NLM

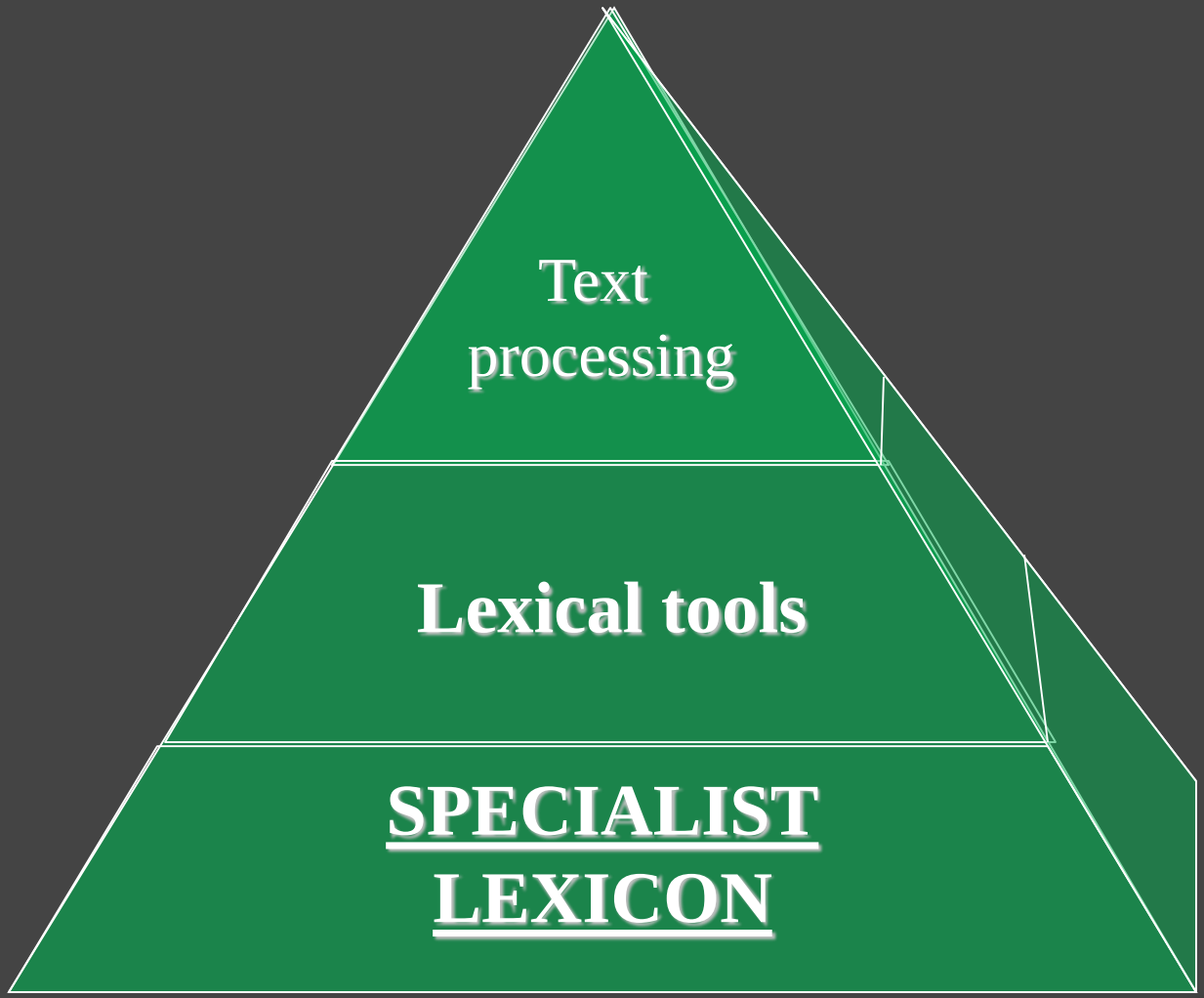
Summer Lectures 2015

June 10, 2015

Allen Browne
Chris Lu

The SPECIALIST Lexicon and Lexical Tools

June 10, 2015


Text processing
Lexical tools
SPECIALIST LEXICON

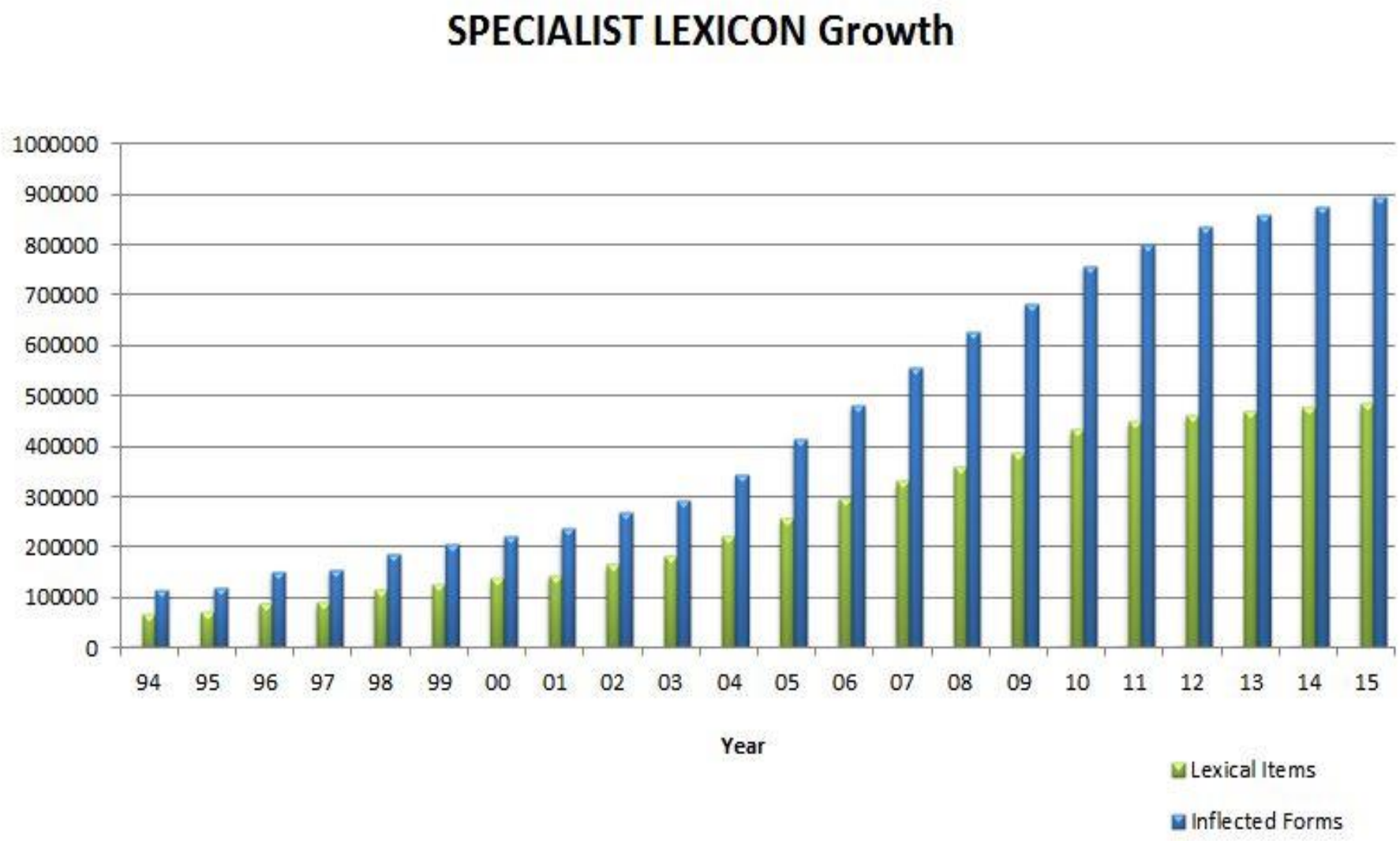
Lexicon: A fancy synonym for "dictionary"

