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1. The Importance of the Study of Greek Phonology

(a) An understanding of phonology provides a key to understanding the ethnic affinities of peoples and the history of the transmission of cultural achievements. Greek cognates of words in other Indo-European languages, however, are often not immediately recognizable owing to distinct phonetic processes in the development of the Greek language. Observe the relationships between the words in the following table:

English	Latin	Greek	Indo-European
father	pater	πατήρ	*pater
kin	genus	γένος	*genos
ewe	ovis	ὄις	*owis
wit	video	ἴδον (φιδον)	*wid-
six	sex	ἕξ	*seks
bear	fero	φέρω	*bher-
ten	decem	δέκα	*dekn
sweet	suavis	ἡδύς	*swad-
cow	bos	βοῦς	g <sup>w</sup> ows
yoke	iugum	ζυγόν	*yug
snow	nivem	νίφα	*snig <sup>wh</sup>
door	foris	θύρα	*dhur-

- (b) An understanding of phonology provides a key to understanding dialectal variations within a language. Thus armed, the student of Attic Greek can relate the Doric ἔντι and the Attic εἰσί to proto-Greek \***senti**; or one can relate the Lesbian Aeolic forms παῖσα and σέλαννα and the corresponding Attic forms, πᾶσα and σελήνη, to proto-Greek \***pantya** and \***selasna**. Thus, although one's study has been concentrated on the dialect of 5th and 4th century Athens, it will be possible to undertake the reading of Homeric or Lesbian Aeolic poetry (Sappho, Alcaeus) or of Ionic prose (Herodotus) with a minimum of difficulty.
- (c) An understanding of phonology provides a key to recognition of cognates derived from the same root, such as the aorist-tense form ἔπαθον (**epnthon**) and the future-tense form πείσομαι (**penthomai**) or the present-tense form ἔχω (**sekho**) and the aorist infinitive σκεῖν (**skhein**). Such understanding lightens the burden of learning principal parts of verbs of apparently anomalous forms such as:

	πάσχω	πείσομαι	ἔπαθον	πέπονθα
from	<b>pnth-sko</b>	<b>penth-s-o-mai</b>	<b>e-pnth-o-n</b>	<b>peponth-a</b>

(d) Of most immediate importance to the beginning student of Ancient Greek, phonology reveals the underlying logic of conjugational and declensional paradigms of verbs and nouns, adjectives and pronouns, even where the forms observed in such paradigms seem superficially inconsistent.

2. Vowels: Indo-European and Ancient Greek

Indo-European vowels			Ancient Greek Vowels					
Simple	Diphthongs		Simple		Diphthongs			
			Short	Long				
<b>a</b>	<b>ai</b>	<b>au</b>	α	α	αι	αυ	α	
<b>e</b>	<b>ei</b>	<b>eu</b>	ε	η	ει	ευ	η	ηυ
<b>o</b>	<b>oi</b>	<b>ou</b>	ο	ω	οι		ω	
<b>i</b>			ι	ι				
<b>u</b>				ου				
shwa								
			υ	υ	υι			

### 3. Vowels: Attic-Ionic shift of α to η

Indo-European long \*a survived in most Greek dialects, but in Attic-Ionic it evolved into a long flat e (English **drag**), which subsequently became assimilated to long open e (French **tête**), spelled η. In **Ionic dialect** this change of quality was carried through uniformly, while in the **Attic dialect** it was inhibited when the original \*α was preceded by ε, ι, or ρ. Note the following dialectal equivalents:

Doric: ἄ ἀμέρα      Attic: ἡ ἡμέρα      Ionic: ἡ ἡμέρη

### 4. Vowels: The diphthong ει

Ancient Greek ει had originally two values: (1) long closed e as in φίλει < φίλε-ε and (2) the true diphthong ει as in γένει < γένε-ι. In late Attic both were assimilated to η. This explains the variant spellings of the second-person singular present middle ending in omega-verbs: λύει is the earlier spelling, λύη the later spelling of what, before the loss of medial sigma in the ending, was λύεσαι.

The long closed e which is spelled ει may result from **contraction** of ε + ε. Thus:

ποιεῖτε <-- ποιέ-ετε  
πόλεις <-- πόλε-ες

or it may result from **compensatory lengthening** of ε after the loss of a following consonant. Thus:

θείς <-- θέ-ντ-ς  
εῖς <-- (σ)έν-ς

### 5. Vowels: The diphthong ου

Ancient Greek ου was originally a long closed o (English **blow**), but in Attic dialect it became u (English **boot**), while Attic υ (originally short and long u as in Latin) acquired the value of the French u, the German ü. This change in the quality of the Greek upsilon explains why the Romans used their own u to transliterate Greek ου but carried over the Greek letter Y to represent a sound not expressed in the existing Roman alphabet.

