Adjarian's Law, the Glottalic Theory, and the Position of Armenian*

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1. Introduction

The standard reconstruction of Proto–Indo–European (PIE) posits a voiceless stop series, a voiced stop series, and a breathy or 'voiced aspirate' stop series. These are shown in (1).

(1)							
	I	VOICELESS	p	t	kʲ	k	kʷ
	II	VOICED	b	d	gʲ	g	gʷ
	III	BREATHY	bʱ	dʱ	gʲʱ	gʱ	gʷʱ

In recent decades this reconstruction has been challenged by the 'glottalic theory', according to which the PIE series II stops were ejectives. In this theory, as seen in (2), the PIE series III stops can be reconstructed as voiced rather than breathy.

(2)	PIE STOPS	STANDARD	GLOTTALIC THEORY
	series I	voiceless	voiceless
	series II	voiced	ejective
	series III	breathy	voiced

The glottalic theory is due to Hopper (1973), Gamkrelidze & Ivanov (1973, 1995), and others; for the standard theory see e.g. Mayrhofer (1986).

One dialectological consequence of the glottalic theory is widely cited. In the standard theory, parallel consonant shifts are generally posited for two branches of Indo–European. Series I stops became aspirated voiceless stops in Germanic and Classical Armenian, series II stops became unaspirated voiceless stops, and series III stops became voiced stops.[1] This is shown in (3) for the coronals.

(3)		GERMANIC (GRIMM'S LAW)		CLASSICAL ARMENIAN	
		STANDARD	GLOTTALIC	STANDARD	GLOTTALIC
	I	*t > *tʰ > θ	*t > *tʰ > θ	*t > tʰ	*t > tʰ
	II	*d > t	*tˀ > t	*d > t	*tˀ > t
	III	*dʱ > d	(*d > d)	*dʱ > d	(*d > d)

Since Armenian and Germanic do not form a dialect group, it has been thought implausible that they had similar consonant shifts. The glottalic theory does not require this assumption. Instead, as also seen in (3), series III can be assumed to be continued unchanged by voiced stops in Armenian and Germanic, and for series II no devoicing need be assumed.

In short, the glottalic theory offers a new perspective on the Indo–European dialect map. According to Hopper (1973: 162), 'Germanic and Armenian are to be viewed as "relic areas" which were not affected by the general Indo–European trend to realize glottalic stops as fully voiced stops.' Gamkrelidze (1989: 117) writes in a similar vein that the PIE stop inventory 'proves to be closer to those of languages traditionally viewed as having undergone later consonant shifts.'

In this paper I will argue against the view that dialectological evidence supports the glottalic theory. Proto–Armenian and Proto–Germanic did not have similar obstruent systems, I will claim, since the Armenian consonant shift occurred only in some dialects but not in Proto–Armenian. By itself this claim is not new, but I will add a new argument based on a sound change found in some modern dialects. This change — 'Adjarian's Law' — can be understood only if the series III stops were still breathy in Proto–Armenian. The Armenian obstruent system is thus archaic, not innovatory, and Armenian is (with Indo–Iranian) one of two IE branches that preserve the PIE breathy stops as such.

2. Armenian Consonantism

The Classical Armenian inventory of consonants and glides is given in (4).

(4)							
	I	pʰ	tʰ	t͡sʰ	t͡ʃʰ	kʰ	
	II	p	t	t͡s	t͡ʃ	k	
				s	ʃ	x	h
	III	b	d	d͡z	d͡ʒ	g	
		v (?)		z	ʒ		
		m	n, l, ɹ, r		j	w, ɬ	

For expository convenience I will refer to stops and affricates together as 'stops'. The Armenian aspirated stops in series I are in general the reflexes of PIE series I stops, the unaspirated stops in series II reflect PIE series II stops, and the voiced stops in series III reflect PIE series III stops. These series III stops also reflect glide fortition in some cases, notably that of word–initial *g* < PIE **w*.[2]

The series III stops are usually interpreted as voiced for Classical Armenian and usually reconstructed as voiced for Proto–Armenian. According to a minority view, though, they were breathy in Proto–Armenian (Benveniste 1958, Vogt 1958, Gharibian 1969).[3] One argument for this view is based on the fact that the reflexes of the PIE series III stops (the counterparts of the Classical Armenian series III stops) are breathy in some modern dialects. Such dialects are of types 1–2 in the scheme in (5).