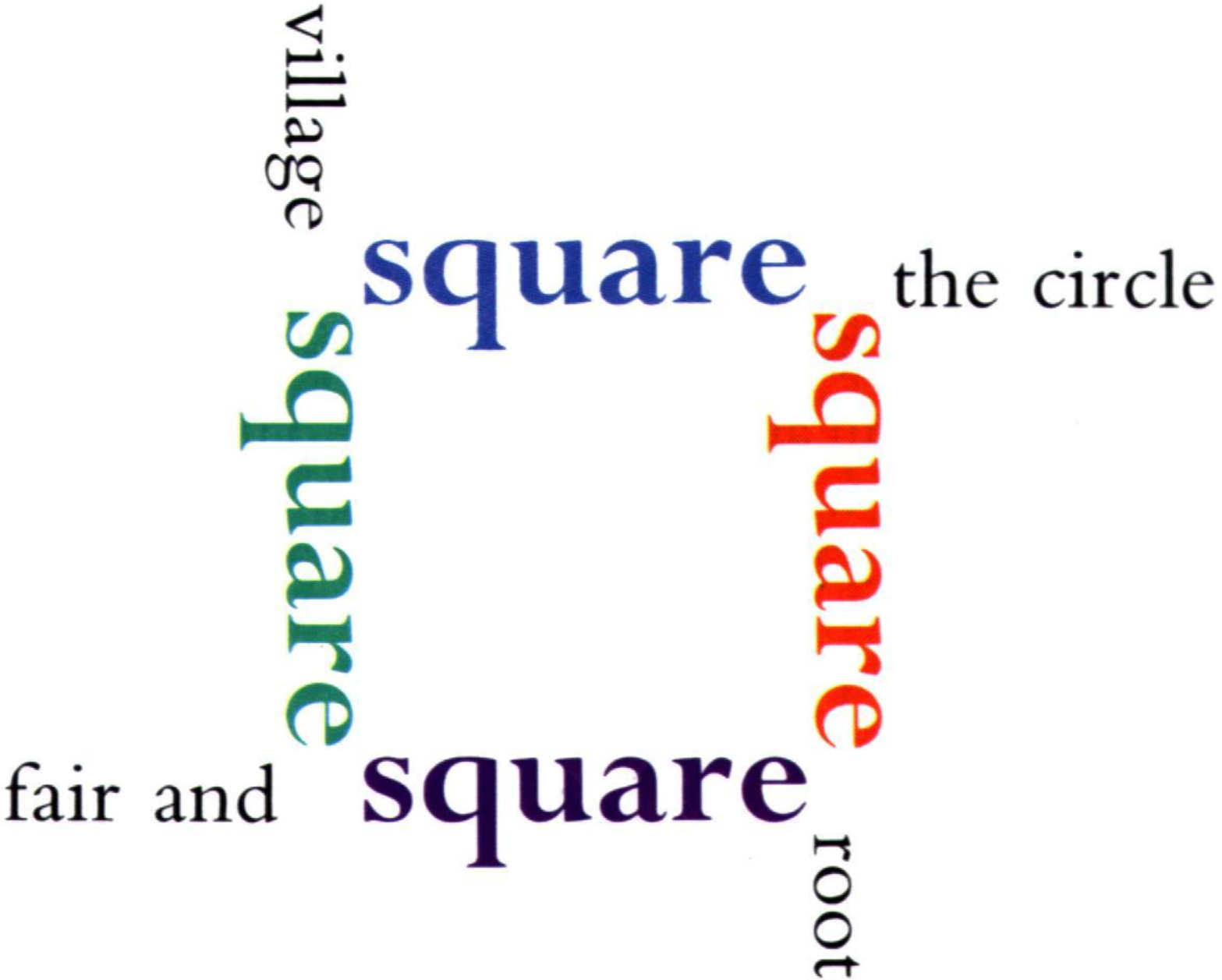
Illeism: Reference to oneself by use of the third person
Infavoidance: The act of covering up one's inferiority complex
Inglenook: A place by the fire or any warm and comfortable area
Insilium: Legal term for evil advice or counsel
Jamais vu: Illusion that one has never previously experienced a situation, when in fact it is quite familiar (see Déja vu)
Jen: A compassionate love for all humanity or for the whole world
Karateka: A karate expert
Kloof: A deep ravine
Kludge: A system (especially of computers) made up of poorly matched components
Lallation: Pronouncing an "R" so that it sounds like an "L"
Lapidation: The act of stoning a person to death
Latrocination: A robbery that involves the use of force or violence
Lexicon: A fancy synonym for "dictionary"
Litotes: A form of understatement in which two negatives are used to make a positive ("he was not unhappy")
Longueur: A long and boring passage in a work of literature, drama, music, etc.
Macarism: The practice of making others happy by praising them
Matutinal: Pertaining to anything that takes place in the morning
Melorrhea: The writing of excessively long musical works
Meteorism: A tendency to uncontrollable passing of intestinal gas
Metrona: A young grandmother
Microperf: The very small perforations along the edges of computer paper
Migrateur: A wanderer
Mnemonic: That which assists memory (a classic mnemonic device is the one familiar to astronomy students: "Oh be a fine girl, kiss me"—a unique way to remember the stellar classifications O,B,A,F,G,K, and M)
Moria: Morbid impulse to make jokes
Omnistrain: The stresses of modern life
Omphaloskepsis: The act of contemplating one's navel
Onychophagy: The habit of biting one's fingernails
Oxymoron: A phrase or expression composed of contradictory elements ("awfully good," for example)

