L., Practical medical dictionary, 13th ed., Baltimore, Wood, 1936. p.v.

the 5th Century B.C. The Hippocratic School and, later on, Galen (the Greek from Asia Minor who lived in Rome in the 2nd century A.D.) formulated the theories which dominated medicine up to the beginning of the 18th Century.[2] The Hippocratics were the first to describe diseases based on observation, and the names given by them to many conditions are still used today, for example, *arthritis, nephritis, pleuritis* (*pleurisy*).

A second reason for the large number of Greek medical terms is that the Greek language lends itself easily to the building of compounds. When new terms were needed, with the rapid expansion of medical science during the last century, Greek words or Latin words with Greek endings were used to express the new ideas, conditions, or instruments.[3] The new words follow the older models so closely that it is impossible to distinguish the two by their forms. Such recent words as *appendicitis, creatinine, cystoscope, epinephrine, streptococcus,* and many others do not appear different from the classical terms. The fact is that about one-half of our medical terminology is less than a century old.

A third reason for using the classical roots is that they form an *international language*, easily understood by anyone familiar with the subject matter. Whoever has had to struggle with such German terms as *Keilbein, Milz, Stickstoff* instead of the familiar *sphenoid, lien,* and *nitrogen* will appreciate this.

Orthography

The Greek terms came into the English language through the Latin. In adapting the Greek words the Romans used the Latin alphabet. This generally corresponds to the Greek but there are a few exceptions. The Romans did not have a *k*, so the Gr. *k* is regularly represented by *c*

Gr. kranion, L. and E. cranium

Gr. kleptomania, L. and E. cleptomania

The Greeks had two letters for the short and long sounds of *e* and *o*; the Romans had only one letter for each whether the sound was short or long.[4]

The Greek *u*, when standing by itself, is transcribed in the L. and E. as *y*

Gr. kruptos—hidden, secret, L. and E. cryptos; the *u* in the Gr.

[2] The best concise summary of the achievements of the early Greek physicians is Charles Singer, Greek Medicine (in the Legacy of Greece, R. W. Livingstone, ed., Oxford, Clarendon Press, 1924, pp. 201-249).

[3] For an all round introduction to linguistics and the influence of Greek on English see Bodmer Frederick, The loom of language, N. Y., Norton, 1944, pp. 246-249 and 657-682.

[4] To avoid the use of Greek letters the long sounds of *e* and *o* are indicated with a line *over* the letter. The long e in Gr. is pronounced as ā in E., as in ache, age, etc.

diphthongs (two vowels united in one sound) when combined with *a, e* or *o* retains the *u* form in transcription: *au, eu, ou.*

The diphthongs *ai* and *oi* become *ae* and *oe* in L. and E. or in the latter, simply *e*, as in

Gr. diaita—regimen, L. diaeta, E. diet
Gr. amoiba—L. amoeba, E. ameba

The Gr. *ei* becomes *i:*

Gr. cheir—hand, L. and E. chir, as in chiropodist

The Gr. endings of *-os* and *-on* usually become *-us* and *-um* in L.

Gr. ton-os—L. ton-us, E. tonicity
Gr. baktēri-on—L. and E. bacteri-um

1. *Some Greek root words*

Scores of simple Gr. root words are used in our every-day English without our realizing their origin. To quote just a few: *acme, basis, chaos, character, criterion, dogma, drama, echo, enigma, horizon, phantasia, stigma, thema,* etc.

Here is a short list of some basic words used in medical terminology:

adēn—gland	kranion—skull	pneuma—air, breath
aortē—aorta	larynx—voice box	psychē—soul
bronchos—gullet	mania—madness, frenzy	pyon—pus
cheir—hand	nausea—seasickness	pyr—fire, fever
cholē—bile	neuron—tendon, nerve	sarx—flesh
derma—skin	osteon—bone	sōma—body
gastēr—belly	ophthalmos—eye	spasmos—spasm
haima—blood	pepsis—digestion	splēn—spleen
hēpar—liver	pharmakon—drug	stoma—mouth
hygieia—health	pharynx—throat	stomachos—stomach
hymēn—membrane	pleura—side, rib	tracheia—windpipe
kardia—heart		trauma—wound
kephalē—head		

2. *Prefixes*

Among the most frequently used elements in the formation of words are prefixes. These consist of one or more syllables (orginally prepositions or adverbs) placed *before* the words to show various kinds of relationships. In joining the stem, the final letter of the prefix undergoes certain changes. If a prefix ends in a vowel and the stem begins with one, the final vowel of the prefix is usually dropped, e.g.

epi-encephalon becomes ep-encephalon
para-otid becomes par-otid.

The final *n* of a prefix becomes *l* before following *l*, as in

syl-logism from syn-logism;

it becomes *m* before *b, m, p, ph,* as in

em-phasis from en-phasis,

whereas before *s* the final *n* is dropped, as in

sy-stem from syn-stēma.

The most important prefixes are listed below with their meanings and a few examples of their use.

a-, an- (before a vowel)—a privative or a negative conveying deficiency, lack or weakness

a-pathy—lack of feeling[5]

a-tom—indivisible

an-emia—lack of blood

an-esthesia—lack of sensation

amphi-, ampho—on both sides, double

amphi-bious—living on both sides (land and water)

amphi-theatre—a place for seeing around, an operating room

ampho-diplopia—double vision in both eyes

ampho-phil—fond of both, a cell which stains with either acid or dyes

ana-, an—up, upward, again

ana-lysis—dissolution, breaking up (of chemical compounds)

ana-mnesis—recollection, medical history

ana-tomy—cutting up, dissection

an-a-phylaxis—renewed loss of protection

anti—against, opposed to, opposite of

anti-dote—against a given thing (poison)

anti-pyretic—against fever

anti-septic—against infection

ant-acid—against an acid, neutralizing an acid

apo—off, away from

apo-physis—a growth away, a projection (from a bone)

apo-plexy—a stroke away, a sudden stroke

apo-staxis—a trickling down, a slight hemorrhage

apo-thecary—a pharmacist (apothēkē—a repository)

cata—down, downward

cata-menia—according to month, menses

cata-rrh—a flowing down, inflammation of the mucous membrane

cata-tonia—a downward tone, stupor

cat-hod—downward way, the return goal of an electron

[5] Most of the definitions of medical terms are taken from Stedman's Practical medical dictionary, 16th revised edition, Baltimore, Williams, 1946. For difficult terms the well-known standard medical dictionaries in English (Black, Dorland, Gould) were consulted occasionally.

