

A quick introduction to language change

Don Ringe, 22 March 2010

1. All languages change slowly but constantly. Why?

To answer that we have to ask where the changes come from. Two basic points:

a) Each change has to begin with a single speaker (or a small group of speakers who happen to innovate in the same way) and spread through the speech community.



So we have TWO questions: how do the innovations originate in the speech of individuals, and how do they spread?

b) Vocabulary (i.e. listed items) and grammar have very different properties and have to be considered separately.

2. Vocabulary: anyone can make up a new word (*byte, ecozone, groovy, grotty*, etc.), or borrow a word from some other language (*sushi, perestroika, macarena, ulema*, etc.) and use it; if it's useful, it'll catch on. This is because the lexicon of any language is (and has to be) open-ended.

3. Grammar: a closed system; all innovations are ERRORS.

But adult native speakers don't make errors consistently. So where do innovations come from?

The only place they CAN come from is acquisition errors, i.e. errors made by individuals learning the language. (This answers our first question.)

4. Who are the learners who make the errors?

a) Foreign adults who must learn the language non-natively. They make lots of errors which they are chronically unable to correct, and most of them are of a single type: use of their native-language structures in the foreign language which they are trying to learn.

—But foreigners' errors usually (not always!) die with them, because native speakers don't usually want to imitate foreigners.

b) Children learning their native language(s) by the process of NATIVE LANGUAGE ACQUISITION (NLA). Most of these errors are self-corrected as the child masters the language, but a few slip through in every generation, and they can become new variables in the variation within the speech community.

☞ An example of a learner error that slipped through:

One of the author's children, at the age of 5 (when acquisition of American English phonology is usually complete), systematically failed to distinguish the syllable nuclei /ɔɪ/ (as in *board*) and /ɪ:/ (as in *bird*). Since there is no such merger in the area where we live, she must have learned it from her preschool classmates and reinforced it in conversation with them. None of her teachers noticed (!!).

By the age of 9 this child had apparently unlearned the merger; *board* and *bird*, for instance, were now clearly different. But once, at the age of 10, she pronounced *version* as [v'ɔɪʒən]—showing that she still had the merger NATURALLY (i.e., unselfconsciously) but had learned to produce the contrast when she was paying attention to what she was saying.

5. How changes spread through the speech community is the subject matter of sociolinguistics; the next lecture will be on that.
6. The above is a description of how change begins on a microlevel, and the sociolinguistics lecture will be about how changes spread on a microlevel.

But what about the macrolevel—change over timespans longer than modern sociolinguistics has existed (i.e. 50 years)? And how can we apply what we've figured out to the distant past, for which we have NO data about language acquisition and utterly inadequate data about sociolinguistic variation?

7. Like every other historical science (historical geology, palaeontology, archaeology, climatology, etc.), we use the UNIFORMITARIAN PRINCIPLE (UP). For linguistics the UP can be stated as follows:

☞ Unless we can demonstrate that the conditions of language use and language acquisition have changed between some time in the past and the observable present, we must assume that the same general types and distributions of language structures and language changes occurred at that past time as we can observe in the present.

In other words: same external conditions, same internal structures and changes expected.

Or: human language is a single phenomenon and always behaves the same way.

Or (more generally): unless we can demonstrate the contrary, we have to suppose that the past was IN GENERAL like the present (not in detail, of course—the details are always shifting around).

8. So we're going to assume that every language change we can see in the historical record arose in the way outlined above and spread in the way to be outlined in the next lecture, unless there are compelling reasons to believe otherwise.

9. But we can extend the UP further. We can observe changes in the historical record over long periods of time. We do have to interpret them in terms of the present (see above), but we also obtain information about how change plays out over many generations—and we use that information to extrapolate into prehistory.

☞ So: we interpret the historical record in terms of the present; and we extrapolate into prehistory on the basis of the historical record and the present.

10. Among other things, we assume that languages are normally transmitted to new speakers by NLA (see above). On that we base a definition of linguistic “descent” as follows:

Language Y of a given time is descended from language X of an earlier time if and only if X developed into Y by an unbroken sequence of instances of NLA.

We'll come back to that below.



What kinds of changes do we observe in the historical record?

