

**THE SCHOOL OF PUBLIC HEALTH  
UNIVERSITY OF MINNESOTA  
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**THE SCIENTIFIC  
VOCABULARY**

**Theodore A. Olson, Ph.D**

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## Forward

Dr. Theodore A. Olson's "*The Scientific Vocabulary*" dictionary was a constant companion for the University of Minnesota's environmental health graduate students during the 50's, 60's and 70's. For those of us who survived the rigors of biometry, epidemiology, the "topics" course (which consisted of a series of formal presentations), three "Plan B" papers and a dissertation, a good scientific vocabulary was an absolute necessity. The faculty would inculcate us with a sense of exactness in the way we presented the spoken and written word. We were expected to read scientific journals from other disciplines as part of our instruction. With exposure to each new discipline, we had to learn and understand its own and unique scientific language. In a small but important way, Dr. Olson dictionary made our academic passage a bit less imposing. Little did we realize its value until the rigors of scholarship demanded that we learn word roots to help with our own reading comprehension and writing proficiency.

We were each presented with a copy of the dictionary during our orientation in Dr. Olson's environmental biology class. He also conveniently left copies of the dictionary in our break room for the benefit of the non-biology students as well. The original tome was mimeographed on fools cap paper; folded in half and stapled in the middle. It had 29 pages, exclusive of the front and back covers, and fit nicely into loose leaf binder pockets and book jackets. It presented Greek and Latin word roots in a logical manner and even provided some grammatical rules. My original copy is yellowed from age and quite smudged from use, but it remains a handy resource and has a place of honor on my reference shelf next to my desk.

In spite of its age, the dictionary is timeless, and we wanted to share it with as many environmental health professionals as possible. Dr. Olson's widow gladly gave us permission to reproduce it in its original form and Dr. Welford Roberts graciously volunteered to transcribe it into an electronic format. Our sincere thanks are extended to him in this undertaking.

Please use *The Scientific Vocabulary* freely and share it with others.

Robert W. Powitz, Ph.D.

As a testimony to the late Dr. Olson, the following are tributes from two of his students who are also current members of the Academy.

"When I was a doctoral student at the University of Minnesota, School of Public Health, I had the good fortune to complete my dissertation under the tutelage of Dr. Theodore A. Olson. Dr. Olson was a strong advocate of the principles of scientific research and the necessity to communicate the findings in a cogent way.

He insisted that the results of his student's research efforts had to be clearly and concisely written. This led him early on in his academic career to author a paper titled, "The Scientific Vocabulary." I found this paper to be very helpful and referred to it on many occasions.


I remember many visits to his home when we sat in the living room at a card table and discussed various parts of my dissertation. We frequently would get into discussions about semantics and he always referred to the Oxford Dictionary that he had placed on the table. Much to my chagrin he would usually "win" any disagreement that we have about verbiage or the way to present a particular idea. I benefited greatly from his scholarly advice and my dissertation was better for his time and efforts.

Dr. Olson was a scholar and made it a priority that his students understood what it meant to be educated. His paper, "The Scientific Vocabulary" was one of the tools that he provided for this endeavor."

John Conway, Ph.D.

"Dr. Theodore (Ted) Olson was an exemplary individual and a Gentleman in the best and truest sense. He was totally committed to the field of Public Health, and to his many students. A compassionate mentor, it was my privilege to be one of his students. "

Michael Adess, Ph.D.



*Theodore A. Olson, Ph.D.  
Professor  
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1904 – 2002*

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**I. Introduction**

One reason so many persons entering the field of science become convinced that the subject matter is extremely difficult and far beyond their ability is that there is a scientific vocabulary which must be mastered. To these individuals, words which are long, hard to pronounce and little used in everyday life activities are mysteries never meant for the prying eyes of ordinary mortals. However, if these unhappy persons would only devote a small fraction of their time and energies to "positive thinking" they would soon discover that far from being a wall or a device for concealment the scientific vocabulary is actually a bridge by which one may enter the "new land." The objective then, should be a basic and rapid development of such a vocabulary to enhance understanding and effective communication between the professional and the neophyte.

In most instances words are built up from smaller parts and usually these parts are taken from the Latin and Greek. It began very naturally when the early scientist of the sixteenth century wished to describe a new object or a new phenomenon. He simply "coined" words using the parts he had at hand. Since the scholar of that time could speak Latin and many could least read Greek, the parts used were Latin and Greek stems and roots. Hence today, since the inertia typical of man has kept these Classic "dead" languages as a basis for scientific communication, scientists are blessed with a vocabulary system which is still very largely international. This is a very happy situation, for the scientists in Scandinavia or Germany, for instance, will find that a large proportion of the scientific terms used by us or by the Russians are the same as theirs, and this tends to lower at least some of the barrier between our respective countries. In support of the great value of "Words of Science to everyone, Isaac Asimov (1959) states "far from frightening people away from science, the scientific vocabulary, looked at squarely and with understanding, should be one of the most powerful attractions of science."<sup>1</sup>

The problem of rapid vocabulary building may be approached in a number of ways. One method involves exposing the students to a selected list of basic Greek and Latin stems and roots and then encouraging them to break down each new word into its basic parts. For example, take the word chlorophyll. This term was coined by two French chemists, Pierre J. Pelletier and Joseph B. Caventou, who derived it from the Greek words chloros meaning green, and phyllon meaning leaf.

After good progress has been made in this activity the student who wishes to go further may be encouraged to build new words. However, this area should be approached with caution since it will require a much more extensive knowledge of grammar and etymology.

Following is a list of typical stems and roots which has been prepared to serve as a basis for word dissection and word building in Public Health Biology

Recently in Turttox News there appeared an excellent article dealing with the scientific vocabulary, especially as word building applies to the biological sciences. This paper by C. J. Dennis entitled "The Language of Biology" is reproduced here as Appendix A by permission of the author and publishers.

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<sup>1</sup> Asimov, Isaac, Words of Science Riverside Press, Cambridge, Massachusetts, 1959.

## II. Greek and Latin Stems and Roots

### A. Greek Verb Roots

The number of roots in common use is relatively small but a surprising number of words can be synthesized through the proper use of prefixes and suffixes.

Greek verbs may have more than one form, for example a word whose vowel is e may show forms with o or a, as in the prefix *bal* (to throw) which may have the form bol. In a sense this is equivalent to English verbs such as sing which may appear as sung the participle, or as the noun song.

To make new words pronounceable it is sometimes necessary to alter the root ending to fit in with the suffix especially if the root ends in a consonant and the suffix begins with a consonant.

Some Representative Greek Roots useful to persons who wish to dissect or build words are included in the following list:

aesth-	perceive, feel	pep-	digest
alg-	feel pain	phag-	eat
acou-	hear	phan- (phaen-, phas-)	appear
arch-	begin	pher- (phor-)	carry, bear
bal- (bol-)	throw build	phil-	love
bio-	live	phob-	fear
chy-	poor	phylac-	guard
cau-	burn	plast-	form, shape, formed
clas-	break, smash	pne-(pno-)	breathe
do-	give	prag-	do
drom-	run	pto-	Fall, happen
gam-	Marry	rhe- (rho-)	flow
gen- (gon)	come into being, be born, produce	schiz-	split
gno-	know	sep- (sap-)	rot
graph-	write, record	sta-	stand, stop
kine-	move	strept-	twist, bent, curved
leg- (log-)	say, explain, speak, (logos = ology = science)	ten- (ton-, ta-)	stretch, extend
ly-	break down, dissolve	tom-	cut
mer-	divide	therap-	help, heal
metr-	measure	tre-	bore, perforate
mne-	remember	trep- (trop-)	turn
oed-	swell	troph-	nourish
op-	see (ops the eye)	zyg-	join
path-	suffer, sorrow, travail	zym-	ferment

### B. Greek Prefixes

These are elements added before verbs, adjectives or nouns to modify the meanings and are never used independently. A vowel at the end of a prefix is usually dropped if the next portion of the word begins with a vowel. Exceptions are *amphi-*, *hemi-* and *peri-*. Also excepted are monosyllabic prefixes. Thus *para-acousia*, "abnormal hearing," becomes *par-acousia*, but we use *peri-osteum* "around the bone" and *pro-otic* "in front of the ear." Further if the part following the prefix begins with "h" it will be retained even though the prefix loses its final vowel. Thus *cata-he-ter* becomes *catheter* (Agard and Howe, 1955).

Some useful Greek prefixes are presented in the following list:

a-, an-	without, not, lacking,	eu-	true, well, good, abundant
amphi-,	both, around	hemi-	half, one-half
ampho-			
ana-	up, again	hyper-	above, beyond, in excess
anti-	against	hypo-	beneath, under, deficient
apo-	from, away	meta-	over, after, beyond changing
cata-	down, lower, under, away	meso-	middle
dia-	through, between, apart	opisth-	backward, behind
dys-	bad, difficulty, trouble, imperfection	para-	beside ,accessory to, also
ec- (eco-)	home (oikos) house, also out from	penri-	around, near
en-, em-	in, into	pro-	before, in front of
endo-, ento-	inside, within	sym-, syn-	together
epi-	upon, more rarely in addition to towards	ecto-	outside
	against		
exo-	out, away from		

### C. Latin Verb Roots

As a part of ordinary speech rather than scientific terminology we have many more verbs which have come to us from Latin than from Greek. Thus we should have an added interest in these word building elements because they contribute to our everyday pursuits and are not limited to scientific' communication. It is true that in many instances the words have come a long way and have been altered somewhat in form while making the transit but usually they are recognizable and can contribute much to our 'word power. Many Latin verbs with a in the stem may be found with i or e substituted for the a in the compound word. Also, Latin verbs may produce compound words composed of either of two possible stems; hence both stems should be known.