dia—through, across, completely
- dia-betes—a going through, syphon, syphon disease
- dia-gnosis—knowing completely, determination of the nature of a disease
- dia-rrhea—flowing through, fluid discharge
- dia-thermy—heat going through, elevation of temperature by means of a current

dys—bad, difficult, defective
- dys-entery—bad intestine
- dys-pepsia—bad digestion
- dys-pnea—difficult breathing
- dys-trophy—bad nourishment

ec-, ex—out, out of, outward
- ec-topic—out of place
- ec-zema—a boiling out, an inflammation of the skin
- ex-ophthalmos—eye (bulging) out
- ex-ostosis—bone outside, a bony tumor

en-, em—in, within
- en-cephalon—in the head, the brain
- en-demic—in the people, present in a community
- em-bolism—thrown in, a plugging of a vessel
- em-bryo—grown in, fetus

hyper—over, above, excessive
- hyper-emia—excessive blood
- hyper-thyroidism—symptoms caused by excessive activity of the thyroid
- hyper-tonic—excessive in tension
- hyper-trophy—excessive nourishment, overgrowth

hypo—under, below, insufficient
- hypo-chondriac—under the cartilage, an imaginary disease
- hypo-dermic—under the skin
- hypo-glyc-emia—low proportion of sugar in the blood
- hypo-physis—a growth under (the brain), pituitary body

meta—after, behind, beyond, change
- meta-bolism—change in throwing, tissue change
- meta-morphosis—change in form
- meta-stasis—change in position
- met-encephalon—after the brain, hindbrain

para—near, alongside, apart from, abnormal
- para-noia—abnormal in mind
- para-plegia—near stroke, paralysis of the extremities
- par-esthesia—abnormal perception

par-otid—beside the ear

peri—about, around

peri-cardium—around the heart, membrane covering the heart

peri-osteum—around the bone, membrane covering the bone

peri-stalsis—contraction around, contraction of the intestines

peri-toneum—(membrane) stretching around, lining of the abdominal cavity

pro—before, forward, in advance

pro-drome—running before, an early symptom

pro-geria—before old age, premature aging

pro-gnosis—knowing before, forecast

pro-phylaxis—advance protection

syn-, sym—with, together, union

syn-drome—running together, an aggregate of symptoms

sy-stole (from syn-stolē)—contraction, the rhythmic contraction of the heart

sym-biosis—living together of two or more organisms

sym-ptom—a falling together, a sign

3. *Suffixes*

A suffix is a terminal letter or syllable added to the stem to modify or amplify its meaning. If a suffix begins with a consonant and it is joined to a stem ending in a consonant, a *connecting vowel,* mostly *o* is added to make the junction.

The most common suffixes are:

-ia, Fr. -ie, E. -y—denotes a pathological state or condition

agon-ia—contest, suffering

hyster-ia—a chronic neurosis formerly thought to be of uterine causation (hystera—womb)

man-ia—madness

ophthalm-ia—inflammation of the eye

-iasis—signifies a pathological state, condition, or its causation

lith-iasis—formation of calculi (lithos—stone)

psor-iasis—a skin disease (psōra—itch)

trichin-iasis—a disease caused by trichinae infestation

-ikos, L. -icus, E. -ic—an adjectival termination

an-esthetic—pertaining to anesthesia, a drug producing anesthesia

epilept-ic—pertaining to epilepsy

hect-ic—irregularly feverish (hexis—habit; orig. meaning habitual)

patholog-ic—pertaining to pathology

-ismos, L. -ismus, E. -ism—denotes a condition

embol-ism—the plugging of an artery or vein (embolos—wedge)
hypnot-ism—a condition of artificially induced sleep (hypnos—sleep)
metabol-ism—tissue change (metabolē—change)
rheumat-ism—rheumatic fever (rheuma—flux)

-istēs, E. -ist—signifies an agent or doer of the action indicated by the root

anatom-ist—one who cuts up
anesthet-ist—one who takes away sensation
orthodont-ist—one who straightens teeth
urolog-ist—one who treats urological disorders

-itis—originally the adjectival ending *-itēs* used with nosos—disease; it is now used alone and has acquired the significance of inflammatory disease

appendic-itis
arthrit-is
bronch-itis
ot-itis
} inflammation of the part named in the stem

-ize, Gr. -izein—a verbal suffix indicating treatment by means of a special instrument or drug

an-esthet-ize—to take away sensation
catheter-ize—to use a catheter
hypnot-ize—to put to sleep

-ma, -ema, -oma—designates a concrete pathological condition

ec-zema—a boiling out, inflammation of the skin
ex-anth-ema—a skin flower, a skin eruption

Words ending in *-oma* are so numerous, referring usually to swelling or tumor, that this ending is considered equivalent to tumor, e.g.

carcin-oma—a cancerous tumor, a malignant growth
granul-oma—a tumor of granulation tissue
neur-oma—a tumor formed of nerve cells
sarc-oma—a fleshy thing, a fleshy tumor

-oid; originally *-oeid,* from Gr. eidos—form, appearance; denotes a resemblance to the object designated in the main word

sphen-oid—wedge-shaped (sphēn—wedge)
typh-oid—like typhus fever (typhos—stupor)
thyr-oid—the shieldlike gland (thyreos—shield)
xiph-oid—sword-shaped (xiphos—sword)