11. Words borrowed from other languages replace native words. Examples from

English:

Old English	Modern English	source of ModE word
<i>hȳd</i>	<i>skin</i>	Norse
<i>wyrtruma</i>	<i>root</i>	Norse
<i>rinde</i>	<i>bark</i> [of a tree]	Norse
<i>steorfan</i>	<i>die</i>	Norse
<i>sinwealt</i>	<i>round</i>	French
<i>beorg</i>	<i>mountain</i>	French
<i>bēod</i>	<i>table</i>	French
<i>stōl</i>	<i>chair</i>	French

Old English	Modern English	source of ModE word
<i>frōfor</i>	<i>consolation</i>	Latin
<i>fulluht</i>	<i>baptism</i>	Latin
<i>þēowdōm</i>	<i>servitude</i>	Latin
<i>dēor</i>	<i>animal</i>	Latin

(Many words from Latin came into English through French, including *consolation*, *baptism*, and *servitude*; but these examples are Latin, not French, in form—that is, mediaeval French borrowed them from “book-Latin” and passed them on to English.)

12. Inherited words change their meanings. Examples from English:

meat originally meant ‘food’ (the word for ‘meat’ was *flesh*; *food* meant ‘nourishment’ or ‘sustenance’)

nice originally meant ‘silly’ (whereas *silly* meant ‘pitiful’, and still earlier ‘blessed’)

deer originally meant ‘animal’ (the word for ‘deer’ was *hart*)

13. The details of inflectional systems change. In the long run, default patterns of inflection take over from minority or irregular patterns. An example from English is the system of comparatives of adjectives. Here is the default pattern in Old English and Modern English:

Old English	Modern English
<i>heard, heardra</i>	<i>hard, harder</i>
<i>cald, caldra</i>	<i>cold, colder</i>
<i>wīd, wīdra</i>	<i>wide, wider</i>
<i>dry̆ge, dry̆gra</i>	<i>dry, drier</i>
<i>dēop, dēopra</i>	<i>deep, deeper</i>

Note what has happened to the OE minority pattern in ModE:

<i>ald, eldra</i>	<i>old, older (elder)</i>
<i>giung, giingra</i>	<i>young, younger</i>
<i>lang, lengra</i>	<i>long, longer</i>
<i>scort, scyrtra</i>	<i>short, shorter</i>

But the commonest irregularities are learned early in NLA and so tend to survive:

<i>gōd, betera</i>	<i>good, better</i>
<i>yfel, wiersa</i>	[<i>evil</i> →] <i>bad, worse</i>
<i>lytel, læssa</i>	<i>little, less</i>

14. Sometimes entire subsystems of inflection are lost, e.g. case in English.

OE had a system of four cases, like Modern German. Examples with ‘king’:

Sē cyning fērde ofer sǣ. ‘The king travelled across the sea.’ (nominative case, marking the subject of the verb)

Ic ne seah nāht þone cyning. ‘I didn’t see the king at all.’ (accusative case, marking the direct object of the verb)

Sele þās bōc þām cyninge. ‘Give this book to the king.’ (dative case, marking the indirect object of the verb)

Ic eom þæs cyninges ārendraca. ‘I am the king’s messenger.’ (genitive case, marking the possessor)

Every noun had forms for all four cases in the singular and in the plural. Since there were also (largely arbitrary) genders, as well as arbitrary inflectional classes (likewise as in Modern German), the system was complex. But most nouns had one of the following sets of endings, exemplified by nouns with the definite article:

		‘the stone’ (masc.)	‘the house’ (neut.)	‘the place’ (fem.)
sg.	nom.	<i>sē stān</i>	<i>þæt hūs</i>	<i>sēo stōw</i>
	acc.	<i>þone stān</i>	<i>þæt hūs</i>	<i>þā stōwe</i>
	dat.	<i>þām stāne</i>	<i>þām hūse</i>	<i>þære stōwe</i>
	gen.	<i>þæs stānes</i>	<i>þæs hūses</i>	<i>þære stōwe</i>
pl.	n./a.	<i>þā stānas</i>	<i>þā hūs</i>	<i>þā stōwa</i>
	dat.	<i>þām stānum</i>	<i>þām hūsum</i>	<i>þām stōwum</i>
	gen.	<i>þāra stāna</i>	<i>þāra hūsa</i>	<i>þāra stōwa</i>

Practically the whole system has been lost in ModE; the only endings left are plural *-(e)s*, which has become the default plural ending for nouns, and the possessive clitic *-’s*, which is the old nonfem. gen. sg. ending. How did that happen?