The following list of Latin verb roots is representative but far from complete. As you read these elements attempt to recall a word from your present vocabulary which contains the root in question. For example the root cuss-, meaning "strike" will remind many persons of the word percussion. Similarly the root lect- will recall its compound, "lecture."

ag-, act-	drive, do	parti-, pass-	suffer, feel
audi-, audit-	hear	pell-, puls-	drive
amo-	love	plec-, plex-	fold
bland-	flatter	pon-, posit-	place, put
cad-, cas-	fall, happen (cadaver = one who falls)	port-, portat-	carry
caed-, caes	cut	pot-	be able
cant-	sing	prehend-, prehens-	seize
cap-, capt-	take	rad-, ras-	scrape
ced-, cess	go	reg-, rect-	rule, direct
credo-	believe	rid-, ris-	laugh
cuss-	strike	rod-, ros-	gnaw
curr-, curs-	run	rupt-	burst
dict-	say	scand-, scans-	climb
dele-	destroy	sci-	know
dom-	tame	sculp-	carve
duc-, duct-	lead, bring	sec-, seg-, sect-	cut, divide
fac-, fact-	make, do become	sed-, sess-	sit, settle
fini-	end	sent-, sens-	feel
fer-	carry	separ-	divide part
fiss-	split	solv-, solut-	break down, dissolve
flect-, flex-	bend	strat-	flat, spread out
flu, flux-	flow	string-, strict	draw, pull in

frag-, fract-	break	stru-, struct-	build
fug-, fugit-	flee, chase	suppl-	furnish
grad-, gress-	walk, go	tang-, tag-, tact-	touch
hab-, habit	have, held, keep, have possession of	teg-, tect-	cover
jac-, ject-	throw	tend-, tens -	stretch
junct-	join	ting-	color
leg-, lect	choose, read	torque-, tort-	twist
lega-, legat-	bind	tract-	pull, drag
mand-	chew	trud-, trus-	shove
manda-, mandat-	command	val-	be strong
mane-, mans-	remain	veh-, vect-	carry
meat-	go, pass	vert-, vers-, vors-	turn
mov-, mot-	move	vid-, vis-	see
nasc-, nat-	born	vol-	wish, be willing
palp-	stroke	volv-, volut-	turn
palpit-	flutter	vor	eat
par-, part-	give birth to		

## D. Latin Prefixes

Like the Greek elements added before a root, the Latin prefix will alter or modify the meaning of the root to form a new word. To avoid unpronounceable words, the consonant at the end of a prefix may have to be changed to agree with the first consonant of the following root. Thus Ad- plus fer is not adferrent but afferent which means carrying to.

Some common and useful Latin prefixes are presented in the following list:

ab-	from, away from	intra-	within
ad-	to, toward, near	intro-	inward
ambi-	both	i-	in, into, not
ante-	before	ob-	toward, facing, against
circum-	around	per-	through, thoroughly
con-, corn-, co	together	post-	after
contra-	against	pre-	before, ahead
de-	from, down, about	pro-	forward, in front
dis-, di	apart	re-	back, again
e-, ex-	out from	retro-	backward
equi-	equal	sub-	under
extra-	outside, beyond	super	over, excessive
in-	in, into, on	supra-	above
in-	not	trans-, tra-	across
infra-	below	ultra-	beyond
inter-	between	uni-	single

## E. Suffixes

Brown (1956) in his “Composition of Scientific Words,” states that almost any variation or play upon an idea can be incorporated in a word by attaching the proper suffix to its base.

Some examples of endings which indicate Action or Agency are:

- ize	in	cauterize, alkalize
-lyze	in	plasmolyze
-or	in	director, assessor, doctor
- trix	in	aviatrix

Some suffixes which produce diminutives are exemplified in the following:

-ium	bacterium	little stick
-idum	clostridium	little spindle
-ule	granule	little grain
-ella	asterionella	little star

A partial listing of suffixes which may be useful in this course is given below. It includes examples of some of the most commonly used forms in the bio-medical field.

<b>Suffix</b>	<b>Compound word containing suffix</b>	<b>Suffix</b>	<b>Compound word containing suffix</b>
-ize	synthesize advocate,	- idium	basidium
-ate	regulate	-olus	embolus
- ist	industrialist, entomologist	-ole	vacuole
-or	conductor, precursor	-ulus	calculus
-ter	sphincter	-ule	molecule
-ete	gamete	-culus	calculus
-etes	diabetes	- cle	ventricle
- ote	zygote	-ellum	cerebellum
-ent	reagent	-bra	vertebra
- sia	anaesthesia	-bulum	acetabulum
-sis	dialysis	-bule	vestibule
-se	synapse	-ble	crucible
-tion	fraction	-brium	manubrium
-y	anatomy	-rium	auditorium
- ia	mania	-in	pepsin
- ence	sequence	-ode	cestode, trematode
-ency	frequency	-itis	otitis, hepatitis
-or	tumor	-osis	tuberculosis, ornithosis, stenosis
-ite	sulphite, Mannonite	-iasis	amebiasis, onchocerciasis, filariasis
-ity	acidity, equality	-otna	trachoma
-ma	stigma, trauma	-ible	flexible
-mata	stigmata, traumata (plural)	-ile	prehensile
-m	system	-al	digital
-men	foramen	-c	psychic, cardiac
-mina	foramina	-ous	porous
-ment	segment	-ose	rhamnose, glucose
-mentum	momentum	-tic	faunistic, sympathetic
-ure	fissure, commisure	-id	turbid, fluid
- ium	cambium, bacterium	-oid	ameboid, colloid, ellipsoid



### III. Alphabetical Listing of Selected Greek and Latin Terms Useful to Public Health:

(L=Latin, G=Greek)

a-, ab- (L)	from, away, off	bucca (L)	cheek, cavity
a-, an- (G)	not, without, negative	bursa (L)(G byrsa)	purse (bag)
ac- (L)	to	caecus	blind, therefore, sac or pocket
acutus (L)	sharp, pointed	calculus (L)	pebble, diminutive of stone
ad- (L)	to, direction toward	calix (L)	cup
af- (L)	to, toward	calvaria (L)	skull
ala- (L)	wing	cambio (L)	exchange, barter
alga (L)	seaweed one	campa (L)	caterpillar
allelo- (G)	another, reciprocal	campus (L)	field, plain
ambly- (G)	blunt, obtuse	cancer (L)	crab
amphi- (G)	around, on both sides, double	canis (L)	dog
amphora (L)	vessel, pitcher, flask jar	canthus (L)	edge, corner, tire of a wheel
ampulla (L)	flask, bottle	cantus (L)	song
ancylo- (G)	bent, hooked	carchesium (L)	cup, contracted in middle
andro- (G)	man, male	cardio- (G)	heart
ante-, anti- (L)	before	caries (L)	decay
anti-, ana- (G)	against, opposed to	carina (L)	keel
ap- (L)	honeybee	caseus (L)	cheese
apis (L)	from, off, away, after, without, separate	cata-, cat- cath, cato-(G)	down, against, very
apo-(G)	water	catena (L)	beneath, below, under
aqua (L)	beginning, first cause, chief	catholicus (L)	chain
archae-, arche-, archi-, archo- (G)	bear, north joint	cauda (L)	universal, general
arcto- (G)	bag, bladder	cell (L)	tail
arthro- (G)	black	centum (L)	storeroom, chamber
asco- (G)	vestibule, hail, entry	cephalo- (G)	hundred
ater (L)	gold	cercaria (New L)	head
atrium (L)	self	cerc- (G)	tailed, larva of trematodes
aurum (L)	armpit, crotch	cerebrum (L)	tail brain, diminutive is cerebellum
autos (G)	little stick	cerevisia (L)	beer
axilla (L)	little stick	cervix (L)	neck
bacillum, bacillus (L)	deep	chalaza (G)	tubercle, pimple, hail, sleet
bacterium (G)	leech	cheno- (G)	goose
bathys (G)	depth of the	chilios (G)	thousand
bdella (G)	sea	chlamydo- (G)	mantle
benthos (G)	two, twice	chloro- (G)	green
bi-, bin-, bis-(L)	life	chondros (G)	grit, grain of wheat, cartilage
bios (G)	germ, bud, sprout,	chorion (G)	membrane
blastos (G)	shoot	chromato- (G)	color
blatta (L)	cockroach, bloodclot	chryso- (G)	gold
blepharis (G)	eyelash	cibarius (L)	pertaining to food eyelash, eyelid
brachium (L)	arm	cilium (L)	around, about, on all sides
branchos (G)	gill, fin	circum (L)	circle
broma (G)	food	circus (L) cirrus (L)	curl, ringlet, tendril
bu- (L)	large, huge, monstrous	cirratus (L)	curly, fringed