-sis, -osis—denotes any production or increase (physiological or pathological); secondarily an invasion and increase of parasites within

the organism. It is often interchangeable with *-iasis* as trichin-osis or trichin-iasis

adip-osis—an excessive accumulation of fat
rhe-xis (from rheg-sis)—a breaking, a rupture
sep-sis—a rotting, putrefaction
tubercul-osis—an invasion by the tubercle bacilli

Chemical suffixes

-ase (asis—slime)—denotes a colloid enzyme
amyl-ase—a starch splitting enzyme (amylon—starch)
lip-ase—a fat splitting enzyme (lipos—fat)

-ate—indicates a salt of a base
phosph-ate—a salt of phosphoric acid
sulph-ate—a salt of sulphuric acid

-ide—a name for a binary compound containing a non-metallic element
chlor-ide—a compound of chlorine with another element
sulph-ide—a compound of sulphur with a base

-in—a termination noting a glucoside
fibr-in (L. fibra—fiber)
gelat-in (L. gelatum—congealed)
prote-in (Gr. prōtos—first)

-ine—an ending used in the names of alkaloids
hero-ine—alkaloidal ester of morphine
morph-ine—alkaloid of opium

-ite—a terminal indicating a salt of an acid ending in *-ous*
phosph-ite—a salt of phosphorous acid
sulph-ite—a salt of sulphurous acid

Compound words

In addition to the words made up of a stem combined with one or more prefixes and suffixes, there are terms which have a second stem as a component part. Some Gr. terms may have as many as three stems joined, e.g. *leuco-cyt-hemia*—leucemia. Nouns, adjectives, and adverbs may be used in various combinations. The first part of a compound word generally indicates its *essential* meaning which is modified or amplified by the second part. If the second part begins with a consonant, the connecting vowel *o* is usually inserted for the sake of euphony. If two vowels are juxtaposed by the combination, the first is generally dropped.

A list of nouns regularly appearing as first part of a compound. (Many of these are names of parts of the body.)

anthrop- (anthrōpos—man)
anthropo-genesis—origin of man
anthropo-metry—measurement of man
bio- (bios—life)
bio-logy—the science of living organisms
bi-opsy—examination of a tissue excised from the living body
broncho- (bronchos—gullet)
broncho-cele—windpipe tumor, goiter
broncho-pneumonia—inflammation of the bronchi
cardi-, cardio- (kardia—heart)
cardi-a-taxia—irregularity in the action of the heart
cardio-gram—recording of the movements of the heart
cheir-, chir- (cheir—hand)
ch(e)iro-practor—a practitioner of manipulation
chiro-gnomy—physiognomy of the hand
cyto- (kytos—cell)
cyto-architecture—the order of arrangement of cells in a tissue
cyto-zoic—living in a cell
derma-, dermat- (derma—skin)
dema-graph—an instrument for writing on the skin
dermato-logy—study of the skin
entero- (enteron—the intestine)
enter-ectomy—resection of a segment of the intestine
entero-lith—an intestinal calculus
gastr- (gastēr, stem, gastr—stomach)
gastro-enterology—the medical specialty dealing with diseases of the stomach and intestines
gastr-odynia—pain in the stomach
gynec- (gynē, gynec—female)
gyneco-mastia—female breast in the male
gyneco-plastics—reparative surgery of the female organs
hem-, hemat- (haima, haimat—blood)
hemat-emesis—vomiting of blood
hemo-rrhage—bleeding
hepat-, (hēpar, hēpat—liver)
hepat-a-trophy—atrophy of the liver
hepato-melanosis—dark pigmentation of the liver
hydr- (hydōr, hydr—water)
hydro-cephalus—water head, a congenital deformation
hydro-gen—a gas which forms water when combined with oxygen
hydro-therapy—treatment by the use of water

hypno- (hypnos—sleep)
hypn-agogue—inducer of sleep
hypno-lepsy—uncontrollable sleepiness
hyster- (hystera—uterus)
hyster-ectomy—excision of the uterus
hystero-ptosis—prolapse of the uterus
litho- (lithos—stone)
litho-nephria—stone in the kidney
litho-tomy—cutting for stone
morph- (morphē—form)
morpho-logy—the science of structure
morpho-genesis—the evolution of form
my- (mys—muscle)
my-asthenia—muscular weakness
myo-carditis—inflammation of the muscular wall of the heart
narc- (narkē—numbness, stupor)
narco-lepsy—numbing seizure, petit mal
narco-mania—craving for narcotics
nephro- (nephros—kidney)
nephro-py-osis—suppuration of the kidney
nephro-scler-osis—hardening of the kidney
neuro- (neuron—cord, tendon, nerve)
neur-algia—nerve pain
neur-asthenia—nerve weakness
odont- (odys, odont—tooth)
odonto-clasis—breaking of tooth
odont-orthrosis—straightening of teeth
ophthalmo- (ophthalmos—eye)
ophthalmo-gyric—causing eye movements
ophthalmo-scope—an instrument to view the eye
osteo- (osteon—bone)
osteo-malacia—softening of the bone
osteo-necrosis—killing, decay of the bone
ot- (ūs, ōt—ear)
oto-myc-osis—a fungus-caused inflammation of the ear
oto-rrhea—discharge from the ear
pod- (pūs, pod—foot)
pod-agra—seizure in the foot, gout
pod-iatrist—foot practitioner
pyo- (pyon—pus)
pyo-genic—pus forming
pyo-periton-itis—suppurative inflammation of the peritoneum

pyr-, pyret- (pyr—fire, heat, inflammation)
pyr-exia—an acute inflammation
pyreto-mania—an uncontrollable desire to incendiarism
sphygmo- (sphygmos—pulse)
sphygmo-graph—an instrument to record pulse beat
sphygmo-mano-meter—an instrument for measuring the blood pressure
zoö- (zoön—a living thing, an animal)
zoö-logy—study of animals
zoö-parasite—an animal parasite