It’s sometimes said that regular sound changes (see below!) destroyed these

paradigms. It's certainly true that the noun endings were not very distinct and became less so over time: all the vowels of the endings, which were unstressed, became schwa /ə/; final *-m* became *-n* and then was gradually lost; finally all the word-final schwas were lost too.

But the forms of the definite article WERE distinctive; moreover, Modern German has a functioning case system in which case is mostly marked on the articles, not on the nouns. Why couldn't things have turned out that way in English?

It turns out that the case system was being lost BEFORE most of the sound changes that would have obscured it had occurred. In other words, these were NLA errors that were NOT caused by misperception or confusion—real change in inflection, not just the fallout of phonological change.

15. Inflectional subsystems can be gained as well as lost. For instance, the Tocharian languages—two closely related languages of central Asia, now extinct, called “A” and “B” because we don't know what their native speakers called them—gained an elaborate case system by tacking postpositions onto nouns. But we know that most of that development happened after they began to diverge (see below), because most of the case endings are different. Compare the singular of ‘horse’ in the two languages:

	Toch. A	Toch. B	Proto-Tocharian
nominative & oblique	<i>yuk</i>	<i>yakwe</i>	*yəkwë
genitive	<i>yukes</i>	<i>yakwentse</i>	*yəkwë-nsë
instrumental	<i>yuk-yo</i>	<i>(yakwe-sa)</i>	
perlative	<i>yuk-ā</i>	<i>yakwe-sa</i>	*-(s)a
comitative	<i>yuk-aśśäl</i>	<i>yakwe-mpa</i>	
ablative	<i>yuk-äş</i>	<i>yakwe-mem</i>	
allative	<i>yuk-ac</i>	<i>yakwe-śc</i>	*-(s)cə
locative	<i>yuk-am</i>	<i>yakwe-ne</i>	*-në

16. Syntax changes too. For instance, in Old English the order of elements in the clause was originally X* – V(erb) – T(ensed verb) (where “V” is a nontensed verb, such as an infinitive or a participle, and “X*” stands for all the other constituents together—subject, objects, adverbs, etc.). One OE text, the Laws of King Æthelbeorht of Kent (who died in 616), consistently shows that word order.

But by the time we have any substantial amount of OE text, an alternative order X – T – Y* – V is being used in many clauses (where “X” is one constituent—the subject, or one of the objects, or an adverb—and “Y*” stands for all the others together, except the verbs). Eventually that became the only possible order.

(Many further syntactic changes occurred between OE and ModE.)

17. Finally, the sounds of language change gradually over time.

This turns out to be the most important thing of all, for a startling reason: SOUND CHANGE IS OVERWHELMINGLY REGULAR. That is, one of two things happens:

in a given speech community over a given span of time, EVERY instance of sound x becomes sound x' ;

or, if there are conditions on which instances of sound x become sound x' , those conditions can be stated ENTIRELY in terms of other sounds in the same word or phrase.

This is not a hypothesis; it is an observed statistical fact.

18. A simple example of regular sound change (actually several sound changes, one after the other):

Old English	Modern English
<i>sāpe</i>	<i>soap</i>
<i>hlāf</i> ‘bread’	<i>loaf</i>
<i>hām</i>	<i>home</i>
<i>gāt</i>	<i>goat</i>
<i>rād</i> ‘journey’	<i>road</i>
<i>āþ</i>	<i>oath</i>
<i>gāst</i> ‘spirit’	<i>ghost</i>
<i>bān</i>	<i>bone</i>
<i>hāl</i> ‘healthy’	<i>whole</i>
<i>āc</i>	<i>oak</i>
<i>dāg</i>	<i>dough</i>
<i>snāw</i>	<i>snow</i>
<i>dā</i>	<i>doe</i>
<i>fāh</i> ‘hostile’	<i>foe</i>

This was actually a sequence of three sound changes:

- (1) /a:/ > /ɔ:/ south of the Thames before 1200 (and the change then spread northward, reaching York around 1300 before petering out);
- (2) /ɔ:/ > /o:/ between about 1450 and 1500 (as part of the “Great Vowel Shift” —see below);
- (3) /o:/ > /ou/ in the 17th century.