clathratus (L)	latticed, grated, screened	di-, dif-, dir-, dis-(L)	two, apart, asunder, away from, without, not
clava (L)	club, graft	dia- (G)	through, between, during
cloaca (L)	sewer, drain, canal	dicho,- (G)	in two
clostero (G)	spindle	dictyo- (G)	net
clypeus (L)	shield	dif- (L)	away from
co (L)	<u>cum</u> together, with	digitus (L)	finger
coccum (L)	grain, seed, berry	dino- (G)	terrible, fearful whirling, a large round goblet, rotation
coelo- (G)	hollow	diplo-	twofold
cognitus (L)	know	dis (L)	in two, asunder, away from, without
col- (L)	together, with	dispar (L)	different, unequal
collo- (G kolla)	glue	diurnus (L)	of the day
com- (L)	together, with	dormio (L)	sleep
con- (L)	together, with	dorsum (L)	back, ridge of hill
concha (L)	snail, shell	doron (G)	gift
conferva (L)	an aquatic plant	duo (L)	two
conido- (G)	nit, egg of a louse, egg,	dyo (G)	two
copro- (G)	dung	dys (G)	bad, ill, hard, unlucky, very, with difficulty
cor- (L)	together, with	e- (L)	out of, from
cornu (L)	horn	ec- (G)	out of, from
corona (L, G kóronos)	crown	ecdysis (G)	a getting out of, escape from, molt
corpus (L)	body	echinus (L)	hedgehog, sea urchin, prickly house,
cortex (L)	bark	eco- (G)	home
costa (L)	rib, side	ecto- (G)	out of, from
cranio (G)	skull, head	edema (G)	a swelling (with fluid)
crena (L)	notch, rounded projection	edulis (L)	edible
crux (L)	cross	ef-. (L)	out of, from
cryo- (G)	icy cold, chill, frost	ego (L)	I, myself
crypto- (G)	hide, conceal	eido- (G)	from, resemblance
cteno- (G)	comb	-ellus, -ella,	diminutives - as
cum (L)	together, with	-ellum (L)	suffixes = little
cyano- (L)	dark blue	elytron (G)	sheath, husk
cyclo (G)	circle	em-, en- (G)	in, into, within
Cyclops (L)	mythical one-eyed giant	embolos (G)	bolt, bar, peg, stopper wedge
cymato- (G)	wave	en- (G)	in
cymba (L)	bowl	endo- (G)	within, inside
cysti., cysto- (G)	bladder, sac, cell	-ensis (L)	a suffix denoting place, locality, Ex. Canadensis
cyto- (G)	cell, hollow place, container, vessel	enteron (G)	intestine
da- (G)	intensive prefix, very	ento- (G)	within, inside
de- (L)	down, from, of	entome (G)	incision (en=in, temno=cut)
debilis (L)	weak	eon (L)	lifetime, age
demi (French from L)	half	epi- (G)	upon, on, over
dendro- (G)	tree	equus (L)	horse, equinus=of horses
dens (L)	tooth	-er, -es (L)	suffix signifying agent, Ex. designer
derma (G)	skin, hide	ergo (L)	consequently, hence, therefore
des	under, from		

erythros (G)	red	glia (G)	glue
eso- (G)	within	globus (L)	ball
etio- (G)	causing, responsible for	gloeo (G)	a sticky substance
eu- (G)	true, good, well, agreeable, easy, very, original, primitive	glomus (L)	ball
ex- (L)	out of, from	glossa (glotta)(G)	tongue
exo- (G)	out of, without	glottis (G)	mouth of the windpipe
fac-, -fact, -feet, -fex, -fic, -fy	make, do	gluco-. (G)	must, sweet new wine
felix (L)	cat	glycero-. (G)	sweet
-fer (L)	carry, bear	glyco-, glycy- (G)	sweet
-fid (L)	divided into parts	glypho (G)	carve, engrave
filum (L)	thread	gnathos (G)	jaw
flagellum (L)	diminutive of whip, lash	gnosis (G)	wisdom
folium (L)	leaf	gomphos (G)	nail, peg, bolt
foramen (L)	hole, operture, opening	gonad (G)	seed, that which produces seed
fossa (L)	ditch	gongylos (G)	ball, round, spherical
fovea (L)	pit, pitfall	gonio (G)	angle, corner
furca (L)	fork	gono (G)	seed offspring, product
fusus (L)	spindle	gracilis (L)	slender, thin
galacto- (G)	milk	grand (grandis) (L)	large, great, noble sublime, magnificent
galea (L)	helmet	granum (L)	seed, grain, kernel, pellet
galla (L)	pathologic swelling or excrescence on plants	grapho (G)	write
gallus (L)	cock (gallina = hen)	gravis (L)	heavy
gamba (L)	hoof	gregarius (L)	pertaining to a flock or herd, common
gameto- (G)	spouse (wife = gamete husband = gametes)	gryllus (L)	cricket
gaster (G)	stomach, belly, pauch, womb	gula (L)	gullet, weasand, throat
gelatus (L)	frost, congealed, stiffened	gustus (L)	taste
geminus (L)	twin	gutta (L)	drop, spot
gemma (L)	bud, precious stone	gymno- (G)	bare, naked
gen- (L)	be born, causing, producing, forming	gyneco-, gyneo- (G)	woman, female
gena (L)	cheek	gyro (L)	turn around (gyros = circle)
genesis (G)	beginning, origin, birth	habito (L)	dwel, have possession of
genus (L)	birth, origin, race, stock, kind	haemato- (G)	blood
genys (G)	jaw, cheek, chin	hali- (G)	sea, salt
geo- (G)	earth	halo- (G)	sea, salt (a round threshing floor; circle around sun or moon)
-ger (L)	bear, carry, perform	hamus (L)	hook
geras (G)	old age (geraios = aged)	haplo- (G)	single, simple
germen (L)	bud, sprout	haustus (L)	a drawing, draught, suck
gibber, gibbus	humped, humpbacked, protuberant, bent	helico- (G)	spiral, whirl, eddy, tendril, coil, curl
gigas (G)	giant (large)	helio- (G)	sun, marsh
gingiva (L)	gum	helmintho-(G) (helmins)	worm
glaber (L)	hairless, bald, smooth	helos (G)	marsh
glaucus (L)	bluish-green or gray, sea colored	hema-, hemato (G)	blood
gleno- (G)	pupil of eye, eyeball, eye socket, socket of a joint, doll		

hemero- (G)	dry, tame	i- (L)	not (ex. irreplaceable)
hemi- (G)	half	-ia (L,G.)	suffix denoting pertaining to
hepaticus (L)	pertaining to the liver	-iasis (G)	a diseased condition
hepta (G)	seven	-iatry (G)	treatment of disease, a healing,
heteros (G)	other, different	-ible (L)	capable of, having the quality of
hexa (G)	six	ichnos (G)	footprint, track
hiatus (L)	opening, gap, aperture	ichthys (G)	fish
hiems (L)	winter	-icle (L)	diminutive suffix, little
hilum (L)	bit, scar, trifle, mark	ictero- (G)	jaundice, yellow
hippo- (G)	horse	ictus (L)	blow, stroke, stab, sting
hirsutus (L)	hairy, rough, shaggy	-icus (G)	belonging to, pertaining to
hirudo (L)	leech	-id,-ide (L)	having the nature of
hirundo (L)	swallow	-idae (NL)	suffix denoting
hisco (L)	open, gape	idem (L)	family of animals
hispidus (L)	hairy, bristly, rough	idio- (G)	the same
histos (G)	upright web-beam of a loom	-idium (L)	ones own, personal, individual
	web, tissue		
holo- (G)	whole, entire, all	ido (G)	diminutive suffix, little
homo, -inis (L)	man	il- (L)	form, resemblance
homo- (G)	same, uniform, similar, equal	ileum (L)	in, not
hormone (G) (hormao)	instigate, start, spur, arouse	-ilis (L)	last part of intestine
hortus (L)	garden	ilium (L)	having the quality of
humanus (L)	of man	-illus (L)	groin, flank
humilis (L)	on the ground, low	im- (L)	diminutive suffix, little
humus (L)	earth, ground	immitis (L)	in, not
hyalinus (L)	of glass	-imus (L)	harsh, rough
hydato- (G)	water	-ina (L)	pertaining to, having the quality. of
hydra (G)	water, snake	-inae (L)	feminine suffix, sometimes as diminutive
hydro (G)	water	incertus (L)	suffix for subfamilies of animals
hygiene (G) (hygieinos)	healthful	incolco (L)	doubtful
hygro- (G)	wet	incus (L)	tread down, stuff, cram
hyman (G)	membrane	-ine, -in (L)	anvil
hyo- (G)	hog	infra (L)	denoting chemical terms, drugs
hyper-, hypero- (G)	beyond, over, very, above	ingluvies (L)	underneath, below
hypha (L)	web	inis (G)	crop, maw
hyphos (G)	sleep	insect (L)	son, daughter
hypo- (p)	under, beneath, less than	instar (L)	(insectum <inseco, -sectus = <u>cut into</u> )
hyraco- (G)	shrew, mole	inter- (L)	form, figure, likeness, image between, among
hys (G)	hog	intra-, intro-(L)	within, inside
hysteros (u)	after, later	inus, (L)	pertaining to
-i (L)	forms second declension genitives, and masculine specific terms with personal names (pertaining to or of as in Trametes pini, pine rust		

ion (G)	particle	larva (L)	ghost, mask early stage of some animals from <u>larvalis</u> , ghostly
-ion, -sion, -tion (L)	having the nature of, act of, process of, -ion comparative ending diminutive suffix)	larynx (G)	gullet
ios (G)	arrow, poison	lathro- (G)	secretly, covertly
iphi (G)	strongly, mightly	lator (L)	bearer, proposer
ir- (L)	in, not	latrina (L)	bath, privy
is- (G) -is (L)	in, into, to(adj. suffix) having the nature of	lavo (L)	wash
-iscus (L)	diminutive, little	lazaros (G)	corpse
-ise (L)	make, give, act	lecitho- (G)	yolk of an egg
-isk (G)	diminutive, little	lego (L)	send, appoint
-ism (L)	denoting condition, quality, doctrine, sect	-lentus (L)	full of, prone to
iso- (G)	equal, like	lepido- (G)	scale
-issimus (L)	very, a superlative (adjectival)	lepsis, -lepsy (G)	seizure
-istos (G)	very, a superlative (adjectival)	leptos (G)	peeled, cleaned of the husks, fine, small, thin, delicate
-ite, ites	having nature of, like, descendants, follower	-letes (G)	hidden
itero (L)	repeat	leuco- (G)	white
-itis (G)	denotes inflammation, disease, pain	levis (L)	mild, light, fickle
-itus(L)	pertaining to, having the nature of	levo (L)	lift up, lighten, raise
-ium (L)	quality of, nature of	lexico- (L)	pertaining to words
-ive (L)	nature, quality, action	lictus (L)	abandoned, forsaken
-ize (G)	make, cause to be, action	lingula, lingula (L)	little tongue, strap, ladle
jaundice (L)	yellowish	limno- (G)	marsh, lake, pool
juncus (L)	rush, sedge	lingua (L)	tongue
jus (L) (Juris)	law	lio- (G)	smooth
juvenis (L)	young	lipo- (G)(leipo)	abandon, leave, lack and <u>fat</u> , from word <u>lipos</u>
juxta (L)	near, next to	-lite (G)	stone
kilo (G)	thousand	litho- (G)	stone
kinetico (G)	pertaining to motion	locus (L)	place
klepto (G)	steal	-log, -logue (G)(lego)	gather, choose speak, reason
krypton (G)	hidden	logos (G)	discourse
la- (G)	very, intensive prefix	-logy (G)	from lego, knowledge of, science, study of
labium (L)	lip	lopho-, lophio (G)	mane, crest, comb, tuft
labrum (L)	lip, brim	lopo- (G)	cloak, mantle, robe
lac (L)	milk	lordos (G)	bent backward
lacer (L)	torn, mangled, cut up	lorica (L)	leather cuirass or corselet
lachno- (G)	soft, wolly hair, down	lucifugus (L)	light-shunning
lacinia (L)	lappet, fringe	luna (L)	moon
lacrima (lacryma) (L)	tear	lupus (L)	wolf
lactis (L)	small intestine	luridus (L)	pale yellow, dull red, ghastly
lacuna (L)	cavity, hollow, cavern pool, from <u>lacus</u>	luteus (L)	yellow
lacus (L)	lake	lux (L)	light
laelaps (L)	hurricane, storm	lychnos (G)	lamp
laeva (L)	left hand	lyco- (G)	wolf
lamella (L)	diminutive of <u>lamina</u> , plate		