The long closed o which is spelled by Greek ου may result from **contraction** of ο + ο (thus:

δηλοῦμεν <-- δηλό-ομεν

or from **contraction** of ο + ε (thus

δηλοῦτε <-- δηλό-ετε  
τοῦργον <-- τὸ ἔργον

or from **contraction** of ε + ο (thus:

ποιοῦμεν <-- ποιέ-ομεν  
σοῦ <-- σέ-ο

or it may result from **compensatory lengthening** of ο after loss of a following consonant (thus:

δούς <-- δό-ντ-ς  
Μοῦσα <-- Μόνσα

## 6. Vowels: Diphthongs with Iota Subscripts: α η ω

The ancient Greek long-vowel diphthongs αι, ηι, ωι tended to lose their appended iotas and to degenerate into the simple long vowels ᾱ η̄ ω̄. They lasted longer in final open position, where we commonly see them in dative-singular forms of first- and second-declension nouns: τῆι πῆγηι; τῶι λόγωι. On the other hand, they probably lost diphthongal pronunciation in medial position as the **variant spellings in Hellenistic Greek papyri** would seem to indicate: ῥαδίω̄ς = ῥαδίω̄ς; ἀποθνηίσκω = ἀποθνήσκω; ἡ ῥῶδη = ἡ ῥῶδη. The orthographic convention of indicating the lost appended iota of the diphthong by means of an iota subscript is Byzantine. Hellenistic manuscripts and papyri show simple long vowels, as the dative singular form τῶ πῆγηι.

## 7. Vowels: Attic Vowel contractions: In the following table, the first vowel is given in the left-hand column, the second in the top row, and the result contractions in the box where the columns intersect.)

	α	ε	ει	ι	η	η	ο	ου	οι	ω	ω
α	α	α	α	αι	α	α	ω	ω	ω	ω	ω
ε	η	ει	ει	ει	η	η	ου	ου	οι	ω	ω
ο	ω	ου	οι	οι	ω	ω	ου	ου	οι	ω	ω

### Comments on the vowel contractions:

- It will be noted from the table that, generally speaking, **a**-vowels prevail over **e**-vowels; **o**-vowels prevail over both **a**-vowels and **e**-vowels.
- Strictly speaking, **ε + α = long α** rather than η; however, as long α changes to η in the Attic dialect, the resultant contraction normally appears as η. Thus: τὰ ἄστυα = τὰ ἄστυη; τὸν Σωκράτεια = τὸν Σωκράτη. Yet this change may be inhibited when the long α is preceded by ε, ι, or ρ. Thus: ἀργυρέα = ἀργυρῆ; τὸν Περικλέεια = τὸν Περικλέα.
- Vowel contraction may also occur between words, especially when the definite article ὁ ἢ τὸ or the conjunction καὶ is followed by a word beginning with α-, ε-, or ο- (*crasis*): ὁ ἀνὴρ = ἀνὴρ; ὁ ἐμός = οὐμός; τὸ ὄνομα = τοῦνομα; τὰ ἄλλα = τᾶλλα.

## 8. Vowels: Quantitative Metathesis: In the Attic dialect, the combinations ηο and ηα tended to shift the vowel quantity from the first to the second vowel: εω, εᾶ. This substantially affects the declension of several categories of nouns and adjectives:

- (a) **Third-declension stems** that alternate between vocalic or diphthongal forms before a consonantal ending and vowel-sonant forms before a vocalic ending (ι/ηγ, ευ/ηγ, αυ/αγ --> ηγ) show metathesis after the loss of the sonant:

πόλις (ι/ηγ)	πόληγος --> πόληος --> πόλεως
βασιλεύς (ευ/ηγ)	βασιλῆγος --> βασιλῆος --> βασιλέως
	βασιλῆγα --> βασιλῆα --> βαασιλέα
ναῦς (αυ/αγ)	ναφός --> νηφός --> νεώς (gen. sg. "ship")

- (b) "Attic declension" of nouns and adjectives originally formed with sonants which were lost:

ναφός --> νηφός --> νεώς (nom. sg. "temple")  
 πλήγος, πλήγα, πλήγον --> πλήος, πλήα, πλήον --> πλέως, πλέα, πλέων  
 πλήγοι, πλήγαί, πλήγα --> πλήοι, πλήαι, πλήα --> πλέω, πλέαι, πλέα

- (c) A related phenomenon is the **shortening** of the **first** of two contiguous long vowels:

βασιλῆγων --> βασιλήων --> βασιλέων  
 τεθνηώς --> τεθνεώς

## 9. Vowels: Compensatory Lengthening

The loss of one of a pair of consonants following a short vowel is compensated for by the **lengthening** of the preceding short vowel. When this occurs:

short α --> long α	ε --> ει	short ι --> long ι	short υ --> long υ
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- (a) This process is particularly noticeable in **active participles**, where the participial sign -ντ- enters into conjunction with a sigma:

λύσαντες -> λύσασις	λύσαντιαι -> λύσανσαι -> λύσασιαι
τιθέντες -> τιθείς	τιθέντιαι -> τιθένσαι -> τιθείσαι
διδόντες -> διδοῖς	διδόντιαι -> διδώσαι -> διδοῖσαι
δύντες -> δύς	δύντιαι -> δύνσαι -> δύσαι

- (b) This process is also significant in **liquid aorists** where the sigma of the First Aorist is lost after μ, ν, λ, or ρ, and the preceding vowel, if short, is compensatorily lengthened:

ἔγαμσαι -> ἔγαμα -> ἔγημαι (ᾱ -> η)	
ἔφασαι -> ἔφαῖναι -> ἔφημαι (ᾱ -> η)	
ἤγγελασαι -> ἤγγειλαι	
ἔκρινσαι -> ἔκριναι	