All three changes were regular; that is why the ultimate outcome is regular.

19. An example of a conditioned regular sound change:

Old English	Modern English
<i>cnāwan</i> /kna:wan/	<i>know</i> /nou/
<i>cnedan</i> /knɛdan/	<i>knead</i> /ni:d/
<i>cnēo</i> /kne:ɔ/	<i>knee</i> /ni:/
<i>cniht</i> /knixt/ ‘servant’	<i>knight</i> /naɪt/
<i>cnotta</i> /knɔt:a/	<i>knot</i> /nat/

Obviously /k/ was lost word-initially when /n/ followed immediately. But /k/ in other positions was not affected; cf.:

Old English	Modern English
<i>crāwa</i> /kra:wa/	<i>crow</i> /krou/
<i>clēofan</i> /kle:ɔfan/	<i>cleave</i> /kli:v/
<i>cwic</i> /kwɪk/ ‘alive’	<i>quick</i> /kwɪk/
<i>cald</i> /kald/	<i>cold</i> /kould/
<i>cynīng</i> /kynɪŋg/	<i>king</i> /kɪŋ/

20. Apparent irregularities in sound change can usually be explained by interference from other kinds of change (which are not regular). There are also usually a few unexplained irregularities—sometimes as high as 3% (counting instances of sounds in a wordlist), but often less than that.

In other words, the regularity of sound change is STATISTICALLY OVERWHELMING.



21. Recall that changes start in the speech of one (or a few) people and spread through a speech community. What happens if a speech community splits up, or becomes so extensive that many changes never spread all the way through it? In that case different changes—all beginning as NLA errors—gradually accumulate in each part of the former single speech community, and the speechforms of

the separate new communities gradually diverge; at first they will still be dialects of a single language (because they'll still be able to understand one another), but in the long run so many different changes will build up that the different speech-forms will be different, mutually unintelligible languages.

22. A group of languages that arose from a single earlier language in this way are called a FAMILY of languages. We can define a language family as a group of languages that are all descended from a single earlier language (cf. the definition of “descent” under (10) on p. 3 above).
23. How can we tell that languages we are investigating form a family? Recall that sound change is overwhelmingly regular. In each language of a family, then, the words and affixes of the parent language developed by regular sound change (but by different actual changes in each daughter language).
24. Here is an example. Latin long /ē/ in stressed syllables usually developed to /wa/ (spelled “oi”) in French and to /e/ in Spanish:

French		Latin		Spanish
<i>avoir</i> ‘to have’	<	<i>habēre</i>	>	<i>haber</i> [aux. verb]
<i>droit</i> ‘straight, right’	<	<i>dīrēctum</i> ‘straight’	>	<i>derecho</i> ‘straight, right’
<i>étoile</i> ‘star’	<	<i>stēllam</i>	>→	<i>estrella</i>
<i>poids</i> ‘weight’	<	<i>pēnsum</i> ‘weighed’	>	<i>peso</i> ‘weight, unit of money’
<i>roi</i> ‘king’	<	<i>rēgem</i>	>	<i>rey</i>
<i>toile</i> ‘linen’	<	<i>tēlam</i> ‘web, warp’	>	<i>tela</i> ‘cloth’
<i>toit</i> ‘roof’	<	<i>tēctum</i>	>	<i>techo</i>
<i>trois</i> ‘three’	<	<i>trēs</i>	>	<i>tres</i>

(Note that regular sound changes are represented by the shaftless arrows, while arrows with shafts denote changes of other kinds; if both are used together, both regular sound changes and other changes occurred.)