The SPECIALIST lexicon

- A syntactic lexicon
- Biomedical and general English
- Over 484,000 records

Lexicon Growth



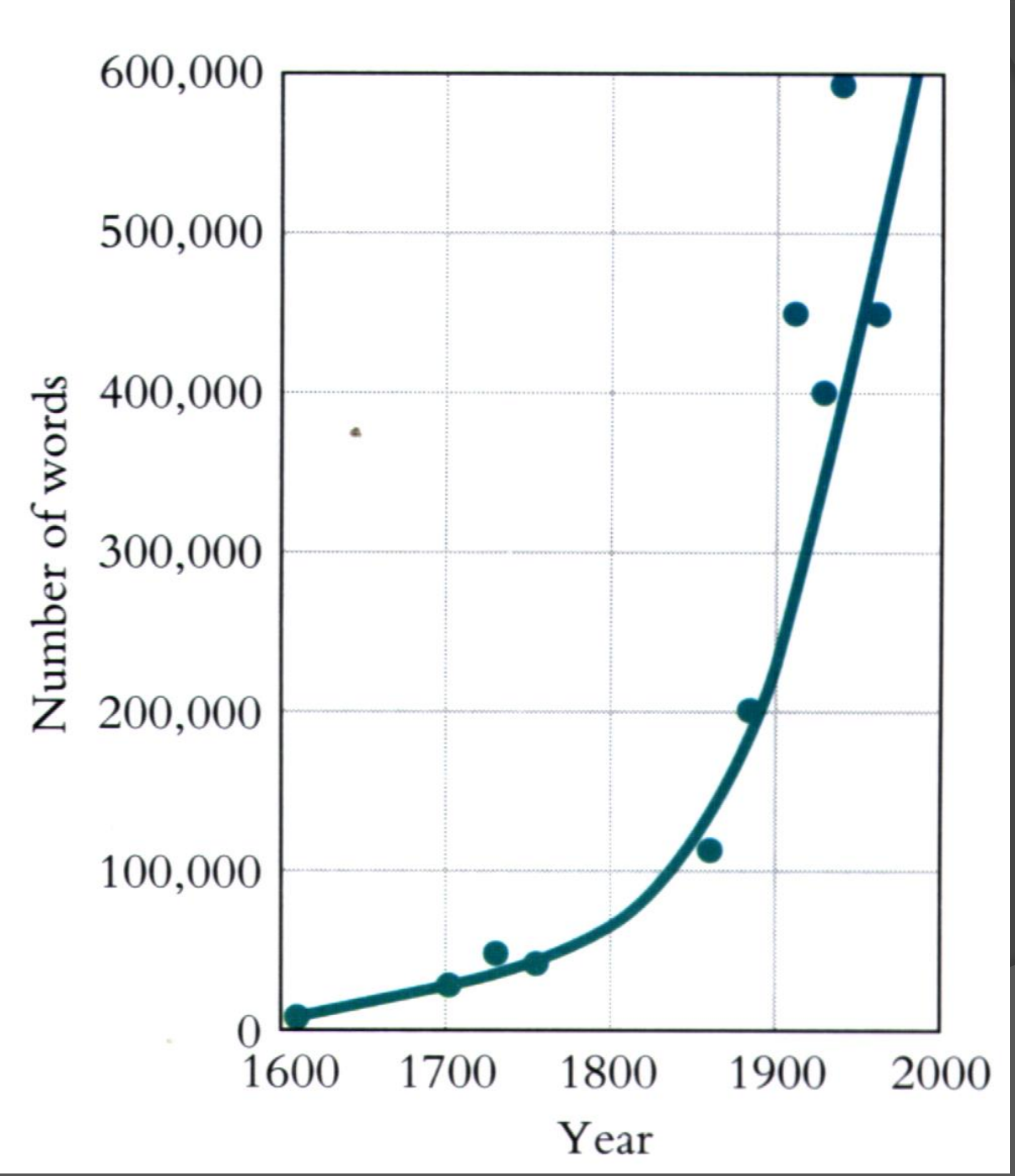

village
square
the circle
square
square
fair and
square
root

Miller -- 1991

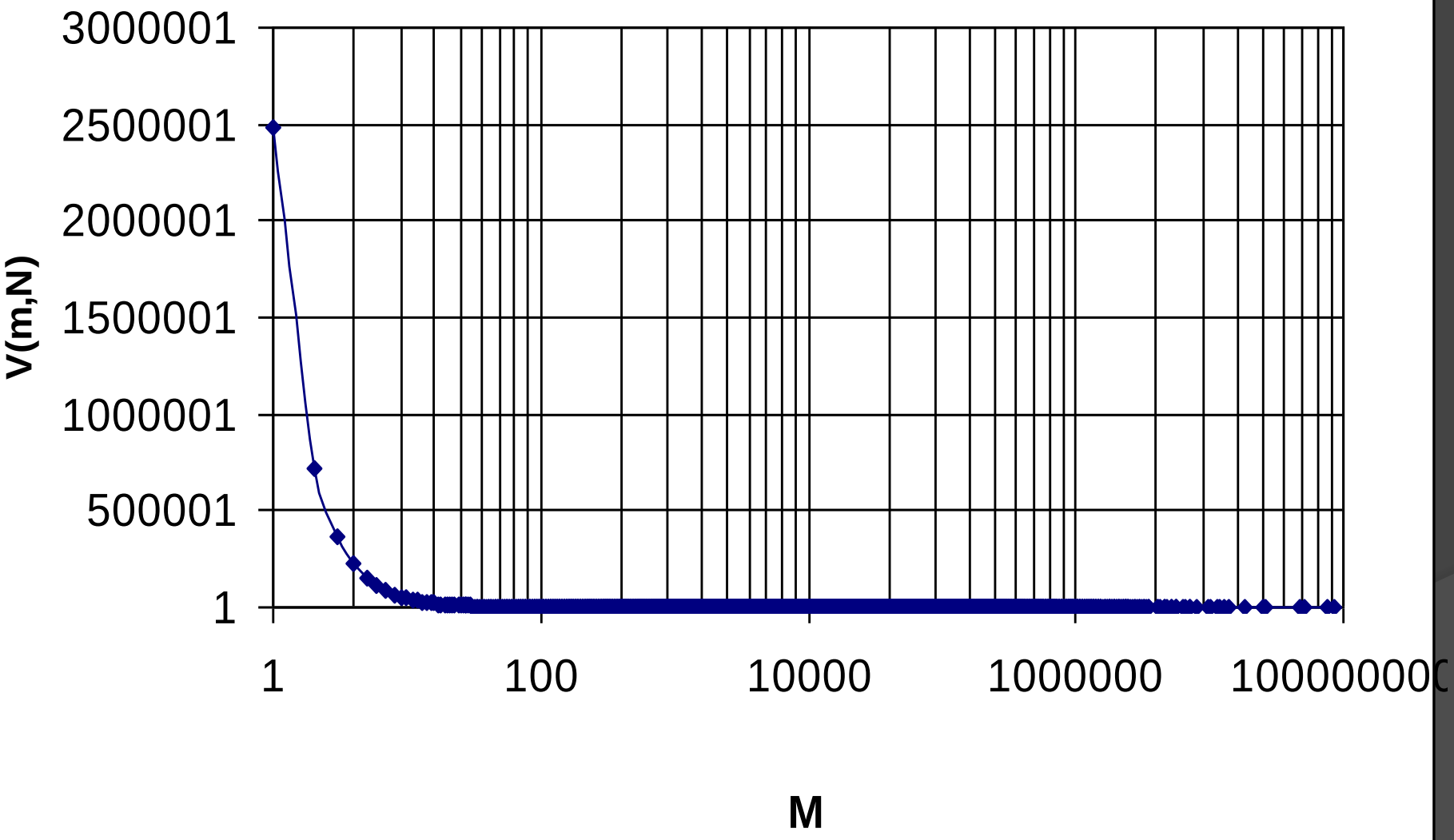
George A. Miller

The Science of Words

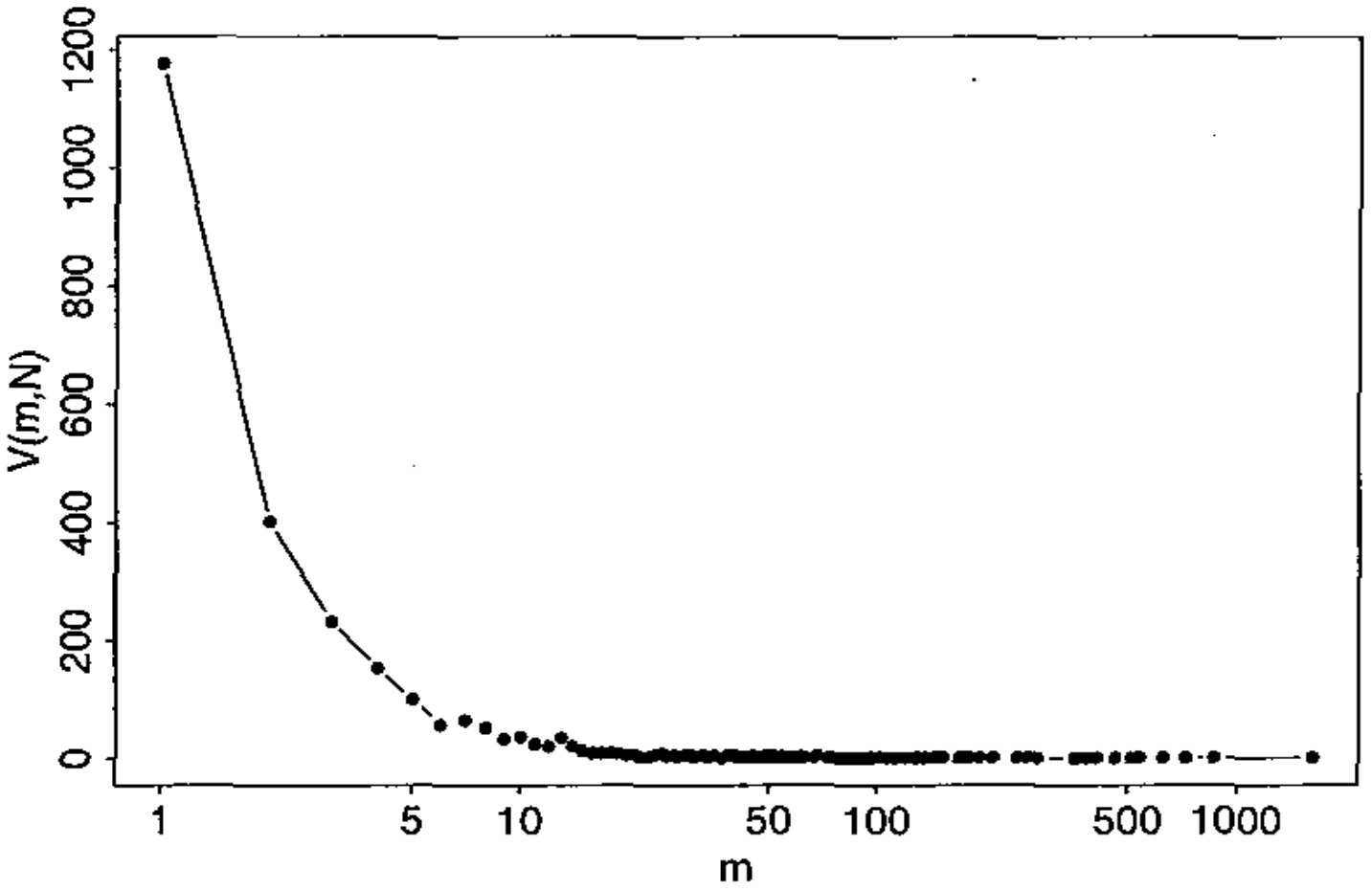
1991