List of adjectives which regularly appear as first part of compounded words.

allo- (allos—other)
allo-cinesis—passive movement, reflex movement
all-ergy—a clinical change in the capacity of the organism to react to an infection, hypersensitiveness
auto- (autos—self)
auto-matism—a condition in which movements are made without conscious exercise of the will
aut-opsy—seeing with one's own eyes, post-mortem examination
brady- (bradys—slow)
brady-cardia—abnormal slowness of the heart beat
brady-pnea—abnormal slowness of respiration
caco- (kakos—bad)
cac-hexia—bad habit, lack of nutrition, and wasting
cac-idrosis—morbid sweating
crypto- (cryptos—secret, hidden)
crypto-genic—of hidden, obscure origin
crypt-orchid—hidden, undescended testis
ecto- (ektos—outside)
ecto-derm—outer side of the skin
ecto-plasm—moulded on the outer side, the outer side of the cytoplasm
erythro- (erythros—red)
erythro-cyte—red cell, red corpuscle
erythr-edema—red swelling
hemi- (one half)
hemi-atrophy—atrophy of one lateral half of a part or organ
hemi-plegia—half stroke, paralysis of one side of the body
hetero- (heteros—other, different, opposite)
hetero-plasty—surgical grafting with tissue derived from another individual

hetero-tonia—different, variable tension

homeo- (homoios—similar)

homeo-pathy—a special system of therapeutics

homeo-stasis—condition of bodily equilibrium; literally "standing still"

homo- (homos—the same)

homo-lateral—on or relating to the same side

homo-sexual—having attraction for the same sex

idio- (idios—one's own, private)

idio-pathic—noting a primary disease, one originating without apparent extrinsic cause

idio-syncrasy—one's own mixing, peculiarities of a person

iso- (isos—equal, like)

iso-thermal—having the same temperature

iso-tonia—tonic equality

leuco- (leukos—white)

leuco-cyte—white cell, white blood corpuscle

leuco-rrhea—white discharge

macro- (makros—long, large)

macro-cephalic—having a large head

macro-glossia—enlargement of the tongue

mega-, megal- (megas, megal—great, large)

mega-colon—dilatation of the large intestine

megalo-mania—delusion of grandeur

melan- (melas, melan—black)

melan-cholia—black bile, a depressed emotional state

melano-sarcoma—a deeply pigmented sarcoma

meso- (mesos—middle)

mes-encephalon—midbrain

mes-entery—middle intestine

micro- (mikros—small)

micro-be (mikros+bios)—small living thing

micro-scope—a viewer of small things

mono- (monos—alone, single)

mono-nuclear—having a single nucleus

mono-plegia—paralysis of one limb

neo- (neos—new, recent, young)

neo-natal—relating to the period immediately succeeding birth

neo-plasm—new growth

oligo- (oligos—little, few)

oligo-phrenia—mental weakness, feeblemindedness

oligo-pnea—infrequent respiration

ortho- (orthos—straight, correct)
ortho-dontia—straightening of the teeth
ortho-pedics—correction of deformities
oxy- (oxys—sharp, acid)
oxy-gen—a gaseous element present in acids
oxy-lallia—rapid speech
paleo- (palaios—ancient)
paleo-genesis—hereditary transmission of peculiarities
paleo-pathology—study of diseases of the prehistoric times
pan- (pas, pan—all, entire)
pan-creas—all flesh, the pancreas gland
pan-demic—a disease attacking all
polio- (polios—grey)
polio-encephalitis—inflammation of the grey matter of the brain
polio-myelitis—inflammation of the grey matter of the spinal cord
poly- (polys—much, many)
poly-pus—many feet
poly-uria—excessive urination
proto- (prōtos—first)
proto-plasm—first formed, living matter
proto-type—first form, primitive form
pseudo- (pseudēs—false, spurious)
pseudo-cele—false cavity, the 5th ventricle of the brain
pseudo-cyesis—false pregnancy
tachy- (tachys—fast)
tachy-cardia—quick heart, rapid action of the heart
tachy-pnea—rapid breathing
xantho- (xanthos—yellow)
xantho-derm—yellow skin
xanth-opsia—yellow vision

Some adverbs regularly appearing as first part of a compound.

di- (dis—twice)
di-hydric—a chemical compound with two hydrogen atoms
di-morphism—existing in two forms
endo- (endon—within)
endo-crine—secretion within, internal secretion
endo-metrium—within the uterus, membrane lining the uterus
eu- (eu—well, easy)
eu-phoria—bearing oneself well, good health
eu-thanasia—easy death

exo—outside, outward
exo-genous—originating outside
exo-gnathion—outside jaw, maxilla
opisth- (opisthē—behind)
opisth-encephalon—brain behind, the cerebellum
opistho-tonos—stretching backward, a tetanic spasm
palin—back, backward, again
palin-dromia—a running back, a relapse
palin-esthesia—a return of sensation
tēlē—distant
tele-neuron—the end neuron
tele-pathy—minding-reading from afar

Some nouns regularly appearing as second part of a compound.