However, when a stressed long /ē/ was immediately followed by a nasal consonant in Latin, the French outcome is a lower mid vowel /ɛ/ if the nasal consonant survives, and nasalized /ɛ̃/ if the nasal consonant was lost in (French) word-final position. The Spanish outcome is still /e/:

French		Latin		Spanish
<i>frein</i> ‘bit’	<	<i>frēnum</i> ‘bridle’	>	<i>freno</i> ‘bridle’
<i>plein</i> ‘full’ (masc.)	<	<i>plēnum</i>	>	<i>lleno</i>
<i>pleine</i> ‘full’ (fem.)	<	<i>plēnam</i>	>	<i>llena</i>
<i>veine</i> ‘vein’	<	<i>vēnam</i>	>	<i>vena</i>
<i>peine</i> ‘pain, trouble’	<	<i>pēnam</i>	>	<i>pena</i> ‘sadness, upset’
				‘punishment’

25. But because regular sound changes occurred in the development of Latin to French and in the development of Latin to Spanish, there are regular SOUND CORRESPONDENCES between the French and Spanish words.

That is true of every family of languages: words retained from the parent language, which are called COGNATES, will exhibit regular sound correspondences between the daughter languages.

26. In the case of Latin and the Romance languages we can see the whole picture, because we have (very extensive) records of Latin, the parent of the Romance family.

But even in cases where the parent language is unattested, we can compare the cognates of the daughter languages and undo the regular sound changes (!) to RECONSTRUCT the parent language, which is called a “protolanguage”.

There is a simple mathematical method for doing that, called the COMPARATIVE METHOD. There isn’t time to explain the method in detail today, but here is an example of its results.

27. An example of a family whose parent language is unattested is West Germanic.

Proto-West Germanic can be reconstructed from its daughters, and of course we use the earliest well-attested stage of each daughter, in which as few changes as possible have occurred—because in addition to regular sound changes, which we can handle mathematically, there are all sorts of irregular changes which have to be dealt with in less rigorous ways.

On the following page are some Old English, Old Saxon, and Old High German cognates containing a PWGmc. vowel reconstructed as *ā.

	OE	OS	OHG	PWGmc.
‘to let go’	<i>lætan</i>	<i>lātan</i>	<i>lāzan</i>	*lātan
‘to advise’	<i>rædan</i>	<i>rādan</i>	<i>rātan</i>	*rādan
‘breath’	<i>æþm</i>	<i>āthom</i>	<i>ādum</i>	*āþm
‘(one’s) own’	<i>swæs</i>	<i>swās</i>		*swās
‘they carried’	<i>bæron</i>	<i>bārun</i>	<i>bārun</i>	*bārun
‘(a) time’	<i>mæl</i>		<i>māl</i>	*māl
‘kinsman’	<i>mæg</i>	<i>māg</i>	<i>māg</i>	*māg
‘they broke’	<i>bræcon</i>	<i>brākun</i>	<i>brāhhun</i>	*brākun
‘weapon’	<i>wæpn</i>	<i>wāpan</i>	<i>wāfan</i>	*wāpn
‘they wove’	<i>wæfon</i>		<i>wābun</i>	*wābun
‘moon’	<i>mōna</i>	<i>māno</i>	<i>māno</i>	*mānō
‘immediately’	<i>sōna</i>	<i>sāno</i>		*sānō
‘wood-chip’	<i>spōn</i>		<i>spān</i>	*spānu
‘they came’	<i>cwōmon</i>	<i>quāmun</i>	<i>quāmun</i>	*kwāmun
‘sad’	<i>geōmor</i>		<i>jāmar</i>	*jāmar
‘they saw’	<i>sāwon</i>	<i>sāwun</i>		*sāwun
‘claw’ (acc.)	<i>clāwe</i>		<i>klāwa</i>	*klāwā

It can be seen that PWGmc. *ā, preserved unchanged in Old Saxon and Old High German, was rounded and raised to *ō* in Old English immediately before a nasal, but fronted to *æ* before any other consonant except *w*.

28. Language relationships can be recognized by systematic sound correspondences between cognates—and ONLY by such correspondences, because only they can prove common descent from a single protolanguage.
29. Isolated similarities prove nothing—and they are surprisingly common. An example: English *much* is unrelated to Spanish *mucho* (!). You can see that this is true by the fact that as you trace their recorded histories back in time they look less and less similar:
- much* (13th c.) ←< southern Middle English *muchel* (where “u” is actually front [y]; 12th c.) < Old English *micel* ‘big’ < Proto-Germanic *mikilaz (cf. Gothic *mikils*) < Proto-Indo-European *meg- (cf. Greek *mégas* and Latin *magnus*, both ‘big’, and Hittite *mēk* ‘much’)

Spanish *mucho* < *muito (cf. Portuguese *muito* and the Spanish adverb *muy*, which was truncated in unstressed position in rapid speech) < Latin *multum* ‘much’ < *mol-to-; the root is PIE *mel-, which appears also in Latin *melior* ‘better’ (> Spanish *mejor*)

☞ Note also that Spanish *-uch-* < Latin *-ult-* is regular:

escuchar ‘to listen’ < *auscultāre*

cuchillo ‘knife’ < *cultellum* ‘little knife’

puchero ‘pot’ < *pultārium* ‘(used) for lentils’

Of course English and Spanish ARE related, but these particular words are not cognates.