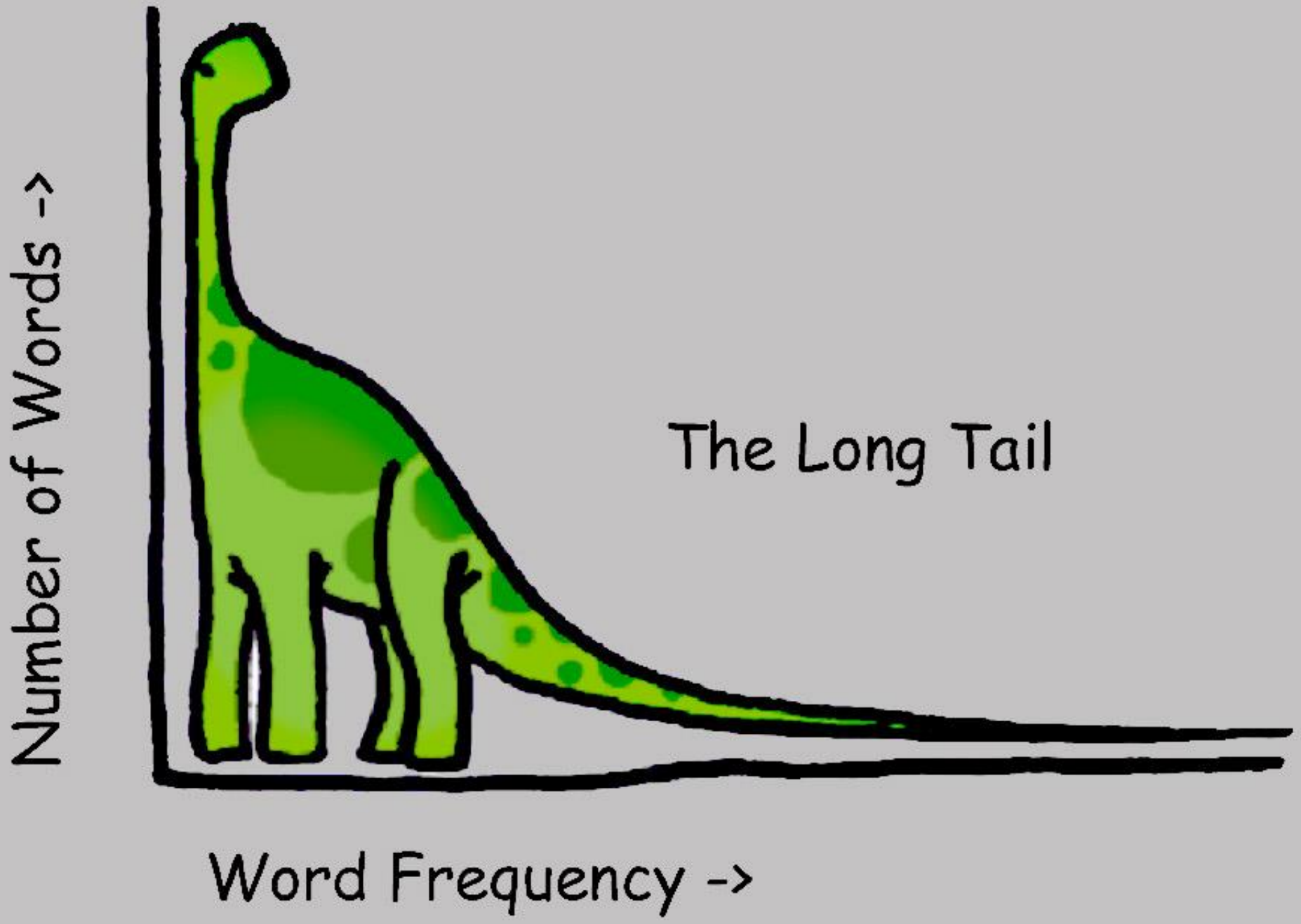


Frequency Spectrum of Medline 2006



Frequency Spectrum: Alice in Wonderland




Number of Words ->
The Long Tail
Word Frequency ->

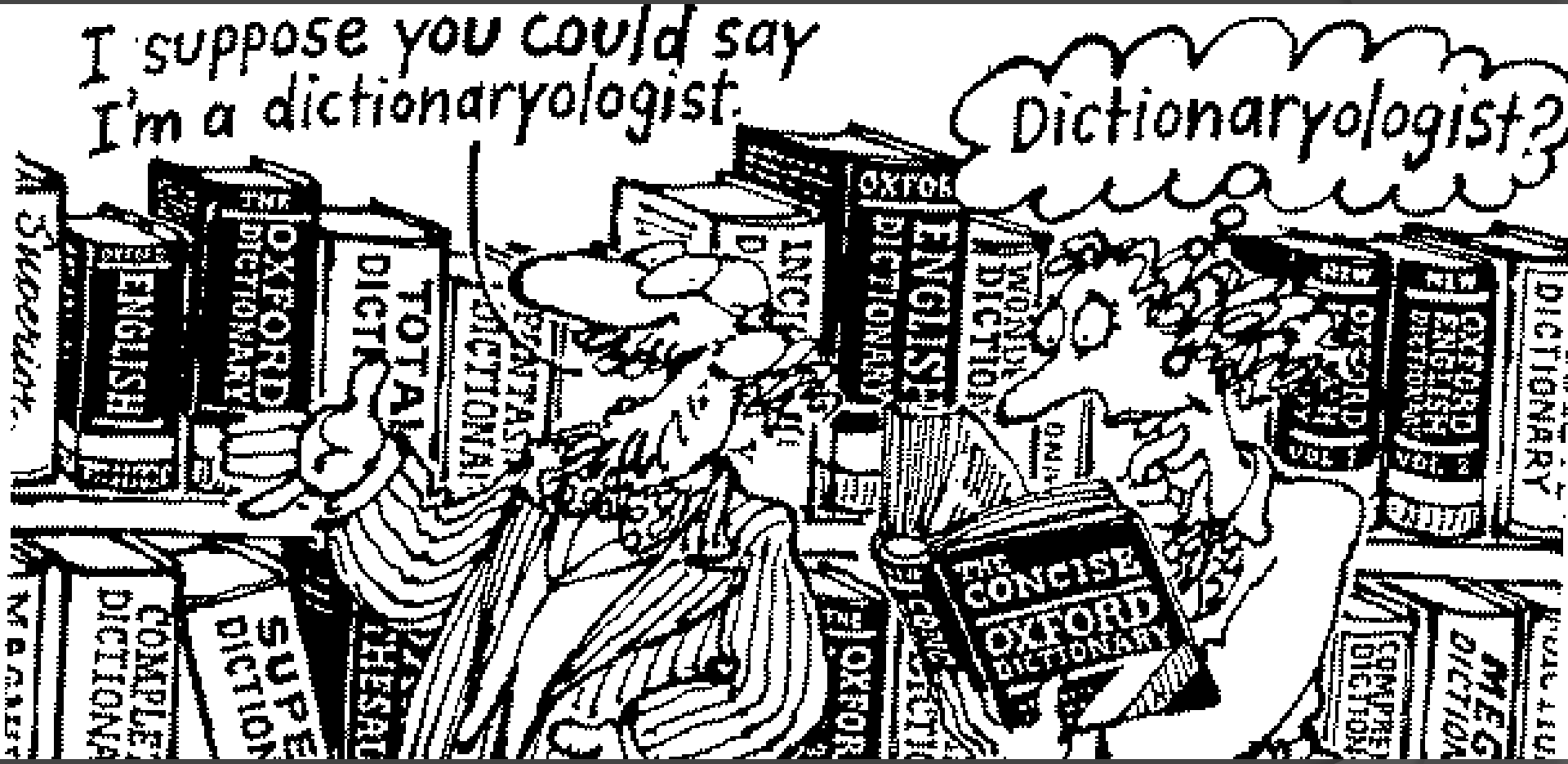
The SPECIALIST LEXICON

- Morphology
  - Inflection
  - Derivation
- Orthography
  - Spelling variants
- Syntax
  - Complementation for verbs, nouns, and adjectives