-agogue (agōgos—leader)
galact-agogue—an agent promoting the secretion of milk
hypn-agogue—inducer of sleep, hypnotic
-agra—seizure
cardi-agra—heart seizure, angina pectoris
pod-agra—foot seizure, gout
-algia (algos—pain)
gastr-algia—stomach ache
neur-algia—nerve pain
-asthenia (asthenēs—weak)
my-asthenia—muscular weakness
neur-asthenia—nerve weakness, nervous exhaustion
-cele (kēlē—protrusion, tumor, hernia)
hemato-cele—blood cyst
hydro-cele—water hernia
-cinesia (kinēsis—movement)
cardio-cinesia—movement, action of the heart
entero-cinesia—movement of the intestine, peristalsis
-clasia, -clasis—breaking
arthro-clasia—breaking of a joint, breaking up of adhesions
hemo-clasis—breaking up of the red blood corpuscles
-cyte (kytos—cell)
erythro-cyte—red blood corpuscle
lympho-cyte—lymph corpuscle
-ectomy (ektomē—excision)
hyster-ectomy—excision of the uterus
thyroid-ectomy—excision of the thyroid gland

-ectopia (ek + topos—out of place)
nephr-ectopia—abnormal mobility of the kidney
splen-ectopia—abnormal mobility of the spleen
-emia (haima—blood)
an-emia—lack of blood
ur-emia—an excess of urea in the blood
-esthesia (aisthēsis—feeling, sensibility)
an-esthesia—lack of feeling
par-esthesia—an abnormal spontaneous sensation (like itching)
-genesis, E. -geny—generation, origin
patho-genesis—the origin or development of a disease
spermato-genesis—production of spermatozoa
onto-geny—the development of the individual
-gram (gramma—writing, drawing)
cardio-gram—the record of the movement of the heart
encephalo-gram—a roentgenogram of the brain
-graph, -graphy (graphein—to write)
dermo-graph—an instrument for marking or writing on the skin
ventriculo-graphy—radiography of the cerebral ventricles
-lith (lithos—stone, calculus)
entero-lith—an intestinal calculus
hemato-lith—a concretion in the wall of a blood vessel
-logia, Fr. -logie, E. -logy (Gr. logos—word, discourse, treatise)
physio-logy—the science which deals with life processes
uro-logy—the specialty dealing with the diseases of the urinary organs
-lysis—dissolution, loosening, breaking down
hemo-lysis—destruction of the red blood cells
para-lysis—loss of voluntary movement in a muscle
-malacia (malakia—softening)
myo-malacia—softening of muscular tissues
osteo-malacia—softening of the bones
-mania—madness, uncontrollable impulse
klepto-mania—a pathological impulse to steal
megalo-mania—delusion of grandeur
-megalia, E. -megaly (megas, megal—large)
acro-megalia or acromegaly—enlargement of the extremities
spleno-megalia—enlargement of the spleen
-meter, Gr. mētron, L. metrum—measure, an instrument for measuring
pulsi-meter—instrument to measure the pulse

thermo-meter—instrument to measure heat

-odynia (odynē—pain)

acr-odynia—pain in the extremities

ot-odynia—pain in the ear

-opia (ōps—vision)

ambly-opia—dimness of vision (amblys—dull)

my-opia—winking vision, shortsightedness (myein—to wink)

-pathy (pathos—suffering)

adeno-pathy—glandular disease

psycho-pathy—à disorder of the mind, insanity

-philia (philein—to like)

hemo-philia—"liking of blood", a disorder marked with hemorrhages

-phobia (phobos—fear)

claustro-phobia—a morbid fear of being in any closed place

hydro-phobia—fear of water, rabies

-plasty (plassein—to form; cf. "plastic" surgeon)

entero-plasty—plastic surgery of the intestines

rhino-plasty—plastic surgery of the nose (rhis, rhin—nose)

-plegia (plēgē—stroke)

hemi-plegia—half stroke, paralysis of one side of the body

para-plegia—paralysis of the lower part of the body

-poiesis—making, formation

hemato-poiesis—formation of blood

-ptosis—falling, displacement

hystero-ptosis—prolapse of the uterus

viscero-ptosis—displacement of the internal organs

-pyosis (pyon—pus)

arthro-pyosis—suppuration in a joint

nephro-pyosis—suppuration of the kidney

-rrhagia, -rrhage (rhēgnymi—break forth)

hemo-rrhage—bleeding

metro-rrhagia—bleeding from the uterus (mētra—uterus)

-rrhaphy (rrhaphē—stitch)

perineo-rrhaphy—suturing of the perineum

urethro-rrhaphy—suture of the urethra

-rrhea (rrhoia—flow)

gono-rrhea—a discharge caused by gonococcus infection

leuco-rrhea—white discharge

-sclerosis—hardening, induration

arterio-sclerosis—hardening of the arteries

arthro-sclerosis—stiffness of the joints

-scope, -scopy (skopein—to view)
cysto-scope—an instrument to view the bladder (kystis—bladder)
ophthalmo-scope—an instrument to view the fundus of the eye
-spasm (spasmos—convulsion, cramp)
entero-spasm—intestinal colic
pyloro-spasm—painful contraction of the pylorus
-stasis—stoppage, checking
hemo-stasis—arrest of bleeding
homeo-stasis—standing still, bodily equilibrium
-staxis—dripping, oozing, slow hemorrhage
entero-staxis—bleeding from the intestines
epi-staxis—nose bleed
-stenosis—narrowing
cardio-stenosis—narrowing of the heart
entero-stenosis—narrowing of the intestines
-stomy (stoma—mouth)
colo-stomy—forming an opening into the colon
cysto-stomy—forming an opening into the bladder
-therapy (therapeia—treatment)
hydro-therapy—treatment by water
physio-therapy—treatment by natural means (air, water, massage)
-thermy (thermē—heat)
dia-thermy—elevation of temperature by electric current
electro-thermy—applying heat by electricity
-tomy (tomē—incision)
laparo-tomy—incision into the doin (lapara—loin)
lobo-tomy—operation on the frontal lobe
-trophy (trephein; stem, troph—to nourish)
a-trophy—lack of nourishment, wasting of the tissues of the body
hyper-trophy—excessive nourishment, overgrowth
-uria (ūrein—urinate)
hemat-uria—blood in the urine
py-uria—pus in the urine

Chemical compound words

Chemical compound words are formed very irregularly. They are hybrid (using Gr. and L. stems combined in one word) and in most cases they are greatly abbreviated, e.g.

am-yl from am (ylon—starch) + (h) yl (ē)—material
formaldehyde from form (ic acid) + al (cohol) + dehyd (rogenatum), etc.