-lysis, lytic (G)	loose, dissolve, break-up	meso-(-G)	middle
-lyze (G)	to make, to do	meta- (G)	between, among, near, after, over, reverseley implying change
macer (L)	thin, lean, poor	metaxy (G)	between, middle
macero (L)	soften	meter (G)	measure, mother
macro (G)	long, large	metric (L)	of measuring
mactans (L)	killing, sacrificing	metridios (G)	fruitful
macula (L)	spot, stain, mark	mezo- (G)	greater
madaros (G)	bold, bare	micro- (G)	small, little
magnus (L)	large, great	micto- (G)	mixed
major, majus (L)	greater	mille (L)	thousand
mala (L)	jaw, cheekbone	minor (L)	less
mala (G)	very, much	miso- (G)	hate
malaco- (G)	soft	mitis (L)	mild
mallues (L)	hammer	mitos (G)	thread
mallos (G)	wool	mitra (L)	turban
malum (L)	apple	mnemo-, mnesi- (G)	mindful, unforgetting
malus (L)	bad	mnion (G)	moss
mamma (L)	breast, teat	mola (L)	millstone
-mancy (G)	pertaining to divination	mollis (L)	soft
mandibula (L)	jaw	molo (L)	grind
mantissa (L)	a trifling addition	molys, molyx, molygros (G)	soft, weak, feeble
manubrium (L)	handle, haft	monas (L)	a unit, alone, single
manus (L)	hand	monile (L)	necklace, collar
mare (L)	sea	mono (G)	one, single, alone
marsupiun (L)	pouch, bag, purse	-mony (L)	action, or result of action
maseter (G)	chewer	mora (L)	delay
mastigo- (L)	whip	morbus (L)	sickness
mater (L)	mother	moros (G)	stupid, foolish
materia (L)	matter	morpho- (G)	form, shape
matrix (L)	mother, womb, source, embed- ding or enclosing, substance	mors (mortis) (L)	death
maxilla (L)	jawbone	morsus (L)	bitten
maximus (L)	greatest	mortuus (L)	dead
me- (G)	not	morus (L)	mulberry
meatus (L)	passage, course	mucor (L)	mold, mildew
meco- (G)	length	mulco (L)	beat, handle roughly, injure
medulla (L)	narrow, innermost part, pith	multus (L)	much
mega-, megal- (G)	large, great, very	muria (L)	brine
mel (L) (mellis)	honey	murinus (L)	pertaining to mice, mouse gray
melan-, melano-, mela-(G)	black	murus (L)	wall
melios, melius (L)	better	mus (L)	mouse
meniscus (L)	crescent	musca (L)	fly
mens (L)	mind	muscus (L)	moss
mensa (L)	table	muto- (L)	change
mensis (L)	month	mutus (L)	dumb, silent
-ment (L)	denoting means, action or result of action	myceto-, myco (G)	fungus
- mentum (L)	chin	myelo- (G)	marrow, pith, spinal cord
-mere -meri, -mero, -merous (G)	share, part, portion	myio- (G)	fly
meros (G)	thigh, ham, femur	myo- (G)	muscle
merus (L)	pure, genuine, unadulterated	myrio- (G)	numberless

mys (G)	mouse, muscle, mussel	noster (L)	our, ours, our own
mysis (G)	a closing of the eyes, pores, etc.	nota (L)	mark
mystaco- (G)	upper lip, the hair upon it	noto- (G)	back
myxa (G)	mucus, slime	novem (L)	nine
myzo (G)	suck	novus (L)	new
nanus (L)	dwarf	nox (L)	night
naris (L)	nostril	nubilis (L)	marriageable
naros (G)	liquid, fluid	nubilus (L)	cloudy, gloomy
nascens (L)	arising, beginning	nucleus (L)	kernel
nasus (L)	nose	nudus (L)	bare, naked
natalis (L)	of birth	nullus (L)	nothing, nobody
natator (L)	swimmer	nutrio (L)	nourish
nau-, nausi-, nauti- (G)	ship	nux (L)	nut
navis (L)	ship	nychos (G)	night
ne- (L)	not	nycterido- (G)	bat
nebula (L)	mist	nycti-, nycto- (G)	night
necator( necatrix) (L)	killer	nygma (G)	puncture, sting
nacro- (G)	a dead body, corpse	nysson (nytto) (G)	prick, spur, pierce puncture
necto- (G)(nektes)	swimmer	o- (L)	toward
nemato- (G)	thread	ob-, o-, oc-, of-, og-,	toward, to, upon
		op-, os- (L)	
nemertes (G)	infallible	obesus (L)	fat
nemo- (G)	graze, dispense	obitus (L)	a going down, death downfall, destruction
		oblatus (L)	flattened at the poles
neo (G)	new, young, recent	occidentalis (L)	of the west
nepa (G)	scorpion	occiput (L)	back part of the head
nephelo- (G)	cloud	occo- (G)	eye
nephos (G)	cloud	octo (L)	eight
nephro-(G)	kidney	oculus	eye
neros (G)	flowing, liquid	ocy- (G)	swift, quick, sharp
netos (G)	heaped up	-ode (G)	way
neuro- (G)	nerve, sinew, tendon	-odes (G)	likeness, fullness
nicto- (L)	wink	odonto, odon (G)	tooth
nictus (L)	a winking	-ody (G)	song
nidus (L)	nest	oeco-, oeci (G)	house, home, dwelling
niger (L)	black	oedema (edema) (G)	swelling, tumor
nihil (L)	nothing	oeco- (G)	alone
nimbus (L)	rain cloud	of- (L)	toward
nipho- (G)	snow	-oid, -oides (G)	like, resembling, having the form of
nitella (L)	brightness, splendor	ois (G)	sheep
nitidus (L)	shining, neat, elegant	oligo- (G)	few, scanty
nivalis, nivarius, niveus (L)	of snow, snowy	-ology	know
nocturnus (L)	of the night	olos (G)	mud
nodus (L)	knot, swelling	-olus (L)	diminutive, little
nomado- (G)	roaming about for pasture, roving	-oma (G)	denoting tumor
nomen (L)	name	-ome (NL)	having nature of
nomo-, noiy- (G)	usage, law, pasture, place or condition for living		
non- (L)	not	omma (G)	eye
nops (G)	blind	omnis (L)	all
nosos (G)	disease, sickness		

-on, -oon (L)	suffix which augments the force or meaning, very	pabulum (L)	food, fodder
onco- (G)	hook, barb	pachne (G)	frost
onto- (G)	being, thing, that which has existence	pachys (G)	thick
onycho- (G)	finger nail, talon, claw hoof	paedo- (G)	child
-onym (G)	name	pageto- (G)	frost
oön (G)	egg	pal- (G)	all
op- (L)	toward	paleo-, palaeo- (G)	ancient, old
operculum (L)	cover, lid	pallidus (L)	ashen, pale, wan
ophio- (G)	serpent, reptile	palpito (L)	tremble, throb, beat, pant
-opia (G)	eye	palpo (L)	touch, stroke, feel
opora (G)	autumn	paludosus (L)	boggy, marshy
-opsis, -opy (G)	relating to sight and appearance	paluster (L)	marshy, swampy
opso (G)	meat, rich fare	pam- (G)	all
optico- (G)	sight	pan-, panto- (G)	all, the whole, every
opus (L)	work	pandus (L)	bent, crooked, curved
-or (L)	one who, agent, actor, condition, state	panis (L)	bread, loaf
ora (L)	edge, border, margin, coast, zone, region	panto- (G)	all
orbis (L)	circle	papas (G)	father
orchis (G)	testicle	papilio (L)	butterfly, tent
orgy (G)	secret rite	papilla (L)	nipple, teat, bud
-orium (L)	place where, place for	papula (L)	pustule, pimple
ornitho (G)	bird	par (L)	equal
ortho- (G)	straight, correct, normal, right, direct	para (G)	beside, near by, near
oryza (G)	rice	parasite (L)	one who eats at the table of another, guest, sponger
os- (L)	toward	paresis (G)	paralysis, letting go, slackening
oscillo (L)	swing	parietalis, parietarius	of walls
-ose, -osity (L)	having the nature of, or quality of, usually means fullness or abundance	-parous (G)	giving birth to, denoting production
-osis (G)	morbid condition, disease	parthenos (G)	virgin
osme (G)	smell, odor	partus, paritus (L)	given birth to, produced
osseus (L)	bone	parvus (L)	little
osteo, osto (G)	bone	pasi (G)	all
ostium (L)	door, entrance	passalos (G)	peg
ostraco- (G)	shell, potsherd	pastor (L)	herdsman, shepherd
ostrea (L)	oyster	patella (L)	small, pan, dish, kneepan
-osus (L)	nature of, quality of, abundance	patens (L)	open, exposed
-otes (G)	quality nature	pater (L)	father
otilo (G)	wound, sore	patera (L)	saucer
oto- (G)	ear	patho-, pathy- (G)	denoting disease, suffering
-otus (L)	quality of, pertaining to	patiens (L)	suffering, enduring
-ous, -ose, osity (L)	having nature of, etc.	patria (L)	fatherland, native country
ovis (L)	sheep	patro- (G)	father
ovo (L)	exult, rejoice	paucus (L)	few, little
ovum (L)	egg	pauros (G)	little, few
oxys (C)	sharp, acute, keen, quick, sour, acid, oxygen compounds	paulus (L)	little
ozo (G)	smell	pax (L)	peace