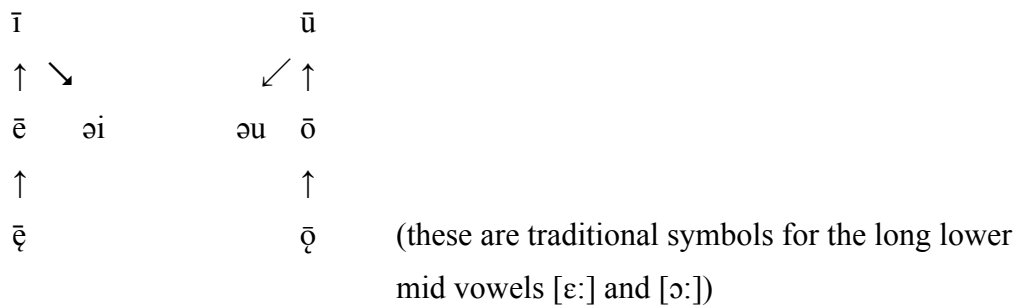
30. Languages are classified into families by finding systematic similarities like those adduced in (24) and (27) above. Within each family languages are grouped into subfamilies if they share significant innovations. (For examples see the appendix.)

Appendix.

The examples used above were chosen because they illustrate the principles of historical linguistics simply and (I hope) clearly. But there are other results of historical and comparative linguistics that you should know about simply because they are well known. Here are a few that come immediately to mind.

A. A famous sound change: the “Great Vowel Shift” of English.

Between 1400 and 1500 the nonlow long vowels of English underwent a “rotation” as follows:



ā

In other words, the long high vowels /ī/ and /ū/ became diphthongs; the long higher mid vowels /ē/ and /ō/ were raised to high vowels; and the long lower mid vowels were raised to higher mid vowels. (The long low vowel /ā/ was not affected at first; later, in the 16th century, it was fronted and raised to /ē̄/.)

A (near-)minimal set of words, spelled phonetically, will illustrate:

	ca. 1400	ca. 1500	ca. 1600	present
‘bite’	bi:tə	bəit	bəit	baɪt
‘beet’	be:t	bi:t	bi:t	bi:t
‘beat’	bɛ:tə	be:t	be:t ~ bi:t	bi:t
‘abate’	aba:tə	aba:t > abɛ:t	əbe:t	əbeɪt
‘boat’	bɔ:t	bo:t	bo:t	boʊt
‘boot’	bo:t	bu:t	bu:t	bu:t
‘about’	abu:tə	abəʊt	əbəʊt	əbaʊt

The GVS is the principal reason why English is spelled so differently from other European languages.

B. Another famous sound change: “Grimm’s Law”.

This was actually a series of changes that occurred in the development of Proto-Indo-European into Proto-Germanic; it completely altered the stop system of the language. I illustrate it with some cognate sets.

1. PIE voiceless stops became fricatives (*p > *f; *t > *þ; *k, *k > *h; *k^w > *h^w) ...

	<i>Latin</i>	<i>Greek</i>	<i>Sanskrit</i>	<i>Gothic</i>	<i>Old English</i>
‘foot’	pēs, ped-	poús, pod-	pát, pad-	fotus	fōt
‘much’		polú	purú	filu	fela
‘in front’	prō	pró	prá	fra-	for-
‘three’	trēs	treîs	tráyas	þreis	þrīe
‘that’ (nt.)		tó	tád	þata	þæt
‘thin’	tenuis		tanús		þynne
‘heart’	cor, cord-	kardíā	[hárđi] ¹	hairto	heorte
‘horn’	cornū		śṛṅgam	haurn	horn
‘dog’	[canis] ²	kúo:n, kun-	śvā, śun-	hunds	hund
‘to steal’	clepere ³	kléptein		hlifan	
‘male (animal)’	caper ‘goat’	kápros ‘boar’	káprt ‘penis’		hæfer ‘he-goat’
‘wheel’		kúklos	cakráam		hwēol
‘what?’	quid	tí	kád	hua	hwæt
‘which (of two)?’	[uter] ⁴	póteros	katarás	hwaþar	hwæþer