Morphology

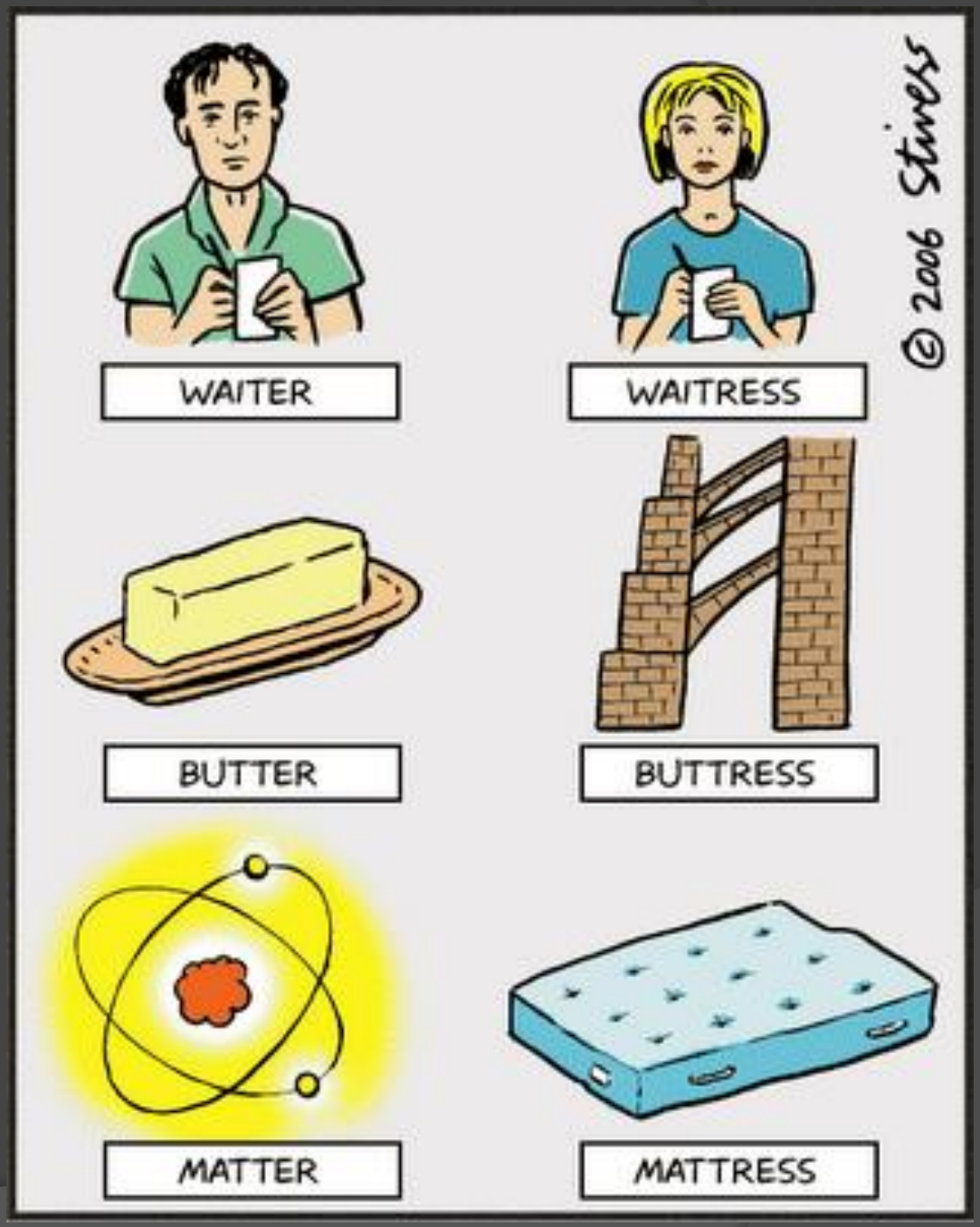
- Inflectional
  - nucleus, nuclei
  - cauterize, cauterizes, cauterized, cauterizing
  - red, redder reddest
- Derivational
  - laryngeal -- larynx
  - transport -- transportation

Derivational Morphology



Dictionary+ology+ist

Derivational Morphology



Orthography

Spelling Variation

- **align -- aline**
- **Grave's disease -- Graves's disease -- Graves' disease**
- **anesthetize -- anesthetise**
- **Esophagus -- oesophagus**
- **foetus – fetus**
- **centre -- center**

Orthography

Syntax -- Verb Complements

- intran
  - I'll treat.
- tran=np
  - He treated the patient.
- ditran=np,pphr(with,np)
  - She treated the patient with the drug.

Syntax -- Verb Complements

{base=treat
entry=E0061964
cat=verb
variants=reg
intran
tran=np
tran=pphr(with,np)
tran=pphr(of,np)
ditran=np,pphr(to,np)
ditran=np,pphr(with,np)
ditran=np,pphr(for,np)
cplxtran=np,advbl
nominalization=treatment|noun|E0061968
}

Syntax -- Verb Particle Constructions

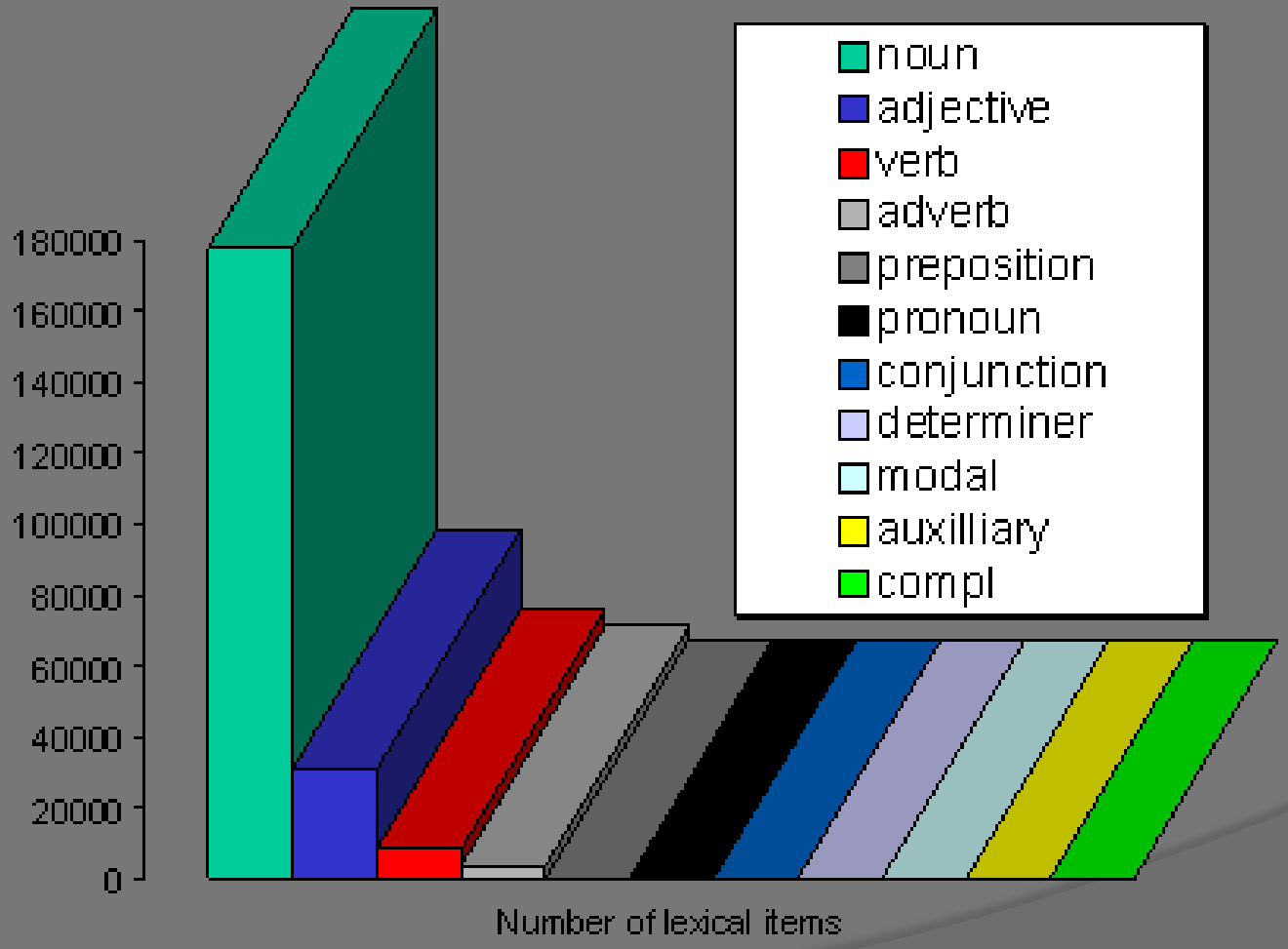
clean up

scrub down

look up

{base=clean
entry=E0017272
cat=verb
variants=reg
intran
intran;part(up)
tran=np
tran=np;part(up)
nominalization=clean|noun|E0017273
nominalization=cleanup|noun|E0319808}