(5)		SEVEN ARMENIAN DIALECT TYPES						
PIE		1	2	3	4	5	6	7
*t	(series I)	tʰ	tʰ	tʰ	tʰ	tʰ	tʰ	tʰ
*d	(series II)	d	t	d	d	d	t	t
*dʱ	(series III)	dʱ	dʱ	d	t	tʰ	d	t

Shown here, with coronals representing other places of articulation, are the regular word–initial reflexes of PIE series I, II, and III stops in seven modern Armenian dialect types. Note that Classical Armenian, as in (3–4), was a type 6 dialect.

Representative word–initial data from Classical Armenian and three modern dialects of types 1–2 are cited in (6) from Allen (1950), Pisowicz (1976b), and

Vaux (1997, 1998). The type 1 dialect is that of Transylvania, and the type 2 dialects are those of Muš ('M') and New Julfa ('NJ').

(6)

	Classical	Type 1	Type 2		PIE ancestor
II	tun	dun	M tun	'house'	*d
	t͡sur		M t͡sur	'crooked'	*gj
	kov	gov	M kov	'cow'	*gʷ
III	ban	bʱan	M bʱan	'word'	*bʱ
	baɪd͡zɪ		NJ bʱaɪd͡zʱəɪ	'high'	*bʱ
	dnel	dʱənel		'to place'	*dʱ
	durn		M dʱur, NJ dʱurə	'door'	*dʱ
	d͡ʒɯ	d͡ʒʱɯ	M d͡ʒʱɯ	'water'	*j
	d͡zern	d͡zʱerkʰ		'hand'	*gjʱ
	gitenal	gʱidnal	M gʱinal	'to know'	*w

Note that breathy stops in the modern dialects correspond to Classical Armenian voiced stops (from PIE glides and series III stops).

Breathy stops in type 1–2 Armenian dialects are said to have longer–duration bursts, noisy [ʱ]–like releases, and lower F0 after release (Adjarian 1899, Allen 1950, Khachaturian 1992). These observations conform well to descriptions such as that of Ladefoged & Maddieson (1996: 58): 'breathy voiced stops in Hindi and many other Indic languages are acoustically distinguished from plain voiced stops by what happens after the release rather than by audible differences during the closure. A breathy voiced stop followed by a vowel shows an acoustically noisy but periodic interval as the glottal gesture overlaps the articulation of the vowel.' The Armenian stops in question, despite some doubts expressed in the literature, clearly fall under the 'breathy' (or 'murmured') rubric in the typology of speech sounds.

An argument from economy motivates the view that Proto–Armenian series III stops were breathy and that breathiness in type 1–2 dialects is a phonetic archaism. That is, it has seemed needlessly complex and phonetically implausible to assume a change by which series III stops, having been voiced in Proto–Armenian, became breathy (once again) in the relevant modern dialects.

Defenders of a Proto–Armenian consonant shift have raised several objections to this interpretation of modern type 1–2 dialects. One is based on glide fortition. A well–known Armenian innovation is the change of PIE *w (in onset position) to the series III velar stop. A *w* > *g* fortition is certainly natural, but a number of authors have observed that the change must instead have been **w* > *gʱ* if the series III stops were breathy in Proto–Armenian (Pisowicz 1976a: 24, Vaux 1998: 239). This has seemed less plausible. But as noted by Mark Hale (Garrett 1991: 798), a PIE **w* > Proto–Armenian *gʱ* change is the voiced version of a generally accepted

(PIE **sw* >) **hw* > Proto–Armenian *kʰ* change. The approximants became fricatives **ɣʷ* and **xʷ*, I suggest, and the fricative noise was reinterpreted as (voiced) breath or (voiceless) aspiration. Note that the assumption of a **w* > *gʱ* change generalizes and therefore SIMPLIFIES the **hw* > *kʰ* change, whereas the traditionally assumed **w* > *g* change is otherwise unnecessary and therefore actually COMPLICATES the historical phonology.