(See also ‘fish’, ‘eight’, ‘night’, ‘building’, ‘tooth’, and ‘ten’ on the following page, and ‘brother’ on p. 3.)

Notes.

1. The initial consonant of this Sanskrit word has been altered by lexical analogy with another word.
2. Unrelated; *c-* and *-n-* match by chance.
3. Preclassical Latin.
4. The first syllable of this Latin word has been altered in some way that is not well understood.

1a. ... unless immediately preceded by an obstruent (no change in that case).

	<i>Latin</i>	<i>Greek</i>	<i>Sanskrit</i>	<i>Gothic</i>	<i>Old English</i>
‘to kick’	spernere		sp ^h ur-		spurnan
	‘to reject’		‘to jump’		
‘contest’			spṛd ^h -	spaúrds	spyrd
				‘racecourse’	‘racecourse’
‘star’	stēlla	astēr	stṛb ^h is (<i>inst. pl.</i>)	staírno	steorra
‘to stand’	stāre	stê:nai (<i>aor.</i>)	sthā-	standan	standan
‘to walk’		steík ^h ein	stigh-	steigan	stīgan
				‘to climb’	‘to climb’
‘to scratch’	scabere			skaban	scafan
				‘to shave’	‘to shave’
‘fish’	piscis			fisks	fisc
‘eight’	octō	oktō	aṣṭáu	ahtau	eahta
‘night’	nox, noct-	núks, nukt-	nák (1x in RV)	nahts	niht

2. PIE voiced stops became voiceless (*b > *p; *d > *t; *ǵ, *g > *k; *g^w > *k^w).

	<i>Latin</i>	<i>Greek</i>	<i>Sanskrit</i>	<i>Gothic</i>	<i>Old English</i>
‘lip’	labrum				lippa
‘building’	trabs ‘beam’			þaúrþ ‘field’	
					(<i>cf.</i> ON þorp ‘village’)
‘tooth’	dēns, dent-	odoús, odónt-	dán, dat-	tunþus	tōþ
‘two’	duo	dúo	dvá	twai	twēgen
‘ten’	decem	déka	dáśa	taíhun	tīen
‘knee’	genū	gónu	jánu	kniu	cnēow
‘row of teeth’		gómp ^h os ‘peg’	jámb ^h āsas (<i>pl.</i>)		camb ‘comb’
‘crushed’	grānum		jīrṇám	kaúrn	corn
	‘grain’		‘worn out’	‘grain’	‘grain’
‘yoke’	iugum	sdugón	yugám	juk	ǵeoc
‘to come’	venīre		gam- ‘to go’	qiman	cuman
‘alive’	vīvos	sdōós	jīvas	qius	cwic
‘woman’		guné	jánī	qino	cwene

3. PIE breathy-voiced stops became voiced ($*b^h > *b$; $*d^h > *d$; $*g^h, *g^h > *g$; the development of $*g^{wh}$ was complex, yielding $*b, *g, *w$, and $*g^w$ in different environments).

	<i>Latin</i>	<i>Greek</i>	<i>Sanskrit</i>	<i>Gothic</i>	<i>Old English</i>
‘to carry’	ferre	phérein	b ^h ar-	baíran	beran
‘to become’	fierī	phû:nai (<i>aor.</i>)	bhū-	bauan	būan
				‘to dwell’	‘to dwell’
‘brother’	frāter	phrātēr	bhrātā	broþar	brōþor
			‘member of a brotherhood’		
‘door’	forēs (<i>pl.</i>)	t ^h úrā	[dvārau (<i>du.</i>)] ⁵	daúrons (<i>pl.</i>)	duru
‘daughter’		t ^h ugátēr	[duhitā] ⁶	daúhtar	dohtor
‘middle’	medius	mésos ⁷	mád ^h yas	midjis	midd
‘goose’	ānser ⁸	k ^h én	hámsas		gōs
‘stranger’	hostis ‘enemy’			gasts ‘guest’	giest ‘guest’
‘to convey’	vehere		vah-		wegan ‘to move’
‘to lie down’		(<i>cf.</i> lék ^h os ‘bed’)		ligan	licgan
‘wild animal’	ferus ‘wild’	t ^h ér			bera ‘bear’
‘nail, claw’	unguis	ónuks, ónuk ^h -			nægl
‘snow’	nix, niv-	níp ^h a (<i>acc.</i>)		snaiws	snāw