## 10. Vowel Gradation (*Ablaut*) and Types

- (a) "The only stable constituent portion of an Indo-European morphological element (root, suffix, or ending) is the consonantal portion. The vocalic portion is always subject to alternation." --Meillet

In English, for instance, one can readily recognize the **r/d** complex as the stable consonantal portion characterized alternately by the vowels **\*i, \*o, \*i** in the principal parts of the verb **ride, rode, ridden**. Alternation of vowels affects not only the principal word-roots of nouns and verbs, however, but also the **suffixes** constituting, e.g., agent nouns in Greek: **τερ** in **πατέρα** but **τορ** in **ἄπατορα**, **τρ** in **πατρός**, **τηρ** in **πατήρ**, and **τωρ** in **ἄπάτωρ**, or the **mood-signs** of verbs as optative **η/ι** in Greek: **διδοίην, δίδοιτε**. In the most common type of Greek verb, the "thematic" verb, an alternating short vowel **ε/ο** provides the link between the stem and the ending: **λύ-ο-μεν, λύ-ε-τε**. Lengthened forms of the same vowel (**η/ω**) serve as the subjunctive mood sign: **λύ-ω-μεν, λύ-η-τε**.

- (b) In its full range, Indo-European vowel gradation comprises five grades: two short-vowel grades: **ᛛ, ᛜ**; two long-vowel grades: **ᛛ̄, ᛜ̄**; and a zero-grade wherein the consonantal portion is linked without a vowel (or with the second element of a diphthong constituted by the long- or short-vowel grades). Although all five grades are rarely represented for any single root in Greek, all are to be seen in the agent-noun suffix forms cited above:

τερ	τορ	τρ	τηρ	τωρ
-----	-----	----	-----	-----

- (c) Three types of vowel gradation are important in Greek:
1. An alternation of **ᛛ, ᛜ**, and *zero*-grades;
  2. An alternation of *long*- and *short*-vowel grades;
  3. An alternation affecting *both* syllables of *disyllabic* roots.

### 11. Vowel Gradation: The type $\check{\epsilon}/\check{o}/-$

- (a) The most common type of vocalic alternation in Greek is that of the grades  $\check{\epsilon}$ ,  $\check{o}$ , and *zero* as seen in the forms of the verb root ΠΕΤ/ΠΟΤ/ΠΤ:

ΠΕΤ- πέτ-ομαι	ΠΟΤ- ποτ-ανός	ΠΤ- ἐ-πτ-όμην
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This type is most frequently seen, however, in a variety in which the  $\check{\epsilon}$  or the  $\check{o}$  forms a diphthong in combination with a semivowel ( $\iota/\upsilon$  or  $\upsilon/\epsilon$ ), with a liquid ( $\lambda$  or  $\rho$ ), or with a nasal ( $\mu$  or  $\nu$ ). In such roots we find the  $\check{\epsilon}$  and  $\check{o}$  grades as diphthongs:

1.	ει	πείθω	οι	πέποιθα
2.	ευ	ἐλεύθερος	ου	ἐλήλουθα
3.	ελ	στέλγω	ολ	στόλος
4.	ερ	φθέργω	ορ	φθορά
5.	εμ	σεμ = ἔν	ομ	σόμαλος = ὄμαλος
6.	εν	τένγω	ον	τόνος

- (b) The *zero*-grade in such instances appears as the vocalic form of the semi-vowel ( $\iota$  or  $\upsilon$ ), or as the common vocalic form of the liquid ( $\alpha$  or  $\alpha\rho$ ) or nasal ( $\alpha\mu$ ,  $\alpha\nu$ , or  $\alpha$ ; these are the forms taken by both vocalic  $\mu$  and vocalic  $\nu$  before a vowel or a consonant respectively). Thus the series above is completed with corresponding zero-grade forms:

1.	ει	πείθω	οι	πέποιθα	ι	ἔπιθον		
2.	ευ	ἐλεύθερος	ου	ἐλήλουθα	υ	ἔλυθον		
3.	ελ	στέλγω	ολ	στόλος	αλ	ἔστάλην		
4.	ερ	φθέργω	ορ	φθορά	αρ	ἔφθάρην		
5.	εμ	σεμ = ἔν	ομ	σόμαλος = ὄμαλος	αμ	ἄμα	α	ἄ-πλους
6.	εν	τένγω	ον	τόνος	αν	τάνυται	α	τατός

12. Vowel Gradation: The type long-vowel/short-vowel: A somewhat less common but no less important second type of vocalic alternation is that wherein a long vowel ( $\bar{\alpha}$ ,  $\eta$ , or  $\omega$ ) alternates with its corresponding short vowel ( $\check{\alpha}$ ,  $\epsilon$ , or  $ο$ ):

1.	σίσταμι = ἴστημι	σίσταμεν = ἴσταμεν
2.	τίθημι	τίθεμεν
3.	δίδωμι	δίδομεν

**13. Vowel Gradation in Disyllabic Roots:** Certain Greek roots, especially those with a liquid or a nasal as the second consonant, seem to undergo such changes as to indicate vocalic alternation both before and after the second consonant. The alternation of the vowel in the first syllable is of the type  $\check{\epsilon}/\check{o}/-$ ; that of the vowel in the second syllable is of the type long-vowel/short-vowel. This pattern of alternation is further complicated, however, by two facts: (1) a regularly appears in the zero-grade of a syllable ending in a liquid or a nasal; (2) the short-vowel grade of the second syllable appears to represent an original Indo-European *shewa* (ḡ). In Greek this *shewa* disappears before a vowel or otherwise is represented by the short vowel ( $\check{\alpha}$ ,  $\epsilon$ , or  $\omicron$ ) corresponding to the long-vowel grade ( $\bar{\alpha}$ ,  $\eta$ , or  $\omega$ ).