pecco (L)	err, sin	phalanx (L)	line, battle array, bone of finger or toe
peco- (L)	hide, skin, rind	phalaros (G)	having a white spot or patch
pecten (L)	comb	phaneros (G)	visible, evident
pecto- (G)	fixed, congealed, compacted	phano- (G)	light, bright, torch
pectus (L)	breast, chest	phantasia, phantasma (G)	image, apparition, appearance
ped-, peda.-, pedi-, pedo- (G)	child	pharynx (G)	throat
pedalion (G)	rudder	phase (G)	appearance, look, state
pedicel (L)	little foot	phasma (G)	apparition, specter
pege (G)	water, stream, spring tear	pheno- (G)	appear, shine
pegos (G)	strong, solid	-pher, -phor (G)	bear, carry
pel- (L)	through	phil-, philo(G)	love as a friend, regard with affection
pelagos (G)	sea	phlebo- (G)	vein
peleco- (G)	helmet	phloeo- (G)	bark
pelecy- (G)	ax, hatchet	phobia (G)	fear
pelico- (G)	how large, how great, of what age	phono- (G)	sound, voice
pellis (L)	skin	phor (G)	thief
pello (L)	beat, drive, push	phore, phoro- (G)	bearer, carrier
pellucidum (L)	clear, transparent	phormio (L)	mat, rug
pelo (G)	clay, mud	photino (G)	shining, bright
pendens, pendulus (L)	hanging	photo- (G)	light
penicillum, penicillus (L)	painters brush, pencil, tuft	phthirio-, phihiro- (G)	seaweed, alga
penna, pinna (L)	feather, wing, arrow, pen	phyco- (G)	louse
pensilis (L)	hanging	phygo- (G)	flight, escape, avoidance
penula (L)	mantle	phyllo- (G)	leaf
penuria (L)	want, poor	phylo (G)	tribe, race
peptos (G)	cooked	phyo, phyteuo (G)	produce, beget, make grow
per- (L)	through, by, very	physa (G)	bellows, bubble, win
peregrinus (L)	traveling about, foreign, strange, exotic	physo- (G)	bellows
perennis (L)	perpetual, everlasting, through the years	phyto- (G)	plant
peri (G)	around	picro- (G)	bitter
peredineo (G)	whirl around	pila (L)	ball
perisso- (G)	extraordinary, beyond regular number or size	pilatus (L)	grown hairy
pero- (G)	disabled, hurt, maimed	pilo- (G)	hair, felt, ball, felt cap
pervius (L)	open, affording, passage	pilus (L)	hair, cap, ball
pes (pedis) (L)	foot	pinna, penna (L)	feather, wing, fin pen, leaflet
pesco (G)	skin, hide, rind	pinos (G)	dirt, filth, squalor
pessum (L)	plug, tampon	pisinnus (L)	small, little
pestis (L)	plague	piso- (G)	pea (bean)
petigo (L)	scab, eruption	pisto- (G)	faithful, genuine
petiolus (L)	little foot, stalk, stem	pisum (L)	pea (bean)
petro- (G)	rock	pithecus (L)	ape
phaeo- (G)	dusky, brown	placenta (L)	cake
-phage, phago- (G)	to eat	placo- (G)	anything flat and wide
		plaesio- (G)	oblong body, figure or form

plagios (G)	oblique	pragma (G)	act, deed, fact, matter
plancto- (G)	wandering , roaming	pravus (L)	crooked, deformed, perverse, bad
plasma (G)	substance , that which is formed or molded	pre- (L)	before, very
platys (G)	broad, wide, level, flat	preda (L)	prey
plaudo (L)	strike, clap the hands in praise	prehendo (L)	seize
plax (G)	plate, tablet	primus (L)	first
plebs (L)	the common people	prior, prius (L)	earlier, former
plecto (G)	plaited, twisted	pro- (L)	before, forward, in front of
-plegia (G)	stroke, strike	probo (L)	test
pleistos (G)	most	probus (L)	good, excellent, upright
pleo- (G)	swim, sail	procto- (G)	rectum, fundament tail, annus
pletho- (G)	crowd, multitude, throng, fullness	prodigiosus (L)	strange, wonderful, vast, extraordinary
pleuro- (G)	side	pros (G)	implying motion from, on or to the side, beside, near, toward
plexus (L)	interwoven, plaited, braided	protos (G)	first
plio- (G)	more	prurio (L)	itch, or long for
pludo (L)	clap, strike	psammos (G) pseudo- (G)	sand
pluto- (G)	rich	psilo (G)	lie, false
pluvius (L)	rainy	psoro (G)	bare, smooth
pneuxno- (G)	wind, air, breath	psycho- (G)	itch scurvy, scabby, mangy
podium (L)	platform, balcony	psychros (G)	breath, life, soul, spirit, mind, butterfly
podo-, podi, poda- (G)	foot	psylla (G)	cold, frigid
poecilo (G)	varicolored, pied, mottled, spotted	ptenos (G)	flea
-poeus (G)	of a given kind, nature quality	ptero- (G)	feathered, winged
pogon (G)	beard	ptilo (G)	wing, feather, fin
polios (G)	gray	ptoma (G)	down, feather, wing, leaf
polis (G)	city	ptyalon (G)	that which has fallen, corpse
pollen (L)	dust, fine flour	psycho- (G)	saliva, spit
pollex (L)	thumb	puber (L)	fold, leaf, layer, plate
pollutus (L)	defiled , unchaste	puicher (L)	downy, ripe
poly- (G)	many, very	pulmo (L)	beautiful
poma (G)	cover, lid,	pulvinus (L)	lung
pomphos (G)	blister	pulvis (L)	cushion, pad, pillow
pomum (L)	apple, fruit	pupa (L)	dust, powder
pons (pontis)	bridge	putor (L)	girl, doll
populus (L)	people	pycno (G)	stench, rottenness
por- (L)	before	pyelis (o)	dense, thick
poro- (G)	hole, passage	pyelos (G)	socket, setting
porta (L)	gate, door	pygmo (G)	trough, tub, bathtub, pelvis
portus (L)	harbor, haven, entrance	pygmy (L)	fist
porus (L)	hole, passage	pygo- (G)	dwarf
post (L)	after, behind	pylo- (G)	rump, buttocks
potamo (G)	river	pyon (G)	gate, orifice
poto (L)	drink	pyro- (G)	pus
practico- (G)	active, busy, able, effective		fire
prae (L)	before		

pyros (G)	wheat, grain	ryncho(G)	nose, snout, muzzle
pyrrho (G)	flame-colored, real yellowish-red, tawny	rica (L)	veil
pysma (G)	question, ask	rodent (L)	gnaw, nibble at
pystos (G)	learned	rogo (L)	ask, beg
pyxis (L)	box	ros (L)	dew
quadri (L)	four	rostrum (L)	beak, bill, snout, muzzle
quantus (L) quasi (L)	how many, how much	rota (L)	wheel
qui, quod, quis,	appearing as if, simulating	rober (L)	red
quid (L)	who, which, what	rufus (L)	red, reddish
quinque (L)	five	ruga (L)	wrinkle, crease
rabidus (L)	mad, furious	ruidus (L)	rough
radius (L)	rod, ray, spoke	saccus (L)	bag
radix (L)	root, radicle = little root	sacrum (L)	holy thing, temple
radula (L)	scraper	sagitta (L)	arrow
ramus (L)	branch, antler	sal (L)	salt
		salio (L) (saltus)	leap, jump, bound, dance
rana (L)	frog, ranunculus dim. = tadpole	salum (L)	the open sea
rapina (L)	robbery, pillage	salus (L)	health
rapum (L)	turnip	sanquis (L)	blood
rasor (L)	scraper	sanitas (L)	health, soundness of mind
rattus (ML)	rat	sanus (L)	sound, healthy
raucu (L)	hoarse	sapiens (L)	prudent, wise
re-, red-, retro	retro- (L) back, again, down, very	sapros (G)	rotten
rectus (L)	straight, upright, proper, right	sarcina (L)	package, bundle, burden, load
reduvja (L)	hangnail, remnant, fragment	sarco- (G)	flesh
regelo (L)	thaw	sartor, sartrix (L)	tailor, patcher
regula (L)	ruler, measure, pattern	sauros (G)	lizard, reptile
remus (L)	oar	scaber (L)	rough, scabby, mangy
ren (L)	kidney	scando (L)	climb
repens (L)	creeping	scapus (L)	stem, staff
repletus (L)	filled, full	scato- (G)	dung
res (L)	thing	schistos (G)	split, divided
reses (L)	remain sitting, idle, inactive	schiza (G)	splinter or chip of wood
reus (L)	accused person, defendant	scintilla (L)	spark
rex (L)	king	scissus (L)	cut, rent, split
rhabdo- (G)	rod, stick, staff	sclero (G)	tough, hard
rhachjo- (G)	spine, backbone, ridge, stem	scoto (G)	darkness
rhago (G)	grape, berry	scribo (L)	write
rhaphido (G)	needle	scutella (L)	small tray or platter
rheos (G)	stream, current	scutum (L)	shield
rhetor (G)	orator, teacher of oratory	se- (L)	apart, aside, separation
rhino- (G)	nose, snout, beak, bill	segnis (L)	slow, slothful, dilatory
rhipido- (G)	fan	seleno- (G)	moon
rhizo- (G)	root	sella (L)	seat
rhodo- (G)	rose, red	selma (G)	deck, floor
rhus (L)	sumac	semen (L)	seed
rhyaco- (G)	stream, torrent		