Categories – Parts of Speech



Lexicon Unit Records

{**base=**Kaposi's sarcoma
spelling_variant=Kaposi sarcoma
entry=E0003576
cat=noun
variants=uncount
variants=reg
variants=glreg
}

{**base**=aspirate
entry=E0010803
cat=verb
variants=reg
tran=np
nominalization=aspiration|noun|E0010804
}

{**base**=chronic
entry=E0016869
cat=adj
variants=inv
position=attrib(1)
position=pred
stative
}

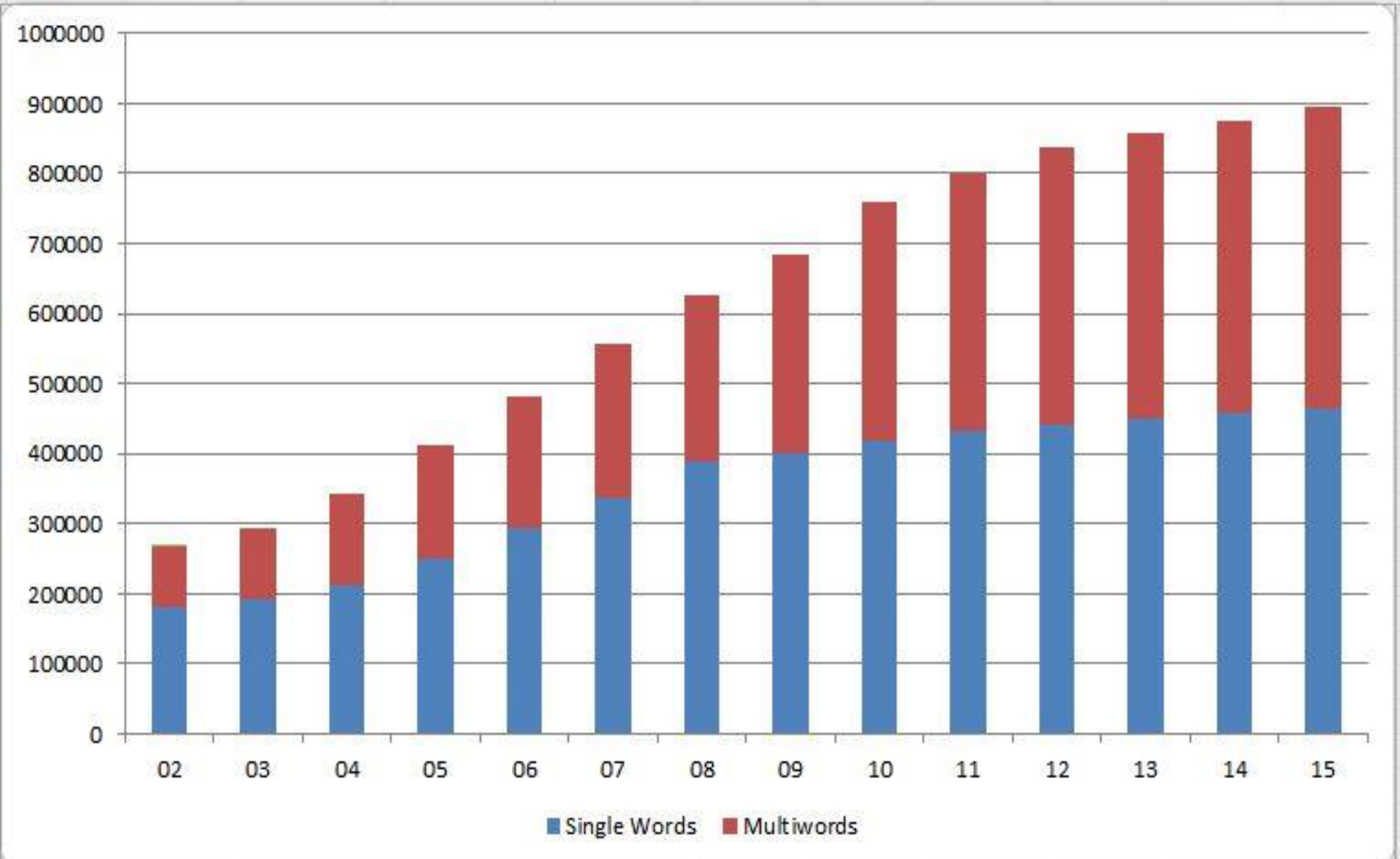
{**base**=in
entry=E0033870
cat=prep
}

Orthographic vs. Lexicographic Word:

Why, for instance, if a two-word boy scout feels chilly on his one-word campground, does he pull up a two-word camp chair in front of his one-word campfire? Anyone who seeks a strictly logical answer to such questions is chasing will-o'-the-wisps (chargeable in telegrams as a single word, because of the hyphens) in a semantic bog.

Louis Salomon, Semantics and Common Sense, Holt Rinehart and Winston, 1966.

Multi Words:


1000000
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
02
03
04
05
06
07
08
09
10
11
12
13
14
15
Single Words
Multiwords

UTF-8

{base=resume
spelling_variant=résumé
spelling_variant=resumé
entry=E0053099
cat=noun
variants=reg
}

{base=role
spelling_variant=rôle
entry=E0053757
cat=noun
variants=reg
}

{base=deja vu
spelling_variant=deja-vu
spelling_variant=déjà vu
entry=E0021340
cat=noun
variants=uncount
}

{base=cafe
spelling_variant=café
entry=E0420690
cat=noun
variants=reg
}

Noun Variants

{base=Kaposi's sarcoma
spelling_variant=Kaposi sarcoma
entry=E0003576
cat=noun
variants=uncount
variants=reg
variants=glreg
}

- Kaposi’s sarcoma
- Kaposi’s sarcomas
- Kaposi’s sarcomata
- Kaposi sarcoma
- Kaposi sarcomas
- Kaposi sarcomata

Regular Nouns

The plural suffix is *s*.
y becomes *ie* following a consonant before *s*.
e is inserted before s if the base ends in *s*, *z*, *x*, *ch*, or *s*

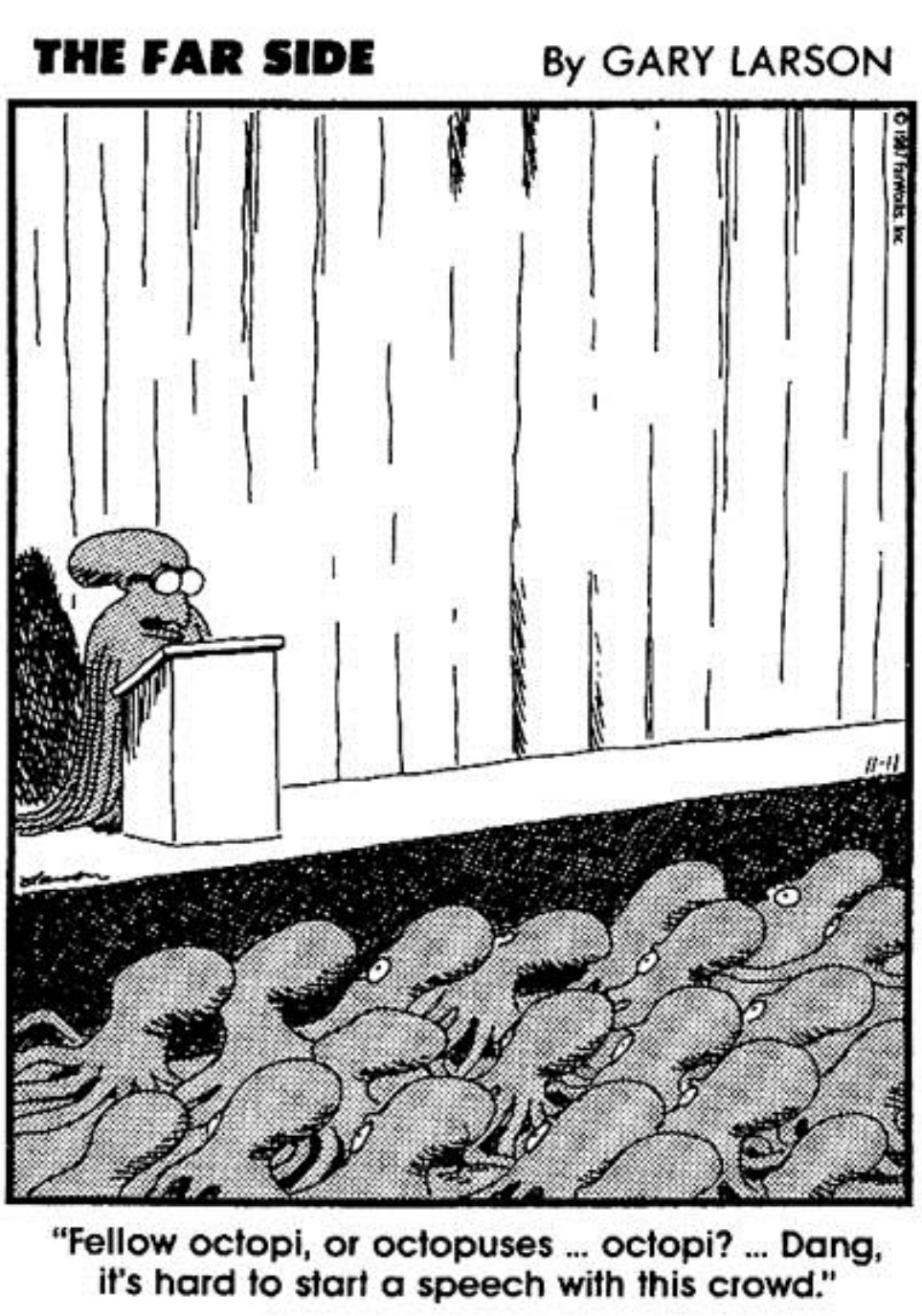
Leach – Leaches
Stomach – Stomachs ← irregular