ΓΕΝ/ΓΟΝ/ΓΝ + η/ε/*					
ε-grade in the 1st syllable, short-vowel grade in the 2nd					
γέν*ος	=	γένος	γεν*της	=	γενέτης
ο-grade in the 1st syllable, short-vowel grade in the 2nd					
γόν*ος	=	γόνος	γέγον*-α	=	γέγωνα
zero-grade in the 1st syllable, short-vowel grade in the 2nd					
γνή-σιος					
zero-grade in the 1st syllable, short-vowel grade in the 2nd					
γι-γν*-ομαι	=	γίγνομαι			

ΒΕΛ/ΒΟΛ/ΒΑΛ + η/ε/*					
ε-grade in the 1st syllable, short-vowel grade in the 2nd					
βέλ*-ος	=	βέλος			
ο-grade in the 1st syllable, short-vowel grade in the 2nd					
βόλ*-ος	=	βόλος			
zero-grade in the 1st syllable, short-vowel grade in the 2nd					
βαλέ-σω	=	βαλέ-ω	=	βαλῶ	
έ-βαλ*-ον	=	ἔβαλον			
zero-grade in the 1st syllable, long-vowel grade in the 2nd					
έ-βλή-θην	βέ-βλη-μαι				

ΚΕΛ/ΚΟΛ/ΚΑΛ + η/ε/*					
zero-grade in the 1st syllable, short-vowel grade in the 2nd					
έ-καλ*-σα	=	έ-κάλε-σα			
zero-grade in the 1st syllable, long-vowel grade in the 2nd					
κλη-τός	έ-κλή-θην				

**14. Consonants: Indo-European and Ancient Greek**

		Stops				Spirant		Nasal	Liquids		Sonant
		Voiced		Unvoiced		Voiced	Unv.	Voiced			
		Plain	Asp.	Plain	Asp.				Lateral	Palatal	
1.	Labial	b β	bh -	p π	ph φ	w -	wh -	m μ			m -
2.	Dental	d δ	dh -	t τ	th θ			n ν	l λ	r ρ	nlr
3.	Palatal	g γ	gh -	k κ	kh χ	y -		ng γγ γκ			
4.	Labio-velar	g <sup>w</sup> -	g <sup>wh</sup> -	k <sup>w</sup> -							
5.	Sibilant					z ζ	s σ				

**Comments on the consonants:**

1. φ, θ, and χ represent the Indo-European **bh**, **th**, and **kh**; but these *voiced* aspirates of Indo-European are *unvoiced* in Greek (e.g. Sanskrit **bharami** = Greek φέρω). Originally they were pronounced as in English **uphold**, **hothouse**, and **inkhorn**; but they evolved into the sounds of f, th (as in English **thin**) and ch (as in German **ich**) and were thus pronounced in the Koinê.

2. The Indo-European spirants **w** and **y** do not survive in the Attic-Ionic dialect; but they are represented in the reconstruction of the history of word-forms by **F** or **Y** respectively. **F** actually does appear in some early inscriptions.
3. The sonant **m** appears in Greek either as **v** after a vowel or as **α** after a consonant. The sonant **n** vocalizes as **α**. The sonants **λ** and **ρ** vocalize in Greek as **αλ** or **λα** and **αρ** or **ρα** respectively:  
**I-E** \*dekm = **Latin** decem = **Greek** δέκα  
**I-E** \*n- = **Latin** in- = **English** un- = **Greek** ἄ-
4. The ancient Greek ζ was a double consonant originally **zd** (cf. Ἰθάκηναζε < Ἰθάκηνασ-δε), in Attic **dz**.
5. Ancient Greek γγ, γκ, and γχ were pronounced as English **linger**, **sink**, and **inkhorn**.

### 15. Consonants: Attic Combinations (read the following table like that in §8 above:

	τ	δ	θ	μ	σ	π	β	φ	κ	γ	χ	σθ	ρ
π	πτ	βδ	φθ	μμ	ψ							φθ	πρ
β	πτ		φθ	μμ	ψ							φθ	βρ
φ	πτ	βδ	φθ	μμ	ξ							φθ	φρ
κ	κτ	γδ	χθ	γμ	ξ				κκ		κχ	χθ	κρ
γ	κτ	γδ	χθ	γμ	ξ							χθ	γρ
χ	κτ	γδ	χθ	γμ	ξ							χθ	χρ
τ			τθ		σ								τρ
δ	στ		σθ		σ								δρ
θ	στ				σ								θρ
ν	ντ	νδ	νθ	μμ	ν, σ	μπ	μβ	μφ	γκ	γγ	γχ		νδρ
ρ	ρτ	ρδ	ρθ	ρμ	ρρ	ρπ	ρβ	ρφ	ρκ	ργ	ρχ	ρθ	ρρ