semi- (L)	half	sos, sosi (G)	safe, sound
semio- (G)	sign, signal, flag	spanios, spanos, sparnos (G)	rare, scarce
sepsis (G)	decay, putrefaction poisoning from bacterial action	speciosus (L)	beautiful, splendid
septem (L)	seven	specus (L)	cave, showy
septentrionalis (L)	north, northern	spertna (G)	seed
septum (L)	hedge, fence, partition	spes (L)	hope
sera (L)	bar for fastening doors	sphaero- (G)	ball
sermo (L)	talk, conversation, discourse	sphex (G)	wasp
serra (L)	saw	spiraculum (L)	air hole, breathing, pore, vent
serum (L)	a thin watery fluid, whey (curdled milk)	spiro- (G)	coil, twist
sessilis	sitting	spissus (L)	thick, crowded, dense, slow
sesqui (L)	one and one-half	splanchnon (G)	entrail
seta (L)	bristle	spudo- (G)	zeal, exertion
sialos (G)	fat	stalsis (G)	compression, contraction, restriction
sibilo (L)	hiss, whistle	stato- (G)	fixed, placed, standing
sic (L)	thus	stauro- C(G)	cross, upright stake
siccus (L)	dry	stego- (G)	roof
siliqua (L)	pod, bag	stela (L)	pillar, column
silva (sylva)	forest	stella (L)	star
simia (L)	ape	stenos, stenygros (G)	narrow
similis (L)	resembling, like	stentor (G)	herald with a loud voice
sine- (L)	without	stercus (L)	dung
sino- (G)	harm, hurt, damage, injury	sterno- (G)	chest, breast
sinus (L)	pocket, recess, bay	sterto (L)	snore
-sion (L)	act of, process of, having nature of	stia (G)	pebble
siphon (L)(G, siphon)	pipe, bent tube	sticto- (G)	punctured, spotted,
siro- (G)	cord, rope, band, string	stilla (L)	drop, dappled
-sis, -sy, -cy	act of, process of	stilus (L)	stake, pen
sitos (G)	food, grain	stizo (G)	prick, puncture, mark, brand, tattoo
situs (L)	place, site, location	stola (L)	a long garment, robe
sol (L)	sun	stoma (G)	mouth
solea (L)	bottom of the foot, sole	stratum (L)	cover, blanket, bed, layer
solium (L)	royal seat, throne, chair of state	streptos (G)	twisted
solpuga (L)	a kind of spider, probably	stria (L)	furrow, channel, hollow, line
solus (L)	alone, single	strictus (L)	drawn together, tight, straight
soma (G)	body, flesh	stridulus (L)	creaking, grating
somnus (L)	sleep	striga (L)	swath, bristle, windrow
sonax (L)	noisy	strigilis (L)	scraper
sophos (G)	wise	stroina (G)	bed, mattress
sopor (L)	sleep, stupor, lethargy	strongylos (G)	round, rounded
-sor (L)	agent	strophe (G)	turning point
soror (L)	sister	stylos (G)	pillar, column
sorus (L)	heap	suavis (L)	sweet

sub- (L)	under, from, somewhat less than	tensus (L)	stretched, extended
subtilis (L)	thin, fine, slender, sly, acute	tenuis (L)	thin
suc-, suf-, sug-, sum-, sup-, sur- (L)	under	-ter, -test -tor, -teira, -tis, -tria, -tris (G)	agent, doer, maker
super (L)	over, above	-ter, -tra, -trum	tool, instrument
supo (L)	throw	terato- (G)	monster, sign, marvel, wonder
supra (L)	above, over	tergens (L)	cleansing
sur- (L)	under	tergum (L)	back
-sura, -tura (L)	result of action	-terion (G)	place where
surgo(L)	rise	terra (L)	earth
sus (L)	pig, hog	testa (L)	urn, brick, shell, skull, potsherd
sutor (L)	sewer, cobbler	tetra (G)	four
sutura (L)	seam	thalasso (G)	sea
syl- (G)	together, with	thallus (L)	shoot, sprout, green branch, body of algae and fungi
sylva (silva) (L)	forest	theca (L)	case, container, envelope, sheath
sym- (G)	together, with	theos (G)	god
syn- (G)	together	therio-, thero- (G)	beast, wild animal
-syna (L)(G)	condition, state, quality	thermo- (G)	heat
synaptos (G)	joined, united	theros (G)	summer
synergos (G)	associated, partner	thesaurus (L)(G)	treasure, storehouse chest
syr- (G)	together, with	thigma (G)	touch
syrinx(ç)	pipe	thio- (G)	sulfur
syro (G)	drag, draw, sweep, trail	thixix (G)	touch
sys- (G)	together, with	thomos (G)	heap
systole (G)	contraction	thorax (G)	breastplate, cuirass, chest
tachys, tachinos (G)	swift	thraustos (G)	brittle
taenia (L)	ribbon, fillet	thremma (G)	creature, slave
talio (L)	punishment in kind for an injury	thrix (G)	hair
	experienced		
talis (L)	the like, kind	thrombos (G)	lump, blood clot
tany- (G)	stretch out	thyra (G)	door
tardus (L)	slow	thysanos (G)	fringe, tassel
tarsos (G)	mat, grate, flat surface, flat of foot	-tia (L)	pertaining to
taurus (L)	bull	tilos (G)	shred, fiber
tax-, taxia-, taxis	place	тино- (G)	stretch
taxo (G)	arrange, classify,	-tion (L)	act, process, result or state of
techno- (G)	art, craft c	tiphos (G)	standing water
tegmen (L)	over	tomentum (L)	wolly hairs
tegula (L)	roofing tile	-tomy, tome (G)	dissection, excision
tegumentum (L)	cover	topos (G)	place
tele (G)	far	-tor (L)	agent
teleos, teleios (G)	having reached its end, finished, complete, perfect	tormos (G)	hole, socket
tellus (L)	earth		
telson (G)	end, boundary	torno (L)	turn, make round
temna (G)	cut, slice	torpidus (L)	numb, stiff
temo (L)	beam, pole, tongue	torus (L)	round elevation, bulge
tempus (L)	time	toxos (G)	bow
tendon (L)	stretch	trachea (L)(G)	windpipe
tenon (G)	sineu	trachys (G)	rough

tragula (L)	javelin	tunica (L)	garment
tragus (L)	goat	turba (L)	tumult, disorder
trama (L)	warp, weft	-ture (L)	result of action
tranos (G)	clear, distinct	turgidus (L)	inflated, swollen
trans- (L)	across, beyond, through	turio (L)	shoot, sprout
trapheco- (G)	beam, piece of timber	turpis (L)	ugly, foul, filthy, base
trasia (G)	kiln, grate	-tus (L)	pertaining to, nature of
trauma (G)	wound	tussis (L)	cough
trema (G)	hole	tutor (L)	watcher, protector
trepho (G)	feed, nourish	tutus (L)	safe, secure
trepidus (L)	agitated, alarmed	tycho- (G)	chance, accident, good fortune, luck
trepo (G)	turn	tyco- (G)	mason's hammer
tresis (G)	perforation	tycto- (G)	created, wrought
tretos (G)	perforated	tylo- (G)	knot, knob, callus, lump
tri- (L)	three	tymma (G)	blow
trica (L)	trifle, hindrance	tympanum (L) (G)	drum
tricho- (G)	hair	typhlos, typhlosis (G)	blind
trientalis (L)	third of a foot	typhos (G)	smoke, vapor
trifidus (L)	three cleft	typis (G)	hammer, mallet
trifolium (L)	clover, trefoil	typo- (G)	impression, shape, figure, mark of a blow
triplex (L)	threefold	tyros (G)	cheese
-tris, -tria (G)	agent, doer	u- (G)	not
tristis (L)	sad	ubi (L)	where (ubique = everywhere)
tritros (G)	third	-uchus (NL)	hold, bear
tritrus (L)	well worn, familiar, commonplace	udus (L)	wet, damp, humid
-trix (L)	agent, usually feminine	-ule (L)	diminutive, little
trochanter (G)	segment of insect leg (the second)	uliginosus (L)	full of moisture
trochlea (L)	pulley	ulio- (G)	deadly, baneful
trocho- (G)	anything round or circular	ullus (L)	any, anyone
trocto- (G)	gnawed, eatable	ulna (L)	forearm, elbow
troglo (G)	hole	ulo- (G)	gum (surrounds teeth)
tromos (G)	trembling, quivering	ultra (L)	beyond, on the other side
-tron (G)	tool, instrument	-ulus (L)	diminutive, little
trope, tropos (G)	a turn, turning, way, direction	umbo (L)	knob, shield
trophe (G)	food	umbra (L)	shade, shadow
trophy (L)	memorial of victory, mark, token	uncia (L)	the twelfth part
trox (G) (trogos)	nibbler, gnawer	uncinus (L)	hook, barb
trudo (L)	thrust	-unculus (L)	diminutive
-trum (L)	tool, instrument	uncus (L)	hook, barb
truncus (L)	maimed, cut off	unda (L)	wave
tryma (G)	hole	-undus (L)	continuance, augmentation
tryo (G)	rub, wear out	unguis (L)	nail, claw, talon
tryos (G)	labor, toil	unicus (L)	only, sole, singular
trypa, trypema (G)	hole	unus (L)	one, the whole
tuber (L)	a swelling, bulb	-unus (L)	pertaining to
tubus (L)	pipe	urano (G)	heaven, sky
-tude (L)	state, condition, nature	urbs (L)	city
tumidus (L)	swollen		