Dialectology suggests another objection to the view that Proto–Armenian series III stops were breathy.[4] The type 1–2 dialects where these are now breathy, as Kortlandt (1978, 1985) and Vaux (1998) note, mostly occupy a contiguous area in the center of the Armenian linguistic area, but type 6 dialects include 'Classical Armenian and isolated areas throughout the Armenian dialect continuum, a tell–tale sign of archaism' (Vaux 1998: 238–39). I will return to this challenge in §6 after first assessing the evidence of a phonological process found in a number of modern dialects.

3. What Adjarian's Law Does

Adjarian's Law is a sound change or a set of changes whereby, in some Modern Armenian dialects, initial–syllable vowels are fronted after certain consonants. The details vary from dialect to dialect, but the low vowel is always affected (/a/ > /æ/) and the change is always triggered by series III stops.[5] Adjarian's Law has recently been discussed by Muradyan (1986) and Vaux (1992, 1996, 1998). Vaux suggests a two–step analysis which is quite persuasive for the non–low vowels: vowels became [+ATR] in the relevant contexts, and [+ATR] back vowels were then fronted. This second step has analogues elsewhere and is phonetically plausible because 'tongue root advancement often entails fronting and raising of the tongue body' (Vaux 1992: 282; cf. Ladefoged & Maddieson 1996: 300–306). Direct evidence for the first step is seen in modern dialects like that of Malatya. The series I and III stops have merged (as voiceless aspirates) in this type 5 dialect, but after series I stops vowels are described as more 'open' than after series III stops (Danielyan 1967: 47). Vaux (1998: 10) interprets this as an [ATR] difference.[6]

A few examples illustrating the application and non–application of Adjarian's Law are given in (7–8), from the type 6 dialect of Kar-evan (Muradyan 1960) and a type 7 Karabagh dialect (Davthyan 1966). More examples could easily be added to these lists (especially if early borrowings were included).

(7) NON–APPLICATION OF ADJARIAN'S LAW

PIE	Classical	Kar-evan	Karabagh	
*d	tun	ton	ton	'house'
*gj	t͡sunɪ	tʏ́sondɯ	t͡sondəɪ	'knee'
	t͡sur	t͡sor	t͡sor	'crooked'
*gʷ	kov	kav	kov, kav	'cow'

(8) EXAMPLES OF ADJARIAN'S LAW

PIE	Classical	Kar-evan	Karabagh	
*bʱ	ban	ben	pen	'speech'
	baɪd̪zɪ	bədzyɪ	pet̪səɪ	'high'
*dʱ	dalaɪ		telaɪ	'green'
*j	d̪ʒuɪ	dʒyɪ	tʃyɪ	'water'
*w	garn	gʲərnɪ	gʲærnɪ	'lamb'
	gaɪun	gʲəɪunkʰ	gʲæɪunkʰ	'spring'
	go²	gʲəx	kʲəx	'thief'

Note that Adjarian's Law vowel effects are conditioned by the original rather than the synchronic prevocalic consonant; the contrast between series II and III stops is neutralized in type 7 dialects.

4. What Adjarian's Law Reveals

What phonetic factors could be responsible for Adjarian's Law? Consonants often affect vowels: coronals may cause vowel fronting, for instance, or a voicing contrast may be reinterpreted as a tone contrast. The vowel effects in data like (7), however, conform to neither pattern. These effects (or the [ATR] antecedents Vaux reconstructs) must have some basically coarticulatory cause. In this section I will consider two analyses of this sort.