- (a) The general principle of assimilation of stops is that the preceding stop is assimilated to the order of the second stop. Thus:  
 ἔπ-δομος --> ἔβδομος (π becomes β before δ)  
 ὄκ-δοος --> ὄγδοος (κ becomes γ before δ)  
 νιβ-τός --> νιπτός (β becomes π before τ)  
 στιγ-τός --> στικτός (γ becomes κ before τ)
- (b) The combinations of stops with **σ** indicated on the table above are seen most commonly in the formation of future and first-aorist stems (λέγω, λέξω, ἔλεξα), in the formation of third-declension nominative singular and dative plural (e.g. κήρυκ-ς, --> κήρυξ, κήρυκ-σι --> κήρυξι, φλέβ-ς --> φλέψ, φλεβ-σί --> φλεψί), and in the formation of the perfect middle-passive second singular (e.g. λέλειπ-σαι --> λέλειψαι). Note that **σ** makes *voiced stops* (γ β) lose their vocalization (they become κ π) and makes *aspirates* (χ φ) lose their aspiration (they also become κ π). Thus θρέφ-σω becomes θρέπ-σω = θρέψω and τρίβ-σω becomes τρίπ-σω = τρίψω; λήγ-σω becomes λήκ-σω = λήξω and εὔχ-σομαι becomes εὔκ-σομαι = εὔξομαι. All **dental** stops (τ δ θ) assimilate to **σ** and are absorbed into it. Thus: πειθ-σω becomes πείσω, ἐρείδ-σω becomes ἐρείσω, and δατ-σομαι becomes δάσομαι.
- (c) The combinations of stops with **μ**, **τ**, and **σθ** are particularly significant in forms of the middle/passive indicative, infinitive, and participle. Thus:

	+μαι	+ται	+σθαι
λέλειπ-	λέλειμμαί	λέλειπται	λέλειφθαι
βέβλαβ-	βέβλαμμαι	βέβλαπται	βέβλαφθαι
κεκήρυκ-	κεκήρυγμαί	κεκήρυκται	κεκήρυχθαι
πέπειθ-	πέπεισμαι	πέπεισται	πέπεισθαι

- (d) The combinations of stops with **θ** are particularly significant in forms of the *aorist passive*. Thus:

ἐ-κηρύκ-θην	becomes	ἐκηρύχθην
ἐ-λείπ-θην	becomes	ἐλείφθην



**16. Consonants: Aspirates (φ, χ, θ)**

- (a) Greek φ θ χ represent Indo-European **bh dh gh**; but these *voiced* Indo-European aspirates are *unvoiced* in Greek. In course of time they degenerated into the sounds of **f** and **th** (as in English **th**in) **ch** (as in German **i**ch). They were pronounced thus already in the Koinê.
- (b) Final unvoiced stops (π τ κ) will assimilate to an aspirated vowel at the beginning of the following word.

ἐπ' ἡμέραν	becomes	ἐφ' ἡμέραν
οὔτ' ἵππος	becomes	οὔθ' ἵππος
οὐκ ἡμεῖς	becomes	οὐχ ἡμεῖς

- (c) **Dissimilation of aspirates**: a syllable bounded by two aspirates loses aspiration of one of the stops, usually the first. Thus:
- σέχω --> ἔχω --> ἔχω (but note that in the **future** tense, χ is de-aspirated when combining with σ; hence, aspiration re-appears at the beginning of the syllable: σέχ-σω --> ἔχ-σω --> ἔκ-σω = ἔξω).
  - θίθημι --> τίθημι
  - θαχύς --> ταχύς (but note that in the comparative degree, aspiration is lost when θαχῶν becomes θάττων; hence aspiration reappears at the beginning of the syllable).
  - The noun root θριχ- appears as τριχ- except in the nominative singular θρίξ and the dative plural θριξί, where χ is de-aspirated in combination with σ.

**17. Consonants: Voiceless stops (π, κ, τ)**

- (a) Articulation of κ tended to vocalization. Note, for instance, that Latin has transliterated the verb κυβερνῶ as guberno.
- (b) τ assimilates before ι or ε. Thus:
- 3 sg. primary ending: -τι --> -σι;
  - 2 sg. acc. personal pronoun: τε --> σε (whence the σ spread to other forms);
  - Compare the noun πλοῦτος with the adjective πλούσιος (< πλούτιος);
  - Abstract nouns ending in -τις --> -σις (e.g. δότις --> δόσις).

**18. Consonants: Voiced stops (β, γ, δ)**

- (a) The voiced stops tended to become fricatives in articulation: β --> **v**; δ --> **th** (as in English **th**e); γ --> **y**. These are their sounds in Modern Greek, and probably were already so in the Koinê.
- (b) The voiced stops tended to nasalize before vowels (σέβ-νος --> σέμνος). Note that the combination -γν- further evolved from -γγν- to loss of -γ- altogether. Hence the Koinê forms γίνομαι and γινώσκω of the older Attic verbs γίγνομαι and γινώσκω.