II. LATIN IN MEDICAL TERMINOLOGY

As the Romans conquered the then known world, Latin became the universal language of Italy and the provinces. Many centuries after the fall of Rome, Latin still ruled supreme. To this very day, Latin is the language of the Catholic Church, and during the formative period of the western European languages it was incorporated in every one of them. The Romance languages, and especially French, is modern Latin, preserving most of the form and spirit of the ancient language. English is to some extent Germanic in form and part of its vocabulary is Germanic, but a considerable section is of Latin ancestry borrowed from the French. Most of the common roots of speech are Anglo-Saxon, but the moment we leave primitive life and advance to more civilized living, our words immediately become Latin. We *walk, start, stop, breathe, sleep, wake, talk, live and lie* in Anglo-Saxon but we *advance, retreat, approach, retire, inspire, confer, discuss, compare, refute, debate, perish, survive* in Latin, and the predominant part of the vocabulary of business, commerce, finance, government, diplomacy, and the sciences is Latin.

Greek medicine migrated to Rome at an early date, and many Latin terms crept into its terminology. Latin was the language of science up to the beginning of the 18th Century, so all medical texts were written in Latin. Under the influence of the great anatomical work of Andreas Vesalius, *De humani corporis fabrica* (1543), the terminology of anatomy is almost exclusively Latin.

1. *Some Latin root words.*

The number of Latin root words in medicine is legion. We shall quote just a few as examples:

anus—ring
aqua—water
bacillus—little rod
bucca—cheek
cancer—crab
caput—head
caries—decay
cella—chamber
cerebrum—brain
cervix—neck
cor—heart
corpus—body
cortex—bark
cutis—skin
dens—tooth
facies—face
fascia—band
febris—fever
femur—thigh, thigh bone
fetus—embryo
foramen—perforation
fornix—arch
fossa—ditch
frons—forehead
fundus—base, bottom
glans—gland
hernia—rupture
ilium—flank
labium—lip
latus—side
lens—lentil
ligamentum—binding
lingua—tongue
lues—plague
lupus—wolf
manus—hand
meatus—opening
mens—mind
mensis—month
morbus—disease
nodus—knot

oculus—eye
os—mouth
ovum—egg
patella—shallow pan
pectus—chest
pelvis—basin
placenta—flat cake
pons—bridge
pulmo—lung
pupilla—little girl
ren—kidney
retina—net
ruga—wrinkle, furrow
saliva—spittle
scrotum—pouch
sella—chair
semen—seed
spina—thorn
stimulus—goad
succus—juice
sudor—sweat
tabes—wasting
talus—ankle
tergum—back
tonsilla—pointed pole
tunica—garment
tussis—cough
ulcus—ulcer
uterus—womb
vagina—sheath
valva—valve
vas—vessel
vena—vein
venter—belly
vermis—worm
vesica—bladder
virus—poison

2. *Prefixes*

When prefixes are joined with a stem, some changes take place, which are essentially the same as the ones outlined in the introduction to the Gr. prefixes. In addition to these, it is to be noted that the final consonant of the L. prefixes *ad-*, *con-* and *ob-* are usually changed to duplicate the letter which follows, for example:

a*d*-cept becomes a*c*-cept
a*d*-ferens becomes a*f*-ferens
a*d*-sume becomes a*s*-sume
co*n*-lapse becomes co*l*-lapse
co*n*-lateral becomes co*l*-lateral
o*b*-ciput becomes o*c*-ciput
o*b*-press becomes o*p*-press, etc.

The most important Latin prefixes are listed below with their meanings and a few examples of their use:

a-, ab-, abs—away from, off
- a-vulsion—tearing away
- ab-ductor—leading away
- ab-oral—away from the mouth
- abs-tract—a condensation

ad—to, toward
- ad-hesion—sticking to
- ad-renal—near the kidney, adrenal gland
- ac-cretion—accumulation
- ap-pendix—hanging upon

ambi-, ambo—both, on both sides
- ambi-dextrous—able to use both hands
- ambi-valent—having power in both directions
- ambo-ceptor—accepting both, a substance in the blood
- ambo-sexual—bisexual, affecting both sexes

ante—before (in time or space), in front of, forward
- ante-cubital—before the elbow
- ante-flexion—bending forward
- ante-natal—before birth
- ante-version—tipping forward

bi-, bis—twice, double
- bi-carbonate—a salt having two elements of carbonic acid
- bi-cuspid—having two points
- bi-lateral—pertaining to both sides
- bis-axillary—pertaining to both armpits (axilla)

circum—around, about
- circum-cision—cutting around
- circum-flex—bent around
- circum-ocular—around the eye
- circum-oral—around the mouth

co-, con- (from L. cum)—with, together
- co-agulation—changing into a clot
- con-cussion—a violent shock
- col-lapse—extreme prostration
- com-press—pressed together, a compressed pad

contra—against, opposed
- contra-ception—against conception
- contra-indication—rendering a particular treatment undesirable
- contra-stimulant—opposing stimulation
- contra-toxin—against toxin

de—down, downward; sometimes a privative
- de-ciduous—not permanent, temporary
- de-composition—decay, putrefaction
- de-mentia—without mind, mental deterioriation
- de-odorant—taking odor away

di-, dis—an inseparable preposition denoting sundering, apart; sometimes negative
- di-gestion—carrying (food) away, digestion
- dis-infectant—freeing from infection, an agent that disinfects
- dis-location—displacement (of a bone)
- dis-sect—cut apart, cut up

e-, ec-, ex—out, out of, off, removal
- e-jection—act of throwing out
- e-nucleate—to remove whole
- ex-tract—something drawn out, extracted
- ex-udate (from ec+sudate)—sweat out, sweat