Vaux himself proposes that Adjarian's Law is 'a case of voiced consonants spreading some feature to following vowels' (1992: 274), the relevant feature being [ATR]. In Adjarian's Law dialects, that is, voiced stops have triggered tongue root advancement. Vaux (1996: 178–79) offers the following explanation: 'Phoneticians have long known that advancement of the tongue root is necessary to produce voicing in stop consonants ... By assuming that this ... is reflected in the phonology as a [+ATR] specification, we directly account for all of the processes discussed ....'

There are two strong arguments against this view that voicing was the cause of Adjarian's Law. The first is typological. Distinctive voicing is extremely common, but changes where voicing triggers (or is reinterpreted as) [ATR] or vowel fronting are essentially unknown. Several possible examples are adduced by Vaux, but none is convincing.[7] If this were in fact a possible kind of sound change, a respectable number of unambiguous cases should exist.

The second argument is phonetic. It is not true that phonologically voiced stops require tongue root advancement. Ladefoged & Maddieson (1996: 50–51) comment as follows:

> [M]aneuvers that can be made to assist the continuation of vocal fold vibration during an oral stop closure ... include a relaxation of the cheeks and other soft tissues around the oropharyngeal cavity so that the pressure will passively expand the volume, as well as active gestures, such as moving the articulatory constriction forwards during the closure, moving the root of the tongue forwards, lowering the jaw, or lowering the larynx ... Some English speakers utilize such gestures to a sufficient degree to produce vocal fold vibration during their voiced stop closures ... but similar gestures are often executed by speakers producing intervocalic phonologically voiced stops without sustained vocal fold vibration ... The target for voiced stops in English can ... be said to include the maintenance of a position of the vocal folds appropriate for voicing, but not to require the employment of other strategies to sustain vocal fold vibration.

Contrary to Vaux's claim, that is, not all languages maintain voicing during the closure of a 'voiced' stop (other cues may suffice), and not all languages which do maintain voicing use tongue root advancement. Without secure parallels or a clear phonetic basis, we must abandon the hypothesis that voicing triggered Adjarian's Law.

An alternative hypothesis is justified both phonetically and typologically. This is the hypothesis that breathiness caused Adjarian's Law: at the time of the change, the trigger consonants were breathy. I suggest the changes informally stated in (9).

(9) CHANGE #1A: a > æ / # breathy C ___
CHANGE #1B: V > [+ATR] / # breathy C ___
CHANGE #2: [+ATR] > [–back]

Change #2 is due to Vaux, of course; only the two parts of change #1 are new. A more accurate statement might simply refer to allophonically breathy vowels.

Change #1 in (9) is subdivided because the /a/ > /æ/ change is not only the core case of Adjarian's Law but one where English evidence may be relevant. In a classic investigation of English glides, Lehiste (1964: 148) reported the data in (10).

(10)

	AVERAGE F2 (IN HZ)			AVERAGE F2 (IN HZ)	
VOWEL	GENERAL	AFTER /h/	VOWEL	GENERAL	AFTER /h/
[i]	2200	2240 (+ 40)	[u]	895	820 (– 75)
[ɪ]	1750	1860(+ 110)	[ʊ]	980	990 (+ 10)
[eɪ]	2015	2135(+ 120)	[oʊ]	960	705 (– 255)
[ɛ]	1610	1760(+ 150)	[ɔ]	880	845 (– 35)
[æ]	1570	1630 (+ 60)	[ɑ]	1110	1155 (+ 45)

Shown here is the acoustic effect of /h/ on a following vowel — in particular on F2 (i.e. fronting in acoustic space; note that English /h/ is often realized phonetically as [ɦ]). A notable effect is seen here with the front vowels and the low back vowel /ɑ/. The same effect may lie at the root of the Adjarian's Law /a/ > /æ/ change.