**19. Consonants: Fate of the Indo-European Labio-velars (k<sup>w</sup>, g<sup>w</sup>, gh<sup>w</sup>)**

- (a) Neighboring vowels interact with the Indo-European labio-velars so as to cause them to shift to respective stops of all three orders and series.
- (b) **Gutturalization**: Indo-European **k<sup>w</sup>, g<sup>w</sup>, and gh<sup>w</sup>** lose the velar appendage before or after υ and before ι (y). Thus:
- Indo-European **k<sup>w</sup>** --> Greek κ  
 λύκFος --> λύκος  
 βού-κFολος --> βούκολος  
 οὐκFι --> οὐκί
  - Indo-European **g<sup>w</sup>** --> Greek γ  
 g<sup>w</sup>ona --> g<sup>w</sup>una --> γυνά (Attic γυνή)

3. Indo-European **gh<sup>w</sup>** --> Greek **χ**  
**lngh<sup>w</sup>us** --> **ἐλαχύς**

Then, after loss of the velar appendage (**w**), the resultant gutturals (**κ γ χ**) follow the pattern of transformations of **guttural + y**. Thus:

Indo-European **k<sup>w</sup>y** --> Greek **κγ** --> Attic **ττ** or Ionic **σσ**

Indo-European **gh<sup>w</sup>y** --> Greek **χγ** --> Attic **ττ** or Ionic **σσ**  
while

Indo-European **g<sup>w</sup>y** --> Greek **γγ** --> ζ (σδ)

<b>ok<sup>w</sup>ye</b>	->	<b>ὄκγε</b>	-	<b>ὄσσε</b>
			>	
<b>lngh<sup>w</sup>y*on</b>	->	<b>ἐλάχθων</b>	-	<b>ἐλάττων</b>
			>	
<b>g<sup>w</sup>y*en</b>	->	<b>γγῆν</b>	-	<b>ζῆν</b>
			>	

(c) **Dentalization:** before **ε, ει, η** or **ι**:

1. Indo-European **k<sup>w</sup>** --> Greek **τ**;
  2. Indo-European **g<sup>w</sup>** --> Greek **δ**;
  3. Indo-European **gh<sup>w</sup>** --> Greek **θ**
- Thus:

<b>k<sup>w</sup>is</b> (Latin <b>quis</b> )	->	<b>τίς</b>
<b>k<sup>w</sup>etwor</b> (Latin <b>quattuor</b> )	->	<b>τέτφορες --&gt; τέτταρες</b>
<b>gh<sup>w</sup>erm</b> (Eng. <b>warm</b> )	->	<b>θερμός</b>
<b>gh<sup>w</sup>en</b>		<b>θένγω --&gt; θείνω</b>

(d) **Labialization:** before **α, ο** or a consonant:

1. Indo-European **k<sup>w</sup>** --> Greek **π**;
  2. Indo-European **g<sup>w</sup>** --> Greek **β**;
  3. Indo-European **gh<sup>w</sup>** --> Greek **φ**
- Thus:

<b>leik<sup>w</sup>*o</b> (Latin <b>linquo</b> )	->	<b>λείπω</b>
<b>sek<sup>w</sup>o</b> (Latin <b>sequor</b> )	->	<b>ἔπομαι</b>
<b>g<sup>w</sup>am-</b>	->	<b>θερμός</b>
<b>gh<sup>w</sup>en</b>	->	<b>βάνγω --&gt; βαίνω</b>
<b>gh<sup>w</sup>on-</b>	->	<b>φόνος</b>
<b>snigh<sup>w</sup>ad-</b>	->	<b>νίφαδ-</b>

**20. Consonants: Unstable σ**

(a) **Initial σ before a vowel** weakens to an aspirate (σ --> **h**). Thus Indo-European cognates with initial **s** before a vowel appear in Greek with a rough breathing:

1. Indo-European **septm** (Latin **septem**) --> Greek **ἕπτα**;
2. Indo-European **semi-** (Latin **semi-**) --> Greek **ἥμι-**.

(b) **Initial σ before a liquid (λ ρ) or a nasal (μ ν)** is normally lost:

- |                                    |   |
|------------------------------------|---|
| 1. IE <b>sn</b> --> Greek <b>ν</b> | IE <b>snigh<sup>w</sup></b> (Eng. <b>snow</b> ) --> Greek <b>νιφ-</b> ; |
| 2. IE <b>sm</b> --> Greek <b>μ</b> | IE <b>smikro-</b> --> Greek <b>μικρός</b> ;                             |
|                                    | IE <b>smia</b> --> Greek <b>μία</b> ;                                   |
| 3. IE <b>sr</b> --> Greek <b>ρ</b> | IE <b>srewo</b> --> Greek <b>ρέω</b> ;                                  |
| 4. IE <b>sl</b> --> Greek <b>λ</b> | IE <b>sleg</b> (Eng. <b>slack</b> ) --> Greek <b>λήγω</b> .             |