extra-, extro—outside of, outer side
extra-cellular—outside the cell
extra-cranial—outside the skull
extra-vasation—a discharge of blood from a vessel into the tissues
extro-vert—a person whose interest is turned outward
in-, im—in, into, inside
in-cision—cutting in, a cut
in-cubation—lying in, the latent stage of an infectious disease
im-mersion—placing a body under water
im-pacted—pressed closely together, immovable
in-, im—an inseparable prefix indicating a negation; a privative
in-curable—not curable
in-sane—without mind, of unsound mind
im-maculate—without a spot
ir-reducible—not reducible, incapable of being made smaller
infra—below, beneath, downward, lower
infra-inguinal—below the groin
infra-maxillary—below the maxilla
infra-orbital—below the orbit (eye socket)
infra-red—beyond the red end of the spectrum
inter—between
inter-cellular—between cells
inter-digital—between the fingers or toes
inter-mittent—marked by intervals
inter-vertebral—situated between two vertebrae
intra—within, inside of
intra-cellular—within the cell
intra-rectal—within the rectum
intra-uterine—within the uterus
intra-venous—in, into, within a vein
intro—into, inward, within
intro-duction—leading into
intro-flexion—bending inward
intro-mission—insertion
intro-vert—turned within, a person given to introspection
juxta—beside, near
juxta-articular—situated near a joint
juxta-position—an adjacent position
juxta-spinal—close to the spinal column
ob—in front of, against, near (space or time)
ob-literation—complete removal
ob-stetrics—to stand in front (of a woman), midwifery

ob-struction—the act of blocking or clogging
oc-clusion (from o*b*-clusion)—the act of closure or state of being closed

per—through, thorough, excessive, very
per-cutaneous—through the skin (cutis)
per-forate—to pierce, bore through
per-meable—permitting the passage through
per-oxide—the oxide that contains the greatest number of oxygen atoms

post—behind, following, after (time or space), posterior
post-encephalitis—following or a sequel of encephalitis
post-febrile—after fever (febris)
post-ocular—behind the eye
post-partum—after birth

prae-, E. pre—before (in time or space), in front of, anterior
pre-frontal—the anterior portion of the frontal lobe
pre-gnancy—before birth, gestation
pre-mature—unripe, undeveloped, occurring before the appointed time
pre-oral—in front of the mouth

pro—before, in front of, forward
pro-cess—an advance or progress
pro-ductive—leading forward, capable of producing
pro-lapse—to fall, sink forward
pro-sector—one who prosects, demonstrator of anatomy

re-, red (before a vowel)—back, again
re-current—running back, returned
re-duce—lead back, replace
re-flex—bent back, reacting, reaction
red-integration—renewal, restoration of lost or injured parts

retro—back, backward, behind
retro-flexion—bending backward
retro-grade—going backward, moving backward
retro-nasal—posterior nasal
retro-version—turning backward

se—an inseparable prefix meaning apart, sundering
se-cretion—separation (esp. of various substances from the blood)
se-gregation—removal of certain parts from a mass
se-junction—breaking of continuity

sub-, sup—under (in position or degree), beneath, downward, nearly
sub-acute—not definitely acute
sub-cutaneous—under the skin

sub-liminal—below the threshold (of sensation)
sup-puration (from su*b*-puration)—the formation of pus

super—above (in position or degree), over, upper part, extreme
super-acute—excessively sharp or acute
super-ciliary—above the eyebrow
super-numerary—in excess of the regular or normal number
super-tension—extreme tension

supra—above, upon, over, upper
supra-costal—above the rib (costa)
supra-pubic—above the pubic arch
supra-renal—above the kidney (ren)
supra-sternal—above the breast (sternum)

trans—across, through, beyond
trans-ference—carry across, displacement of symptoms or effect
trans-fusion—pouring across, transfer of blood
trans-plantation—grafting of tissues
trans-urethral—through the urethra

ultra—beyond, in excess
ultra-filtration—extra fine filtration
ultra-ligation—ligation of a vessel beyond the origin of a branch
ultra-violet—rays beyond the violet end of the spectrum
ultra-virus—extra virus, filtrable virus

3. *Suffixes*

-ago, -igo (from L. ago—to drive)—gives an idea of activity
lumb-ago—rheumatism of the lumbar region (lumbus—loin)
prur-igo—itch (prurire—to itch)
vert-igo—dizziness, giddiness (vertere—to turn around)

-alis, E. -al—an adjectival termination
cruci-al—decisive (crux—cross)
digit-al—relating or resembling a digit
dors-al—relating to the back (dorsum)
or-al—relating to the mouth (os, stem or-)

-culum, E. -cle—a diminutive
corpus-cle—little body
folli-cle—little bag (follis)
ventri-cle—little belly, ventricle (venter)
vesi-cle—little bladder (vesica)

-or—denotes a state or an agent
don-or—giver (donare—to give)
levat-or—one that lifts (levare—to lift)
rub-or—redness (ruber—red)

tum-or—swelling (tumescere—to swell)

-orium, Gr. -tērion—designates a place

sanat-orium—a place for treatment (sanare—to heal)

sens-orium—the seat of sensation (sensus—sense)

tent-orium—tent, an anatomical part resembling a tent or covering

-osus, E. -ous or -ose—an adjectival suffix

aque-ous—watery (aqua)

adip-ose—fatty (adeps, stem; adip—fat)

pil-ose—hairy (pilus—hair)

rug-ose—wrinkled (ruga—wrinkle)

-tas, E. -ty—denotes an abstract quality or idea

acidi-ty—the state of being acid (acidum)

immuni-ty—a state resistant to disease (immunis—free from service)

in-sani-ty—unsoundness of mind (insanus)

senili-ty—old age (senex—old)

-tio, Fr. and E. -tion—a suffix of verbal roots signifying an action or function

bi-furca-tion—a forking, division into branches (furca—fork)

in-flamma-tion—a morbid change in the tissues (flamma—flame)

palpa-tion—an examination by the hands (palpare—to feel)

4. *Compound words*

Latin is, comparatively speaking, poor in compound words. Instead of doubling up words in Latin, significant prefixes or suffixes are added, or the words—retaining their proper syntactical relations—are simply written together as one word (jurisdictio, paterfamilias, etc.). Still, the language contains many genuine compounds of all parts of speech: substantives, verbs, and adverbs.