Greco-latin Regular nouns

singular ends with:	plural ends with:	Examples
–us	–i	focus/foci
–ma	–mata	trauma/traumata
–a	–ae	larva/larvae
–um	–a	ilium/ilia
–on	–a	taxon/taxa
–sis	–ses	analysis/analyses
–is	–ides	cystis/cystides
–men	–mina	foramen/foramina
–ex	–ices	index/indices
–x	–ces	matrix/matrices

Octopuses

{base=octopus
entry=E0204527
cat=noun
variants=reg
variants=glreg
}



Uncount Nouns
(abstract or mass)

```
{base=smallpox
entry=E0056359
        cat=noun
        variants=uncount
}
{base=potassium
entry=E0049387
        cat=noun
        variants=uncount
}
```

- * a smallpox
- * two smallpoxes
- much smallpox
- * a potassium
- * two potassiums
- much potassium

* This form does not occur

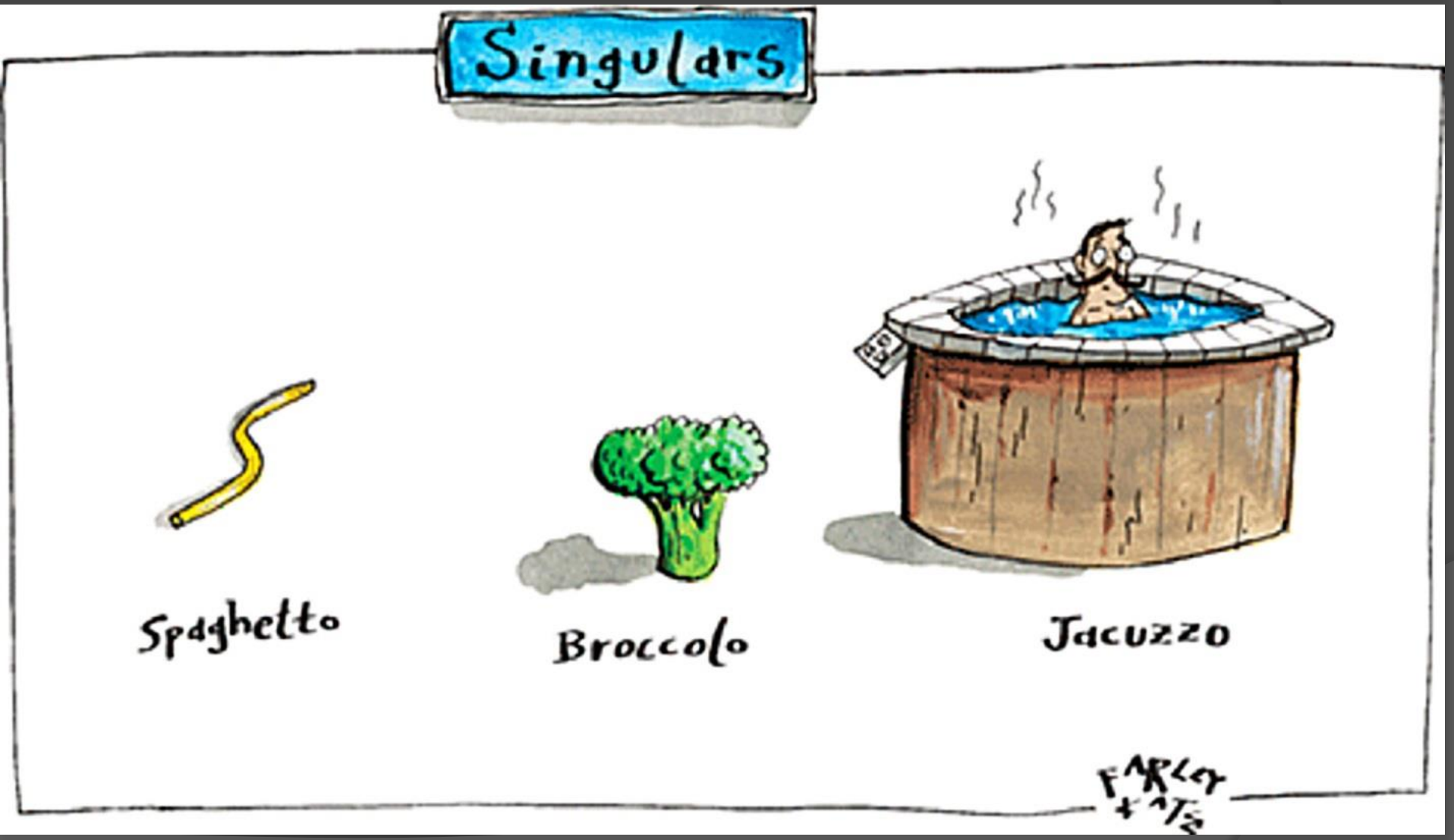
Countablilty

- Mail
  * A mail
    much mail
  * many mails

- E-Mail
  An e-mail
  much e-mail
  many e-mails

* This form does not occur

Uncount Nouns



Fixed Plural Nouns

{base=police
entry=E0048616
cat=noun
variants=plur
}

{base=scissors
entry=E0054633
cat=noun
variants=plur
}

Irregular Nouns

{base=corpus
entry=E0019113
cat=noun
variants=irreg|corpora|
variants=reg
}

{base=larynx
entry=E0036919
cat=noun
variants=irreg|larynges|
variants=reg
}

Regular Verbs

- The third person present tense suffix is *s.*
  - *y* becomes *ie* following a consonant before *s.*
  - *e* is inserted between z, x, ch, or sh and *s*.
- The past tense suffix is *ed*.
  - *y* becomes *ie* following a consonant before *ed.*
  - Final *e* is deleted before *ed.*

- The past participle is the same as the past tense.
- The present participle suffix is *ing*.

  - *y* becomes *ie* following a consonant before *ing.*

  - Final *e* is deleted before *ing*

    unless preceded by *e*, *y* or *o.*

Regular Verbs

- dismiss: dismisses, dismissed, dismissing
- agree: agrees; agreed; agreeing
- dry: dries, dried, drying

Regular Doubling Verbs

- End in a CVC pattern
- Double the final consonant before *ed* and *ing*.
- Are otherwise regular
- variants=regd

control: controls, controlled, controlling

Irregular Verbs

Bite: bite, bites, bit, bitten

Irregular Verbs

{base=bite

entry=E0013219

cat=verb

variants=irreg|bite|bites|bit|bitten|biting|

intran

tran=np

cplxtran=np,advbl

}

Ancillary Data Bases

- Synonymy
  - sm.db
- Derivation
  - dm.db, dm.rules
- Inflection
  - im.rules
- Neoclassical compounds
  - nc.db

Derivational Facts and Rules

dm.facts

treatment|noun|treat|verb
prohibition|noun|prohibitive|adj
cell lineage|noun|cell line|noun
photochemotherapeutic|adj|photochemotherapy|noun
pharmacotherapeutic|adj|pharmacotherapy|noun