- (c) **Intervocalic σ**, like initial σ, weakened to an aspirate, then evanescenced, leaving a hiatus between the vowels, which Attic dialect then closed by contraction of vowels:
1. γένεσος --> γένεσος --> γένεος --> γένουος;
  2. μενέσω --> μενέσω --> μενέω --> μενῶ.
- (d) **σ before an unvoiced stop** remains intact. Thus, while the e-grade of the root σεκ<sup>W</sup> shows loss of σ and aspiration in ἔπομαι, the zero-grade of the same root σκ<sup>W</sup> shows the σ intact in the aorist infinitive σπέσθαι. Similarly the root **segh/sgh** shows present indicative first singular ἔχω (from ἔχω, but with dissimilation of aspirates, cf. §17c above), aorist infinitive σχεῖν.
- (e) **σ before a voiced stop**: σ is vocalized to ζ:
1. IE **osdo-** --> Greek ὄζος (articulated **ozdos**)
  2. Ἄθίνασ-δε --> Ἄθίναζε (articulated **Athenazde**)
- (f) **σ between a liquid or nasal and a vowel** evanescences, and the preceding vowel is then lengthened compensatorily (cf. §10 above):
1. ἡγγελα --> ἡγγελα
  2. ἔγαμσε --> ἔγαμε --> ἔγημε
  3. ἔφθερσα --> ἔφθειρα
  4. ἔκτενσα --> ἔκτεινα
- (g) **Double σ** tends to simplify. Thus ἐτέλεσ-σα becomes ἐτέλεσα. In the second person singular of εἶναι, ἔσσι first simplified to ἔσι; when this intervocalic σ was lost, the resultant contraction, εἶ, became the historical Attic equivalent of the Homeric ἔσσι.
- (h) **σ following stops**: see §16b above.

## 21. Consonants: Unstable ɸ

- (a) **Medial intervocalic ɸ** was lost early: IE **newo-** (Latin **novus**) = Greek νέος.
- (b) **Initial ɸ** was lost, sometimes leaving aspiration as evidence:
1. ɸέργον --> ἔργον
  2. ɸέσπερος --> ἔσπερος
  3. ɸέκσος --> ɸέπος --> ἔπος
- (c) **Initial ɸ** is lost before = (just as before vowels):
1. ɸρόδος --> ῥόδος
- (d) **Dental stop** before ɸ:
1. ɸ was lost after δ or θ (δɸεινός = δεινός);
  2. ɸ was lost after τ but caused doubling of τ:  
κɸέτɸαρες --> τέτɸαρες --> τέτταρες.
- (e) **σ before ɸ**: both are lost, but the preceding vowel is lengthened compensatorily in order to retain the originally long syllable produced by the vowel followed by two consonants:
1. νάσɸος --> νᾱος --> νῆος --> νέως.

## 22. Consonants: Unstable consonantal Yod (ι or γ)

- (a) **Initial yod, when unvoiced** became an **aspirate**, like initial σ and (in some instances) initial ɸ (e.g., IE **γ\*ek<sup>W</sup>ar** --> Greek ἦπαρ); **when voiced**, it became a ζ (e.g., IE **γugom** --> Greek ζυγόν).
- (b) **Medial intervocalic yod** was lost: δεγος --> δέος.
- (c) **Yod between voiceless dental stops and vowel**:
1. in the earlier period τγ and θγ both became σ:  
IE **k<sup>W</sup>otyos** --> πότθος --> πόσος  
μέθγος --> μέσος
  2. in the later period τγ and θγ became first τσ, then ττ:  
μέλιτθα --> μέλιττα
- (d) **Yod between voiceless guttural stops and vowel**:
1. **initial** κγ or χγ followed by a vowel became τ in Attic dialect, σ in Ionic:  
κγο + ἡμερον --> Attic τήμερον; Ionic σήμερον
  2. **medial** κγ or χγ followed by a vowel became ττ in Attic dialect, σσ in Ionic:  
πράκγω --> Attic πράττω; Ionic πράσσω

- (e) **Yod between voiced dental or guttural stop and vowel:** δγ or γγ --> ζ
- |         |     |        |
|---------|-----|--------|
| ἀρπάγγω | --> | ἀρπάζω |
| κομίδγω | --> | κομίζω |
- (f) **Yod after a labial stop** becomes τ to which the preceding consonant is assimilated:
- |         |     |         |
|---------|-----|---------|
| χαλέπγω | --> | χαλέπτω |
| θάφγω   | --> | θάπτω   |
| βλάβγω  | --> | βλάπτω  |
- (g) **Yod between liquid or nasal and a vowel:**
- l doubles: βάλθω --> βάλλω  
ἀγγέλθω --> ἀγγέλλω
  - ρ and ν effect a metathesis of the consonantal yod to the second element of a diphthong with the preceding vowel:
 

χάργω	-->	χαίρω
βάνγω	-->	βαίνω
φθέργω	-->	φθείρω
- (h) **Yod between ɸ and a vowel:** ɸ is lost, an ι-diphthong results:
- |         |     |        |
|---------|-----|--------|
| κλάφγω  | --> | κλαίω  |
| εὐρέφγα | --> | εὐρεῖα |
- (i) **Yod between σ and a vowel:** ultimately **both** are lost:
- |         |     |        |     |       |     |      |
|---------|-----|--------|-----|-------|-----|------|
| τόσγο   | --> | τοῖο   | --> | τό-ο  | --> | τοῦ  |
| τελέσγω | --> | τελείω | --> | τελέω | --> | τελῶ |

### 23. Consonants: Unstable Liquids (λ, ρ), and Nasals (μ, ν)

"Liquids and nasals are sounds of such sonority that, while they usually have the function of consonants and so are normally ranked as such, they may also have the function of the ordinary vowels, that is, they may be pronounced so as to form a distinct syllable without the aid of other vowels. This is the case in many languages, and so in English the unaccented syllables of words like **able**, **hidden**, **bottom**, in which the vowels which appear in the spelling are no longer pronounced, but only the **l**, **n**, **m**. Such sounds are assumed for the parent speech, and are best termed 'syllabic liquids and nasals and distinguished from the corresponding consonants by the symbols ρ λ ν μ."

