Lecture 2: **Phonemes in combination**

1. Phonotactics

- Phonotactic inventory also language specific

- For example –dl– not in English, but in Russian

Greek clusters

Two stops					
πτερόν	feather	βδέω	burp	φθείρω	destroy
κτείς	comb	ἐριγδουπος	loud-crashing	χθων	land
Stop + liquid					
πλέω	sail	βλώσκω	go	φλέψ	vein
πρῶτος	first	βροντή	thunder	φρήν	mind
πνέω	I breathe	**βν?**		ἀφνειός	rich
τλάω	dare	**δλ?**		θλῖψις	passion
τρεῖς	three	δράω	do	θρίξ	hair
ἔτνος	pea-soup	δνοφερός	dark	θνήισκω	die
τμῆσις	cutting	δμώς	slave	ἀριθμός	number
κλέος	glory	γλῶσσα	tongue	χλωρός	green
κρίνω	judge	γράφω	write	χρή	need
κνημίς	greave	γνώμη	opinion	χνοῦς	beard
ἀκμή	tip	πρᾶγμα	thing	αἰχμή	spear
2 liquids					
μνήμη	memory				
C + /s/					
ψυχή	soul	**βς?**		ξηρός	dry
σπέος	cave	σβέννυμι	quench	σφόδρα	exceedingly
στέλλω	send	ζεύγνυμι	yoke	σθένος	strength
σκέπτομαι	look	μίσγω	mix	σχολή	leisure
σμικρος	small				
3 consonants					
σπλάγχνον	entrails	στλεγγίς	strigil	σκληρος	hard
σπρ?		στρατός	army	**σκρ?**	

- Two stops: 1ˢᵗ ≠ [+dental], 2ⁿᵈ = [+dental]

- Predictive:

  *τι-τκω (cf ἔτεκον) > τίκτω I give birth

- Must agree in voicing/aspiration

- Some not found initially – but morpheme-initial

  e.g. ἀκμητος, ἐριγδουπος

- Clusters μλ, μρ, δλ etc. avoided/eliminated:

  *μλωσκω (cf ἔμολον) > βλώσκω I go

  *μροτος > βρότος mortal

  Linear B *de-re-u-ko* /dleukos/ > γλεῦκος sweet wine (cf dulcis)

- Later (post 4ᵗʰ century BC): introduction of words with σκρ-:

  σκρινίον dossier, σκριβλίτης a kind of cheese-cake

Latin initial clusters

C + C					
primus	*plango*	*tres*	*?*	*crimen*	*classis*
brevis	*blandus*	*[drenso]*	*?*	*grandis*	*gloria*
frango	*flos*				
spuma		*stare*		*scelus*	
C + C + C					
spretus	*splendeo*	*strepitus*	*?*	*scribo*	*[sclingo]*

- No *stl – but there was in Old Latin locus > *stlocus, lis < *stlis

- latus < *tlatos, veclus for vetulus, anclo < Gk ἀντλέω

- longus < *dlongos

- [gn] on its way out gnatus > natus, gnosco > nosco

2. Morpheme interactions

- Clusters which apparently break the 'rules' above are found across morpheme boundaries

- English /md/ not permitted, but NB damned {dam} + {ed}

- Latin –dh–: *adhuc*, –dn–: *adnumero*

- Greek ἐκβάλλω (κβ), ἐκφέρω (κφ), ἐκπίπτω (κπ)

3. Sandhi

- sam (*together* cf *sum*) + dhita (*placed* cf τίθημι)

- Internal and external

- External: Sanskrit

  Mahabharata book 2, verse 66, line 4, pad c:

शत्रुसाद्गमयद्द्रव्यं	तद्बुध्यध्वं	महारथाः
śatrusādgamayaddravyaṁ	*tadbudhyadhvaṁ*	*mahārathaḥ*
śatrusād gamayad dravyaṁ	*tad budhyadhvaṁ*	*mahārathaḥ*
śatrusāt gamayat dravyam	*tat budhyadhvam*	*mahārathas*

- Natural consequence of connected speech

- Not a problem of phonology – deals with words in isolation

- But what is a word? For example, are clitics words?