Change #1b in (9), whereby contextually breathy vowels became [+ATR], may well have a phonetic explanation along the lines proposed by Vaux in his attempt to connect voicing and tongue root advancement. Voicing need not be maintained during a stop closure, but breathiness must be produced in the release

of a breathy stop. The vocal folds are farther apart during such a release than during that of a modally voiced stop, and so, to ensure enough airflow to maintain breathiness, the transglottal pressure drop must be higher. This goal can be assisted by tongue root advancement (and by some of the other articulatory gestures cited above).

From the typological point of view, interactions between breathiness and [ATR] are not at all unusual. For example, [+ATR] vowels are often perceived as breathy. Ladefoged & Maddieson (1996: 300) report that Akan [+ATR] and [–ATR] vowels differ 'not simply in the tongue root gesture, but in the enlargement of the whole pharyngeal cavity, partly by the movement of the tongue root, but also by the lowering of the larynx' in the [+ATR] vowels, which 'sometimes results in these vowels having a slightly breathy quality.' A related effect has been phonologized in a Utah English dialect, where the 'tense' vs. 'lax' vowel contrast has been replaced by a breathiness contrast in certain contexts (Di Paolo & Faber 1990, Faber 1992).

Comparable effects are also seen in the other (breathiness > [+ATR]) direction. Javanese slack voice (i.e. semi–breathy) stops, according to Ladefoged & Maddieson (1996: 64), 'exhibit a lowered F1, indicating that larynx lowering occurs. In vowels following these stops, there is a lower F0, and a reduction of energy in the upper frequency range of the spectrum, a notable acoustic property of vowels with slack or breathy voice ....' The lowered–F1 effect here described is the acoustic basis for the breathiness > [+ATR] change proposed in (9) above.

The clearest Adjarian's Law trigger other than a stop suggests another argument that breathiness rather than voice was the phonetic cause of the change. As shown by Weitenberg (1986), Adjarian's Law also affected the sequence /ja/ > /ɦa/, which has become /ɦæ/ (or the like) in the relevant modern dialects. Some examples are given in (11).

(11)	Classical Armenian	Muš (type 2)	Šatakh (type 7)	Meghri (type 6)	Cilician and Syrian (type 4)	
	jaɬtʰel	ɦaxtel	ɦæxtʰel	éxtʰil		'conquer'
	jaradʒ	ɦaredʒ	ɦærætʃ	éredʒ		'before'
	jaɹd	(ɦeɹd)	ɦæɹtʰ		Sv ɨɹtʰ	'straw'
	jaɹak				MA heɹag	'lasting'
	jam				MA hem	'delay'
	jamel				Sv imil	'to delay'

The Muš, Šatakh, and Meghri data are cited from Weitenberg (1986); the Cilician and Syrian data are from the dialect of Svedia (Andreasyan 1967) and from Middle Armenian (Karst 1901); the Muš dialect has not undergone Adjarian's Law and is cited for comparison only. Note that *ɦ* has been lost in Meghri and Svedia and had merged with *h* in Middle Armenian.

A /ɦa/ > /ɦæ/ change is of course hard to explain if Adjarian's Law was caused by the aerodynamic requirements of voiced stops. But if breathiness was

the cause, it is undeniably natural for a segment that is essentially nothing but breathiness to trigger the change. For this reason, and for the reasons stated above and below, I conclude that Adjarian's Law was originally triggered by breathy (not by modally voiced) obstruents.