urceus (L)	pitcher, urn	vertex (L)	top, peak, eddy
urens (L)	burning, stinging	verto (L)	turn
-urge, -urgo, -urgy (G)	denoting work	verus (L)	true
uro- (G)	tail	vescor (L)	eat
ursus (L)	bear	vesica (L)	bladder, purse, blister
-us, -a, -urn (L)	masculine, feminine, neuter terminations	vesper (L)	evening, west
uter (L)	bag, one or the other, other	vespertilio (L)	bat
utriculus (L)	diminutive, small bag or bottle	vesperugo (L)	bat
-utus (L)	having nature of, pertaining to	vestis, vestimentuin (L)	garment
uva (L)	grape	veto (L)	forbid
unidus (L)	wet, moist, damp	vetus (L)	old
uvula (L)	lobe of soft palate	via (L)	way
vacca (L)	cow	vibrissa (L)	whisker
vacillo (L)	waver	vibro- (L)	shake, oscillate
vado (L)	go, rush	vicinus (L)	near, neighboring
vadum (L)	shallow place, shoal, ford	victus (L)	food, diet
vagina (L)	sheath, scabbard, case	victus (L)	shriveled, shrunken wrinkled
vagus (L)	wandering	villus (L)	shaggy, hair
valde (L)	exceedingly, very	vir (L)	man
valens (L)	strong, vigorous	virgo (L)	maiden
vara (L)	trestle, horse	viridis (L)	green
vargus (L)	vagabond	Virilis (L)	manly
varus (L)	blotch, pimple	virus (L)	slimy liquid, poison
vas (L)	vessel, duct, utensil also bail, surety	vis (L)	force, strength
ve- (L)	without, intensive	viscum (L)	sticky mistletoe
vector (L)	carrier, passenger, rider	vita (L)	life
vellus (L)	fleece, pelt	vitellus (L)	yolk of an egg
velo (L)	cover, conceal	vitrum (L)	glass
velum (L)	veil, curtain, sail	voco (L)	call
vena (L)	bloodvessel	volans (L)	flying
venator (L)	hunter	volva (L)	cup-shaped sheath
vendo (L)	sell	vomica (L)	sore, boil, ulcer
venio (L)	come	vorax (L)	greedy, gluttonous
venter (L)	belly	vox (L)	voice, sound, call
ver (L)	spring, springtime	xanthos (G)	yellow
verdant (L) (viridis)	green	xenos (G)	stranger, guest
vergo (L)	bend, incline, tend toward	xeros (G)	dry
vermis (L)	worm	xylo- (G)	wood
vernalis, vernus (L)	of springtime	zoon (G)	animal
verro (L)	sweep, clear away	zoros (G)	pure, sheer
versus (L)	furrow, line of poetry, turn	zygon, zygos (G)	yoke, pair, balance
		zyme (G)	yeast

## APPENDIX A

**“The Language of Biology” by Clifford J. Dennis, Ph.D., published in *Turtlox News* Vol. 38, No. 2, February, 1960.**

"One of the advances man shows over lower forms of life is his ability to use an intelligible language. Words are symbols used to represent things or ideas and are arranged in various ways to express more complex concepts. Every field of human inquiry has its own terminology which is used to define, describe and analyze the subject matter of that field. A person can not really understand much about any academic study unless he has a rather good grasp of the terminology which is employed. Not much progress can be made if such things as structure, function and behavior are designated by terms like "this thing," "that part" and "this activity." Below is a description of hitching horses written by Mark Twain without the use of technical terms. This indicates in a humorous fashion the absurdity of avoiding technical words.

“The man stands up the horses on each side of the thing that projects from the front end of the wagon, and then throws the tangled mess of gear on top of the horses, and passes the thing that goes forward through a ring, and hauls it aft, and passes the other thing through the other ring and hauls it aft on the other side of the other horse, opposite to the first one, after crossing them and bringing the loose end back, and then buckles the other thing underneath the horse, and takes another thing and wraps it around the thing I spoke of before, and puts another thing over each horse's head, with broad flappers to it to keep the dust out of his eyes, and puts the iron thing in his mouth for him to grit his teeth on, up hill, and brings the ends of these things aft over his back, after buckling another one around under his neck to hold his head up, and hitching another thing on a thing that goes over his shoulders to keep his head up when he is climbing a hill, and then takes the slack of the thing which I mentioned a while ago, and fetches it aft and makes it fast to the thin that pulls the wagon, and hands the other things up to the driver to steer with.”<sup>2</sup>

Perhaps this selection of Mark Twain's describes how a person would hitch a team of horses. But could you hitch horses following this description? It is doubtful that you could. However, provided with the necessary wagon, harness and horses and adequate names, descriptions and drawings of the materials used together with accurate instructions for hitching, most people probably could do a fairly satisfactory job of hitching up a team of horses. Technical terms are necessary.

Biological terminology is often a source of difficulty and frustration for students. It would be a very rare biology teacher who has not listened to student complaints about learning all of those "hundred dollar words." An increase in vocabulary is one of the aims of education, particularly when a greater vocabulary is coupled with an understanding of words and concepts. You should realize that simply learning lists of words has very negligible value. Since technical terminology is necessary, the material in this paper is presented with the aim of easing the pain of learning strange and apparently difficult words.

Now then, let us consider how words originate and how they are constructed. Table 1 traces the origin and development of our modern English language as well as certain other related languages.

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<sup>2</sup> / Mark Twain, in *A Tramp Abroad* (New York: Harper and Brothers, 1905), pp.28-29



**Table 1**  
**Development of Modern English and Related Languages**

<b><u>Indo-European (about 2500 B.C.)</u></b>				
<b><i>Hellenic</i></b>	<b><i>Latin</i></b>	<b><i>Germanic</i></b>	<b><i>Celtic</i></b>	<b><i>Sanskrit</i></b>
Greek	French	Danish	Irish	Indian languages
	Spanish	Swedish	Welsh	
	Italian	Norwegian	Scots-Gaelic	
	Portuguese	Icelandic	Breton	
		German		
		Dutch		

**Old English (Anglo-Saxon – 450-1050)**

Germanic Tribes conquered the Britons who spoke Celtic.

**Middle English (1050-1450)**

William the Conqueror, French Norman, overcame King Harold, Anglo-Saxon, There was much borrowing from French and Latin.

**Modern English (1450-present)**

There has been much borrowing from Greek, Italian, Spanish and from all over the world. Parts of words especially have been borrowed by the sciences.

**WORD ANALYSIS**

You should learn to recognize word parts since they often give you a clue to the meaning of the word. The word form -bio- will refer to life whenever it is used. We have such words as biology, the study of life; biometry, the measurement of life or statistics as applied to life sciences and biota, the animals and plants of a region. Some of our words can be analyzed or broken down into parts; some are not subject to analysis of this sort and are called root words. Upon analysis the word zoology is broken down into zoo- and -logy. Zoo- comes from the Greek zoion, animal; -logy is derived from the Greek logos, discourse. Zoology literally means animal discourse or, as we commonly say, study of animals. On the other hand, the word cell can not be analyzed in this way. Cell is derived from the Latin celia, little room.

Word analysis will be a very useful tool because it will often give you a good idea of the meaning of words. But it will not always do so. Perhaps the main reason for this is that words generally tend to change their meanings, pronunciations and spellings with the passage of time. Uncommon words may defy analysis, and sometimes words have the same root but different meanings.

Do not let these things discourage you. More often than not, analysis of words will be very helpful. Your dictionary will indicate spellings, syllables, origins and meanings of words. Make good use of it.

Word analysis involves a study of prefixes, roots and suffixes.

## A. Prefixes

A prefix is a short word form used at the beginning of a word which modifies the meaning of the second part of the word. Often the spelling of a prefix is changed to make pronunciation easier. For example, the Latin prefix ad is changed so that instead of appendage we have appendage. Some of the most common prefixes used in biological terms, which are derived from the Old English, Greek and Latin, are listed below with some variations in spellings, meanings and examples.

Prefix	Meaning	Examples
	<b>From Old English</b>	
fore	before, in front	forearm
un-	not	unconscious
	<b>From Greek</b>	
a-, an-	without, lacking	asexual, anaerobic
amphi-	on both sides	amphibian
ana-	up	anatomy
anti-	against	antiserum
cata-	down	catabolism
dia-	through	diaphragm
epi-	over	epidermis
hyper-	excessive	hyperthyroidism
hypo-	under	hypothalamus
meta-	after, change	metaphase, metamorphic
para-	beside	parabasal
peri-	around	perianth
Pro	for, before, in front of	pronotum
syn-, sym- sys-	together	synapsis, sympetalous, systole
	<b>From Latin</b>	
ab-, abs-	from, away	abduct, abscess
ad-, af- ag-	toward, to	adduct, afferent, agglomerate
bi-	two	bifocal
circum-	around	circumflex
com-, con-	with	commensal, conjugation
de	down, away from, separation	depressed
dis-, dif-	away, apart	disarticulation, diffusion
ex-, ef-	out, from	extraction efferent
extra-	outside	extracellular
in-, im-	in, within	inclusion, immersion
in-	not	incapacitate
inter-	between	internode
intra-	within	intracellular
ob-, oc-	over, toward	obteted, occlusion
post-	after	postescutellum
pre-	before	prenatal
pro-	for, before, in front of	prophase
re-	back, again	regression, ref racture
semi-	half	semicircular
sub-, sus-	under	subcutaneous, suspend
super- supra-	over, extra, above	supersensitive, suprarenal
trans-	across	transpiration
ultra-	beyond	ultrasonic

## B. Roots

A root is a word form that can not be analyzed and has a relatively constant form and meaning. It is sometimes difficult to distinguish between prefixes and roots, but a root is usually more important and may be found at various positions in words. If you know the meaning of the root or roots which are parts of a word you may often obtain a general idea of the meaning of that word. Most of the roots used in biological terms are derived from Latin or Greek. Scientists have made much use of both Greek and Latin roots to form combinations to produce new words for previously unknown phenomena. There are often meaningless, short connectives between word parts such as in the word chromosome which can be analyzed as -chrom-, color; -o-, the meaningless connective and -soma-, body.