- Problems of expression: lexical vs phonetic

- Internal sandhi more problematic

- Words used as unit to examine phonemic inventory

- For example Greek nasals are assimilated

  ἔγχειριδιον > ἐν + χειριδιον

  ἔμβαινω > ἐν + βαινω

  cf English *unbelievable*

4. Back to the phoneme

- Phoneme realised by different allophones

- Predictable from the phonetic environment

- Are contrastive

- Staple of phonological description so far:

  In English there is an opposition [+VOICE] [-VOICE]

  Aspiration is NOT phonemic in English

  Aspirated phone are found as allophones of the voiceless phoneme

  /p/ has two allophones /pʰ/ and /p/

  The two are found in *spot* and *pot*

- BUT there is no word **sbot*

- Voiced consonants may not be found after s- in English

- The voicing contrast is *neutralised* in this position

- The sound after s- in English shares features with both [p] and [b]:

[pʰ]	[p]	[b]
[-VOICE]	[-VOICE]	[+VOICE]
[+LABIAL]	[+LABIAL]	[+LABIAL]
[+ASPIRATION]	[-ASPIRATION]	[+ASPIRATION]

Neutralisation case study 1: English glottal stops

- English is said to have the phonemes /p/, /t/, /k/

- But they may all be realised by a glottal stop:

	Standard English	Some dialects
bat	/bæt/	/bæʔ/
cap	/kʰæp/	/kʰæʔ/
back	/bæk/	/bæʔ/

- Allophones are not biunique

Neutralisation case study 2: Latin nouns

lex	[lek-s]	*lux*	[luk-s]
legem	[leg-em]	*lucem*	[luk-em]
legis	[leg-is]	*lucis*	[luk-is]
legi	[leg-i]	*luci*	[luk-i]
lege	[leg-e]	*luke*	[luk-e]

Neutralisation case study 2: German word-finals

- In German, Dutch, Afrikaans, Polish, Russian

- Opposition voiced:voiceless neutralised in final position

	V__V	__#
p	+	+
b	+	-
t	+	+
d	+	-
k	+	+
g	+	-
f	+	+
v	+	-
s	+	+
z	+	-
ʃ	+	+
ʒ	+	-

5. Solutions

- Traditional analysis: {'LAW'} has two allopmorphs, /lek/ and /leg/

- Conditioned by the rule: {'LAW'} _ /lek/ / — {NOM.SG.}

- Application of the morpheme realisation rules gives:

  Phonological level: /leks/

- Application of the phoneme realisation rules gives:

  Phonetic level: [leks]

- This leaves the problem for morphology

- But why do whole group of words behave in the same way?

- Modified analysis:

- {'LAW'} has only one allomorph /leg/ which is output first to an intermediate level: /legs/

- At this level rules exist to rewrite phonemes;

  eg. [+STOP, +VOICE] > [–VOICE] / — s

- Output of these rules is to the phonological level:

  Phonological level: /leks/

- Solution 2: The archiphoneme

- Invention of the Prague school

- Represented by capital letter in // ie /T/

- Does this explain ψ and ξ?

ἔλαβον	λήψομαι
τρέφω	θρέψω
λείπω	λείψω
πλέκτω	ἔπλεξα
ἔχω	ἕξω
ἄγω	ἄξω

- A problem: Rad vs Rat in German

Nom sg	raːt	raːt
Gen sg	raːtəs	raːdəs
Nom pl	reːtə	reːdər

- Solution 3: Abandon bi-uniqueness

- cf homphonic words e.g. [ɹæɪt]

Bibliography

Hawkins *Introducing Phonology* (Routledge, 1984)