--C. D. Buck, Comparative Grammar of Greek and Latin

- (a) Greek developed the vocalic element of liquids and nasals of Indo-European into a readily appearing before or after them, or (under some circumstances, in the case of **nasals**) even replacing them. That is:

λ	-->	αλ, λα
ρ	-->	αρ, ρα
μ	-->	αμ, μα, α
ν	-->	αν, να, α

- Final μ in Greek becomes ν after a vowel, α after a consonant. This is particularly significant in the Greek variant forms of IE m as the case-indicator of the accusative singular of nouns and as the first-person singular active secondary ending of verbs:

IE septm (Latin <b>septem</b> )	-->	ἕπτα
IE agrom (Latin <b>agrum</b> )	-->	ἄγρον
πόλιμ	-->	πόλιν
ἄνδρμ	-->	ἄνδρα
ἔλυομ	-->	ἔλυον
ἔλυσμ	-->	ἔλυσα

- An added α readily accrues to a liquid or a nasal when the liquid or nasal is followed by a vowel:

προ	-->	προς	-->	παρος
σμ-α	-->	ἄμα		

Likewise, variant forms of words occur with α either preceding or following the consonant:

θάρσος	=	θράσος
κάρτος	=	κράτος

- Initial μ** (IE privative prefix, Latin **in-**, English **un-**) appears as **ἀ-** **before a consonant** (e.g. ἀ-θάνατος), **as ἀν-** **before a vowel** (e.g. ἀν-ίσος).

4. So also  $\mu$  or  $\nu$  within a word becomes  $\alpha$  before a consonant,  $\alpha\nu$  before a vowel:

$\tau\nu\tau\acute{o}\varsigma$                       -->     $\tau\alpha\tau\acute{o}\varsigma$   
 IE  $\gamma^w\mu\text{-}\gamma\omicron$  -->     $\beta\acute{\alpha}\nu\gamma\omega$                       -->     $\beta\alpha\acute{\iota}\nu\omega$

- (b) Liquids and nasals followed by yod and a vowel: see §23g above.  
 (c) Liquids and nasals followed by  $\sigma$  and a vowel: see §21f above.  
 (d) When a vowel is followed by  $\nu\sigma$ , the  $\nu$  evanesces and the preceding vowel is lengthened compensatorily (see §10a above).

#### 24. Consonants at Word-ends

- (a) **No** stops survive at word-end in Greek. Hence:
- The final stop of noun-stem is lost in the nominative and vocative singular:  
 stem  $\lambda\acute{\epsilon}\omicron\nu\tau\text{-}$     nominative:  $\lambda\acute{\epsilon}\omega\nu(\tau)$     vocative:  $\lambda\acute{\epsilon}\omicron\nu(\tau)$   
 stem  $\acute{\omicron}\nu\omicron\mu\alpha\tau\text{-}$     nominative-accusative singular:  $\acute{\omicron}\nu\omicron\mu\alpha(\tau)$   
 stem  $\acute{\alpha}\nu\alpha\kappa\tau\text{-}$     vocative:  $\acute{\alpha}\nu\alpha(\kappa\tau)$
  - Final  $\tau$  of the third-singular and third-plural secondary active endings ( $-\tau$ ,  $-\nu\tau$ ) is lost:  
 $\acute{\epsilon}\phi\epsilon\rho\epsilon\tau$                       -->     $\acute{\epsilon}\phi\epsilon\rho\epsilon$   
 $\acute{\epsilon}\phi\epsilon\rho\omicron\nu\tau$                       -->     $\acute{\epsilon}\phi\epsilon\rho\omicron\nu$
- (b)  $\sigma$ ,  $\rho$ , and  $\nu$  are the only consonants retained at the end of Greek words.
- $\sigma$  (including its compounded forms  $\xi$  and  $\psi$ ) is, of course, the regular **nominative-singular case-ending** and the **second-singular secondary active verb-ending**:  $\nu\epsilon\alpha\nu\acute{\iota}\alpha\varsigma$ ,  $\acute{\alpha}\gamma\rho\omicron\varsigma$ ,  $\pi\acute{o}\lambda\iota\varsigma$ .
  - $\rho$  is retained:  $\pi\alpha\tau\acute{\eta}\rho$ ,  $\acute{\alpha}\nu\acute{\eta}\rho$ ,  $\acute{\rho}\acute{\eta}\tau\omega\rho$ .
  - $\nu$  is retained; final  $\mu$  becomes  $\nu$ :  
 IE **in**                      -->    Greek  $\acute{\epsilon}\nu$   
 IE **sem** -->    Greek  $\acute{\epsilon}\nu$   
 IE **agrom**                      -->    Greek  $\acute{\alpha}\gamma\rho\nu$