5. The Dialectology of Breathiness

The analysis of Adjarian's Law proposed above is supported by its dialectological distribution. The change is attested in type 6–7 dialects, in type 4 dialects as cited in (11), and (as an [ATR] alternation only) in the type 5 Malatya dialect. Crucially, it is not found in dialects where the series III stops are breathy. Muradyan (1986: 29) argues that breathy stops cannot have triggered Adjarian's Law, 'since in those dialects where such sounds exist or existed, no palatalization of *a* is registered.' But the absence of Adjarian's Law in dialects with breathy series III stops is entirely consistent with my analysis. A well–known property of assimilatory sound changes (like umlaut) is that they often occur together with the loss or neutralization of their conditioning environment. Ohala (1993: 255) explains that 'failure to detect [this] environment is a direct cause of the listener failing to implement correction of a contextually caused perturbation.' If a reinterpretation of breathiness caused Adjarian's Law, we therefore expect the change to be phonologized only where this phonetic feature has been lost.

A related dialectological consideration argues against Vaux's interpretation of Adjarian's Law. If the vowel change were an effect of stop voicing, any voiced stop should be a potential trigger. In fact, only series III stops trigger Adjarian's Law, never series II stops — even in dialects where these are voiced. Thus, in the Cilician Middle Armenian dialect cited in (11), Adjarian's Law was triggered by *ɦ* (which evidently later merged with *h*) but not by any stop. Series II stops were voiced in this type 4 dialect, and series III stops were voiceless, but neither caused any vowel fronting. This can be explained if stop breathiness (but not *ɦ*) was lost in Cilicia before Adjarian's Law arose. In Malatya, the series I and III stops have merged and vowels after the latter are evidently [+ATR]. The series II stops are voiced in this type 5 dialect, but it is the series III stops (voiceless aspirates, synchronically) that have triggered the first step in Adjarian's Law. Such facts are merely coincidental if Adjarian's Law was caused by stop voicing, but if breathiness was the crucial factor they have a principled explanation.

6. Conclusion

I have argued in §§4–5 that Adjarian's Law vowel fronting is caused by breathiness, not voicing. This in turn has significant implications for the reconstruction of the Proto–Armenian obstruent system. In dialects where stops trigger Adjarian's Law, these stops must have been breathy when the change originated. The proposed interpretation of Adjarian's Law thus opens a phonetic window on earlier stages of certain Armenian dialects. Through this window we

see breathy series III stops not only in type 1–2 dialects (today) but also (formerly) in dialects where the series III stops have triggered Adjarian's Law. Among these are precisely the dialects of type 6 whose geographical noncontiguity suggested archaism to Kortlandt and Vaux (cited in §2). In these dialects, the presence of Adjarian's Law proves that series III stops were formerly breathy and have only relatively recently become plain voiced stops.

An Armenian dialect map will make these points somewhat clearer. The rough partial map given below is based on the map in Gharibian (1969). Shown here are the central and eastern parts of the Armenian linguistic area. The areas of the map occupied by dialects of types 1–2 are shown; such dialects are also documented in New Julfa (in Iran) and in Transylvania and Ukraine.[8] Also labelled below are the continuous area where type 7 dialects are found and the discontinuous areas of type 6. Adjarian's Law is found throughout the type 7 area and in two of the type 6 areas: those labelled '6a' (Agulis, Kar-evan, Meghri, etc.) and '6b' (Areš).[9]

On the proposed analysis of Adjarian's Law, the type 7 dialect area and the '6a' and '6b' areas (as well as Malatya at least) can all be added to the type 1–2 areas as territory where breathy series III stops are securely documented or inferrable. This result strengthens the view that the series III stops were breathy in Proto–Armenian — a significant archaism from the PIE perspective — and that Proto–Armenian had no Germanic–style consonant shift. Insofar as it invokes this alleged parallelism between Armenian and Germanic, the glottalic theory of PIE consonantism hence loses a potential dialectological prop.

Notes

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[1] Strictly speaking, glottalic–theory advocates may assume that the putative PIE ejectives remained intact in Armenian, since their reflexes are ejectives in some modern dialects. I ignore these modern ejectives here: they can be viewed either (in the glottalic theory) as archaisms retained under the influence of neighboring non–IE languages with ejectives or (in the standard theory) as innovations due to the same influence. See also Pisowicz 1988.