Some nouns regularly appearing as first part of compounded words.

ilio- (ilium—flank)

ilio-costal—relating to the ilium and ribs (costa)

ilio-femoral—relating to the ilium and thigh bone (femur)

ilio-lumbar—relating to the iliac and lumbar region (lumbus—loin)

ilio-sacral—relating to the ilium and sacrum

latero- (latus, stem later—side)

latero-abdominal—pertaining to the side and abdomen

latero-flexion—a bending or curvature to one side (flectere—to bend)

latero-torsion—twisting to one side (torquere—to twist)
latero-version—turning to one side (vertere—to turn)

Some adjectives regularly appearing as first part of a compound.

albo—(albus—white)
albo-cinereous—ashen white (cinus, ciner—ash)
albo-ferrin—a light brown powder with an iron compound (ferrum)
albu-lactin—trade name of a soluble lactalbumin (lac-milk)

anter- (anterior—before, in front of)
antero-grade—moving forward (gradior—to step)
antero-lateral—in front and to the side (latus)
antero-posterior—relating to both front and rear.

dextro—(dexter, dextr—right)
dextro-ocular—right eyed (oculus)
dextro-manual—right handed (manus)
dextro-pedal—right footed (pes, stem, ped-)

mal- (malus—bad, evil)
mal-adjustment—poor adjustment
mal-aria—bad air (aria)
mal-formation—congenital deformity
mal-practice—mistreatment of a disease

medio- (medius—middle)
medio-carpal—relating to the central part of the wrist (carpus)
medio-lateral—relating to the middle and one side
medio-tarsal—relating to the middle of the instep (tarsus)

multi- (multus—many)
multi-form—occurring in many forms
multi-gravida—a woman who has been pregnant many times
multi-lobar—having several lobes
multi-nuclear—having two or more nuclei

pluri- (plus, plur—more)
pluri-glandular—noting several glands or their secretion
pluri-gravida—a synonym for multi-gravida
pluri-para—a woman who has given birth to three or more children

primi- (primus—first)
primi-para—a woman giving birth the first time
prim-ordial—primitive (ordire—to begin)

postero- (posterior—behind)
postero-lateral—behind and to one side

postero-parietal—relating to the posterior portion of the parietal lobe

semi—half, in part, somewhat

semi-comatose—in a condition of mild coma

semi-flexion—midway between extension and flexion

semi-lunar—half-moon shaped (luna)

semi-luxation—a partial dislocation (luxatio)

sesqui—one and a half, one half more

sesqui-basic—a salt with 3 equivalents of the acid for 2 of the base

sesqui-hora—an hour and a half

sinistro- (sinister, sinistr—left)

sinistro-cerebral—relating to the left cerebral hemisphere

sinistro-lateral—relating to the left side

sinistro-torsion—turning or twisting to the left

uni- (unus—one)

uni-axial—having one axis

uni-lateral—having one side, confined to one side only

uni-nuclear—having one nucleus

Some nouns usually appearing as second part of a compound word.

-form from L. forma—shape, form—indicating a resemblance to the stem word

cunei-form—wedge shaped (cuneus)

funi-form—rope like (funis)

fusi-form—spindle shaped (fusus)

-fuge from L. fugare—to expel, drive away

centri-fuge—an apparatus driving particles to the center

febri-fuge—reducing fever (febris)

vermi-fuge—an agent causing expulsion of intestinal worms (vermis)

5. *Hybrid terms*

Many medical terms are a mixture of Greek and Latin. Such terms are called *hybrid* terms. They may be Gr. words with L. endings, such as

bacteri-al	de-hydr-ation
derm-al	peri-card-ium
hem-al	

or L. words with Gr. endings, as

appendic-itis	fibr-oma
tonsill-itis	granul-oma, etc.

or a mixture of Gr. and L. in one compound such as

cancer-ology para-sacral
colori-meter post-hepatic
mono-nuclear veno-tomy
oculo-gyric
viscero-ptosis and many others.

As a rule such terms should be avoided as contrary to the spirit of the language, although many of them are so well entrenched that it would be rather difficult, if not impossible, to replace them (for example, appendicitis, bacterial, dehydration, colorimeter, visceroptosis, etc.).*

References

From the voluminous literature on medical terminology I wish to mention only a few important works that could be consulted with profit:

Agard, Walter R., Medical Greek and Latin at a glance, 2nd ed., N.Y., Hoeber, 1937. A short, concise presentation of the subject with good classified lists.

Spilman, Mignonette, Medical Latin and Greek, Ann Arbor, Edwards Bros., 1946. Arranged somewhat differently from Agard's work, it starts with the Latin, being the more familiar language and leads slowly to the more difficult Greek. Has two good lists of the Latin and Greek roots in medical terminology.

Andrews, Edmund, Medical terminology, Annals of Medical History, 10:180-198, 1928. A good introduction to medical terminology; it is not a systematic presentation but a short bird's-eye view of the whole field, stressing the historical principles.

Andrews, Edmund, A history of scientific English. The story of its evolution based on a study of bio-medical terminology, N.Y., Smith, 1947. A posthumous work of the same author, elaborating on the above-mentioned article, studying all linguistic elements in medical terminology against their historical background. A real store-house of valuable data for the philologically minded.

Jaeger, Edmund C., A source book of biological names and terms, Springfield, Ill., Thomas, 1944. An alphabetical dictionary of biological names and terms with good derivations.

* To be concluded.