Notes.

5. The initial consonant of this Sanskrit word has been altered by lexical analogy with *dvā* ‘two’ (see above).
6. The initial $*d^h$ of this Sanskrit word has been dissimilated to *d-* by the following *-h-*.
7. $*ty$ and $*d^hy$ became *s* in Greek (but $*dy$ became *sd*).
8. This Latin word is apparently from a rural dialect that had lost *h*.

C. The most thoroughly studied language family (and also one of the larger ones, though not the largest by a long shot) is Indo-European. The well-attested languages of the family are sharply divided into ten subgroups:

1. Anatolian, including Hittite and some other ancient languages of what is now Turkey; all Anatolian languages are now extinct.
2. Armenian.
3. Greek.
4. Albanian.
5. Italic, sharply divided into Osco-Umbrian (including several extinct languages of ancient Italy) and Latino-Faliscan; the latter subgroup included Faliscan (an extinct ancient language) and Latin. The modern descendants of Latin are the Romance languages: Sardinian, Romanian, Italian, Rhaeto-Romance (three languages spoken by small populations in the Alps), French, Provençal, Catalan, Spanish, and Portuguese.
6. Celtic. In addition to poorly attested ancient languages spoken in what are now northern Italy, France, and northeastern Spain, Celtic includes two subgroups of languages still spoken: Irish (including Scots Gaelic) and British (including Welsh and Breton).
7. Germanic. There are three subgroups: East Germanic, of which only the extinct Gothic is well attested; North Germanic, including Old Norse and its modern descendants Danish, Swedish, Norwegian, Faeroese, and Icelandic; and West Germanic, including English, Frisian (four languages spoken by small populations near the North Sea coast), Netherlandic, Afrikaans, Plattdeutsch, German, and Yiddish.
8. Balto-Slavic, sharply divided into Baltic and Slavic. The former includes Lithuanian, Latvian, and the extinct Old Prussian. Slavic languages include (East Slavic) Russian, Belarussian, and Ukrainian; (West Slavic) Polish, Czech, Slovak, and the two Sorbian languages (spoken by small populations in eastern Germany); and (South Slavic) Slovene, Serbo-Croatian, Macedonian, Bulgarian, and the mediaeval Old Church Slavonic, which seems to have been the ancestor of the last two listed.
9. Indo-Iranian, including most of the languages of Iran, Afghanistan, Pakistan,

northern India, and Bangladesh. The subgroup is further divided into Indic, Iranian, and Nuristani (the last including six languages spoken by tiny populations in the mountains of eastern Afghanistan). More than half of all IE languages still spoken are Indo-Iranian. Important ancient languages include (Indic) Sanskrit and (Iranian) Avestan, the sacred language of the Parsees; important modern languages include (Indic) Hindi, Urdu, Bengali, Panjabi, Marathi, Gujarati, Nepali, Kashmiri, Sinhalese, Romany (the group of languages spoken by Gypsies), and (Iranian) Farsi, Dari, Tajiki, Kurdish, Baluchi, Pashtu, and Ossetic. Numerous Indo-Iranian languages are spoken by small populations, some of which have not been studied adequately; at least 60 Indo-Iranian languages are still spoken.

10. Tocharian, including two extinct early mediaeval languages of Xinjiang (!), called Tocharian A and Tocharian B.

While the ten major subgroups are clear enough, there is no consensus on exactly how they are related to each other. Here is a recently proposed “tree”:

PIE

Anatolian

Tocharian

Italic

Celtic

Germanic

Greek

Armenian

Balto-Slavic

Indo-Iranian

(The position of Albanian does not seem to be recoverable.)