Derivational Facts and Rules

dm.rules

 # e.g. alienation|alienate
ation$|noun|ate|verb
ration|rate; station|state;

Inflectional Facts and Rules

im.rules

```
# Noun rules (glreg)
us$|noun|singular|i$|noun|plural
    antus|anti;
ma$|noun|singular|mata$|noun|plural
a$|noun|singular|ae$|noun|plural
um$|noun|singular|a$|noun|plural
on$|noun|singular|a$|noun|plural
sis$|noun|singular|ses$|noun|plural
is$|noun|singular|ides$|noun|plural
men$|noun|singular|mina$|noun|plural
ex$|noun|singular|ices$|noun|plural
x$|noun|singular|ces$|noun|plural
```

Neoclassical compounds

nc.db

abdomin(o)|abdomen|root
ab|away from|prefix
acanth(o)|prickle|root
acar(o)|mite|root
acetabul(o)|acetabulum|root
ad|towards|prefix
agogue|inducing|terminal
albumin(o)|albumin|root
sis|condition|terminal
stomy|surgical opening|terminal

PNEUMONOULTRAMICROSCOPICS ILICOVOLCANOCONIOSIS

pneu.mo.no.ul.tra.mi.cro.scop.ic.sil.i.co.vol.ca.no.co.ni.o.sis \'n(y)u:-m*-(.)no--.*l-tr*-.mi--kr*-'ska:p-ik-'sil-i-(.)ko--(.)v\ n [NL, fr. Gk pneumo-n + ISV ultramicroscopic + NL silicon +]a:l-'ka--no--.ko--ne--'o--s*s ISV volcano + Gk konis dust : **a pneumoconiosis caused by the inhalation of very fine silicate or quartz dust**

-- Merriam Webster's 3rd International Dictionary, page 1747.

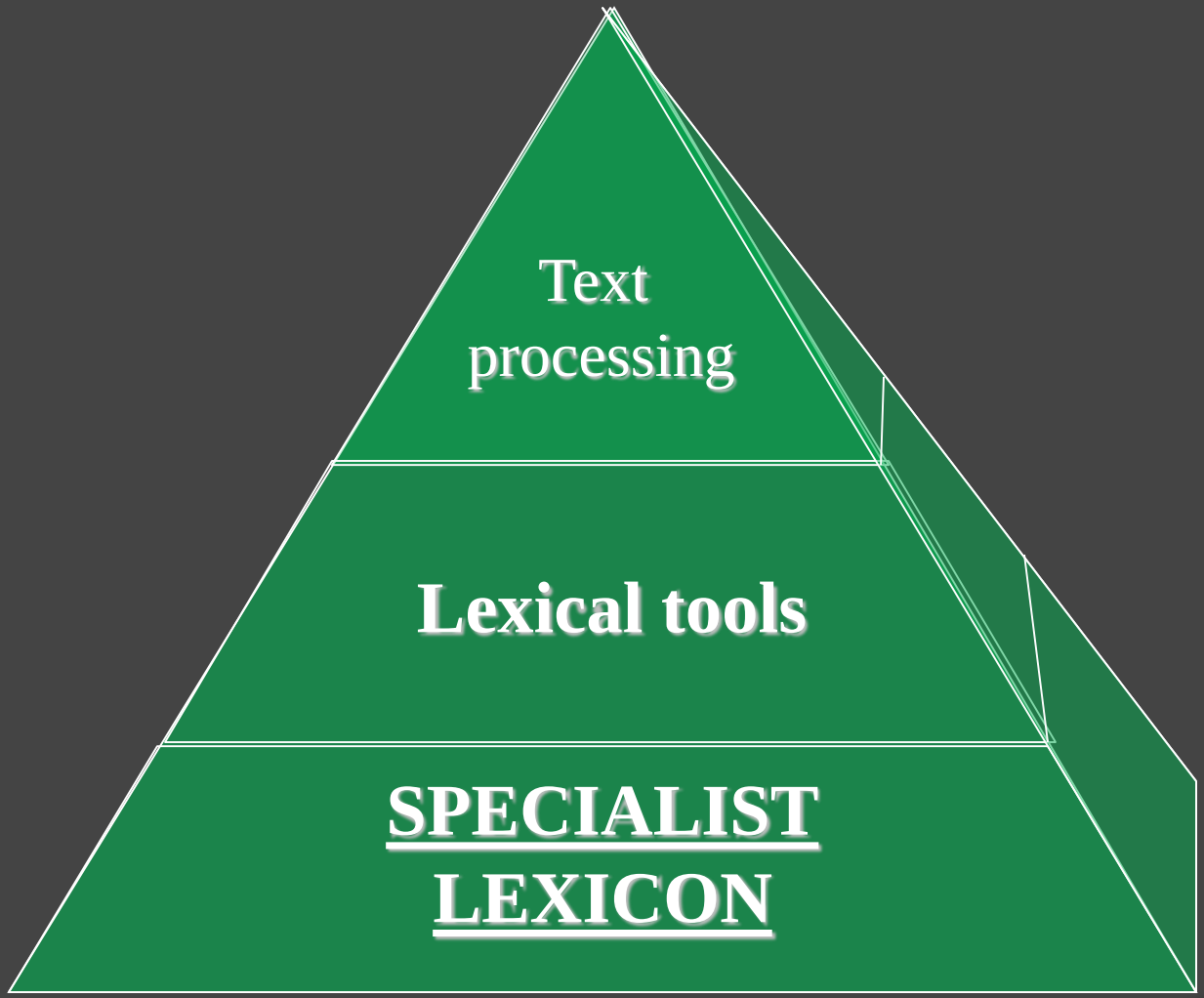
The Protein of a tobacco mosaic virus, Dahlemense strain

acetylseryltyrosylserylisoleucylthreonylserylprolylserylglutaminylphenylalanylvalylphenylalanylleucylserylserylvalyltryptophylalanylaspartylprolylisoleucylglutamylleucylleucyllasparaginylvalylcysteinylthreonylserylserylleucylglycllasparaginylglutaminylphenylalanylglutaminylthreonylglutaminylglutaminylalanylarginylthreonylthreonylglutaminylvalylglutaminylglutaminylphenylalanylserylglutaminylvalyltryptophyllysylprolylphenylalanylprolylglutaminylserylthreonylvalylarginylphenylalanylprolylglycylaspartylvalyltyrosyllsyslvalyltyrosylarginyltyrosylasparaginylalanylvalylleucylaspartylprolylleucylisoleucylthreonylalanylleucylleucylglycylthryonylphenylalanylaspartylthreonylarginylasparaginylarginylisoleucylisoleucylglutamylvalylglutamylasparaginylglutaminylglutaminylserylprolylthreonylthreonylalanylglutamylthreonylleucylaspartylalanylthreonylarginylarginylvalylaspartylaspartylalanylthreonylvalylalanylisoleucylarginylserylalanylasparaginylisoleucylasparaginylleucylvallasparaginylglutamylleucylvalylarginylglycylthreonylglycylleucultyrosylasparaginylglutaminylasparaginylthreonylphenylalanylglutamylserylmethionylserylglycylleucylvalyltryptophylthreonylserylalanylprolylalanylserine

Synonyms

sm.db

alar|adj|wing|noun
amygdaline|adj|tonsil|noun
articular|adj|joint|noun
bulbar|adj|medulla oblongata|noun
fununcular|adj|boil|noun
genicular|adj|knee|noun
hepatocellular|adj|liver cells|noun
lazar|adj|leprosy|noun
lenticular|adj|crystalline lens|noun
ypsiliform|adj|upsiloid|adj
wolfram|noun|tungsten|noun
double vision|noun|diplopia|noun


Text processing
Lexical tools
SPECIALIST LEXICON

Lexical Tools

- Wordind -- breaks strings into words
  - Produces the Metathesaurus word indexes (MRXW)
- LVG -- performs various lexical transformations
- NORM -- a selection of LVG transformations,
  - Used for Metathesaurus indexing
  - Produces the Metathesaurus Normalized word and string indexes (MRXNW & MRXNS)
  - Used to access those indexes

Normalization

- Hodgkin Disease
- HODGKINS DISEASE
- Hodgkin's Disease
- Disease, Hodgkin's
- HODGKIN'S DISEASE
- Hodgkin's disease
- Hodgkins Disease
- Hodgkin's disease NOS
- Hodgkin's disease, NOS
- Disease, Hodgkins
- Diseases, Hodgkins
- Hodgkins Diseases
- Hodgkins disease
- hodgkin's disease
- Disease;Hodgkins
- Disease, Hodgkin

- disease hodgkin

The Lexical Systems Group

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