The following list contains some of the more common roots from Greek and Latin which are used as bases for biological terminology. The root, meaning and examples are given.

Root	Meaning	Examples
<b>From Greek</b>		
-anthrop-	man	anthropomorphic
-aster-	star	Asteroidea
-auto-	self	autonomic
-bio-	life	biogenesis
-chrom-	color	chromatin
-chloro-	green	chloroplast
-cyto-	cell	cytology
-derm-	skin	dermis
-ecto-	outside	ectoplasm
-endo-	within	endodermis
-gastro-	stomach	gastrovascular
-hem-	blood	hemolysis
-hetero-	different	heterozygous
-homo-	same	homologous
-hydr-	water	hydrobiology
-leuco-	white	leucocyte
- mega-	large	megaspore
-meso-	middle	mesoglea
-micr-	small	microscope
-mon-	one	mononucleate
-morph-	form	morphology
-orth-	straight	Orthoptera
-phor-	bearing	Mastigophora
-phot	light	photosynthesis
-plasm-	a thing moulded	endoplasm
pod-	foot	Gastropoda
poly-	many	polymorphism
-proto-	first	protoplasm
pseudo-	false	pseudopodium
-pter-	wing	Hymenoptera
-som-	body	somatic
-tri-	three	triploid
-zo-	animal	zoology
<b>From Latin</b>		
-ac-	sharp	acute
-aqu-	water	aqueous
-aud-	hear	auditory
-brev-	short	brevicornis
-capit-	head	capitulum

-carn-	flesh	carnivore
-cid-, -cis-	kill, cut	insecticide, excise
-corp-	body	corpuscle
-dec-	ten	Decapoda
-dent-	tooth	dentate
-duc-	lead	adduct
-flor-	flower	flora
-gen-	origin, kind	gene, genus
-loc-	place	locus
-mar-	sea	marine
-multi-	many	multiple
-mut-	change	mutation
-nomen-	name	nomenclature
- omni-	all	omnivorous
-ped-	foot	millipede
-seg-, -sect-	out	segmental, dissection
-spir-	breathe	spiracle
-terr-	land	terrestrial
-uni-	one	unicellular
-vac-	empty	vacuum
-vol-	wish	voluntary
-volv-, volu-	roll, turn	Volvox, evolution

### C. Suffixes

A suffix is a modifying form at the end of a word. A suffix, like a prefix, is often difficult to distinguish from a root. This word form is an illusive sort of thing. The same suffix can have several meanings; suffixes are subject to much irregularity of formation; all word endings certainly are not suffixes. Suffixes are derived from many languages. Since there is nothing unusual about the suffixes of biological terms there seems to be little reason for listing any. They function just like the -ness on compactness. If in doubt, you should consult your dictionary.

## Spelling and Formation of Plurals

Spelling is a sore point with many students. It need not be. Some people have a greater facility with words than others, but certainly any college student can learn to spell. For some it will be easy; for others it will require considerable time and effort; but it can be done and is very much worthwhile. Educated society expects good spelling, not only of the more common words but of technical terms as well. Perhaps it is a rather superficial criterion, but a person's education is often evaluated to a great extent on the basis of his spelling ability. English is a difficult language to spell, but if you will proceed as outlined below you can improve your spelling.

1. You must recognize the fact that proper spelling is not only a social necessity but is also essential to accurate scientific expression.
2. Assume the responsibility for your own improvement. Do not simply study prepared lists of words. Work on the words that trouble you .
3. Realize that biological terms are really easier to spell than many more common words. This is true because pronunciation is much more closely related to spelling than in other words. In biological terms nearly all letters are sounded. Try to pronounce the words. You may not get the pronunciation and accent exactly right, but this will help you learn the letter order of the words.
4. It is important to recognize the word as a whole, but it also is important, especially with longer words, to learn to break words into syllables. To do this you must really look at a word, not merely glance at it.
5. Use the words in sentences so that you can gain a good conception of what the words mean and how they are used.
6. Write the words over and over again to help fix them in your mind.
7. Make friends with your dictionary.
8. Do not hesitate to work at your spelling. You will be amply repaid for your effort.

The formation of plurals of biological terms is a thorny problem. Some words take the usual English plurals; some take the plural form of the language from which they were derived. There is an area of disagreement among biologists concerning plural formations of terms derived from foreign languages. Most biologists prefer to use the foreign plurals, but some would use the English plural forms. For example, most biologists would use the Latin form, antennae for the plural of antenna, but some would use the English form antennas. Learning plurals will require much memory work at best.

These are the most common singular and plural endings for foreign words.

### Singular

-us  
-a  
-urn  
-ix, -ex  
-is

### Plural

-i-  
-ae  
-a  
-ices  
-es

These endings are added to the word stem to form the singular or plural.

<b>Stem</b>	<b>Singular</b>	<b>Plural</b>
nucle-	nucleus	nuclei
lamell-	lamella	lamellae
pseudopodi-	pseudopodium	pseudopodia
append-	appendix	appendices
vert-	vertex	vertices
bas-	basis	bases

There are many more plural forms but to list them all would serve little useful purpose. It would be very confusing.

### **Definitions**

Science attempts to define its terms and concepts as precisely as possible. However, even in the sciences extreme precision is not always reached. Definitions are subject to change. Dictionaries record present usage and meaning. The dictionary writer does not try to force meanings on people. He attempts only to present as clear a picture as possible of the meanings words have at the present time under various conditions. Unless a dictionary is a relatively modern one, it may not accurately mirror present meanings or even contain many newer terms. Also, a dictionary definition may fall far short of really delimiting words denoting more complex concepts. For example, let us consider the word love. Dictionaries, of course give several meanings for love, but they can not really define a human concept as complex as love. We all realize that loves are of different kinds and that the word means something different to everyone. There has been thousands of words written by learned philosophers in an effort to define or describe the common word good. The study of biology is concerned with life, but we can not define life in such a way as to express all of its ramifications.

However, the difficulties of defining terms need not concern us greatly. Most biological terms can at least be defined in such a way that we can use them. You should develop the habit of trying to define words as accurately as possible. There is no room for lazy mental processes in the study of biology. Accuracy in thought, expression and understanding is our aim.

The easiest and simplest way to define anything is to use a synonym, that is, another word with the same meaning. Unicellular can be defined as one-celled; fission means splitting; apterous means wingless.

Some definitions must be rather complex, but most biological terms can be defined rather simply. A definition consists of two parts, the classification and the differentiation. The classification indicates the general class of item to be defined; the differentiation indicates how the item is different from related items. Here are some examples of what is meant by classification and differentiation

1. Genetics is the study of inheritance. The word defined is genetics; study is the classification; of inheritance is the differentiation. There are, of course, many different sorts of studies. Genetics differs from the others in that it is, specifically, the study of inheritance.
2. A thallus is a plant body lacking roots, stems, leaves and flowers. In this example the word defined is thallus; plant body is the classification; lacking roots, stems, leaves and flowers is the differentiation. There are many kinds of plant bodies, but the kind lacking roots, stems, leaves and flowers is a thallus.

There are several common errors committed in the formation of definitions. These errors and examples of them are listed below.

1. Lack of the same grammatical structure in the word defined and the classification. This is a very common mistake. It most often appears in calling a noun a "when" or a "where". For example, excretion is not "when metabolic wastes are eliminated". Excretion is not "when" anything. Excretion is the elimination of metabolic wastes. An ear is not "where you hear". An ear is a bodily organ of hearing; it is not a "where" of any kind.
2. Classification too wide. To classify the deer as an animal is essentially correct but is not very helpful as a classification since there are a great many things that could be called animal. To say that a deer is a ruminant animal would be a better and narrower classification. A butterfly is an insect, but a narrower classification would indicate that a butterfly is a Lepidopterous insect.
3. A derivative of the word or the word itself in the definition. It does not define tree very well to state that a tree is "a tree-like plant". It would be a poor definition of biologist to say that a biologist is "a person who studies biology".
4. Differentiation not accurate or complete enough. To say that a spider is "an eight-legged arthropod" does not exclude scorpions, ticks, mites and daddy-long-legs which are also eight-legged arthropods. We would have a better definition if we were to define a spider as an eight-legged arthropod which has spinnerets at the end of its abdomen from which issues silk used in making snares, webs, hiding places, nests or cocoons. The other eight-legged arthropods do not have spinnerets. To state that the triceps brachii is "a skeletal muscle concerned with body movement" does not exclude all of the other skeletal muscles which are also concerned with body movement. However, if we indicate that the triceps brachii is a skeletal muscle which extends the elbow we have narrowed the differentiative and produced a better definition.
5. Definition that is too technical or "bookish". This is not a common student error. With scientific terms it is often necessary to use technical terms in definitions. It would be difficult to define episternum in non-technical terms. About the best we can do is define episternum as the most anterior pleurite of an insect segment. If a choice must be made between simplicity and accuracy the choice must, of course, be made in favor of accuracy. However, undue technicality can be troublesome. If we were to define an analgesic as "an anodyne" we would be correct. But what is an anodyne? An anodyne is a medicine that relieves pain. It would be a much more useable definition if we simply defined an analgesic as a medicine that relieves pain.

### **Summary**

Man, by the use of language, is able to communicate with his fellows. Educated society requires adequate usage and comprehension of English.

In scientific expression particular terminology is a necessity. This terminology can be learned and understood more easily if you will try to gain an understanding of how words are derived and constructed. English is derived from the Germanic and contains many words from Latin, Greek, French, German and other languages.

Word analysis is often useful in helping you gain a better understanding of words. A knowledge of common prefixes, roots and suffixes which are used in biological terms will greatly increase your ability to learn these words. You should cultivate the habit of making liberal use of your dictionary.

Spelling ability can be increased by diligence and the application of proper study habits.

Accuracy in expression and definition are prime requisites in the study of biology. Even though precise definition is not always obtainable we must strive for accuracy and clarity of definition. You can derive a great deal of personal satisfaction from increasing your word power and, consequently, your understanding of biological science.