[2] Word–initial voiced fricatives do not occur in native vocabulary. (For overviews of the historical phonology see Meillet 1936 and Schmidt 1981.)

[3] Whether this was also true of Classical Armenian is a distinct question; the literary language 'Classical Armenian' may well not have had a single uniform pronunciation. I ignore as implausible and unnecessary the compromise analysis of Pisowicz (1976a, 1997), who contends that a consonant shift did occur in Proto–Armenian and that after the Classical Armenian period the series III voiced obstruents became breathy in the ancestor(s) of all modern dialects.

[4] A third objection is based on loanwords: in early borrowings from Greek and Iranian, voiced stops are systematically borrowed as Armenian series III stops, not series II stops (Pisowicz 1976a: 21–24). But the Greek voiced 'stops' were probably fricatives at the time of lingustic contact with Armenian, and it may make sense for (noisy) fricatives to be borrowed as breathy stops. Moreover, it may be unnecessary to assume that the relevant Armenian dialect differences postdate Greek and Iranian borrowing; breathiness might have been lost relatively early in some dialects through which loans entered the language (though not in Adjarian's Law dialects, for reasons discussed below).

[5] Other consonantal triggers have been proposed. The best established of these is *fi*, discussed in §4 below, but *l* and the voiced fricatives have also been suggested (e.g. by Vaux 1992, but without detailed exemplification; as he notes, his analysis of Adjarian's Law fails to account for these triggers satisfactorily).

[6] It should be noted for the record, in connection with the (sometimes overused) term 'ATR', that there is no direct phonetic evidence of tongue root advancement (or retraction) as an articulatory correlate of the Armenian phonological categories under discussion.

[7] See Vaux (1992, 1996, 1998: 177–78). These putative examples are of three main types. First, in Babine, what Vaux treats as a 'voicing' contrast is a contrast between aspirated and unaspirated voiceless obstruents, written as in standard Athapaskanist practice with purely orthographic voicing. Second, in Buchan Scots English, the relation between voicing and vowel height is not of the alleged type: voiced obstruents block a vowel height harmony process that extends from stressed vowels to following unstressed vowels, but otherwise voicing has no vowel height or [ATR] effects. (I take the difference between triggering and blocking a process to be significant.) Third, in some mainland and insular Southeast Asian languages, consonant voicing does seem to be associated with vowel tongue root advancement, but there is also synchronic or comparative evidence for breathiness in these cases; breathiness is discussed below.

[8] According to Pisowicz (1976a: 47–51), the New Julfa dialect reflects a seventeeth–century (forced) settlement from Julfa, which is in the type 2 territory on the map above, and the Transylvanian and Ukrainian dialects both reflect settlement from the Crimea. Outside the map, therefore, there is only one dialectologically archaic area where the series III stops are documented as breathy.

[9] Because Lusenc (1982) is unavailable to me, I am not certain that Areš has an Adjarian's Law dialect. It probably does, and I include it here, because it is geographically surrounded by Adjarian's Law dialects and because the data cited by Vaux (1998: 182) are consistent with this interpretation. Also labelled on the map are the type 6 dialects of Tiflis ('6c'), Artvin ('6d'), and

Amasia ('6e'). As applied to these dialects, the inference of archaism from geographical discontinuity is less appealing than usual: according to Pisowicz (1976b: 200–202), the Tiflis and Artvin dialects are transitional or intermediate between types 2 and 6 (which in principle differ only in their breathy vs. plain voiced realizations of series III stops). Enough local and lexical variation is described to force the inference of separate developments (i.e. breathy > plain voiced shifts) in any case.

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ERRATA (Garrett, 'Adjarian's Law', BLS 24S)

Please note the following typographical errors (results of editorial font conversion):

Passim, [ɦ] should be lowered and full-size (i.e. [ɦ]) except when used to denote stop breathiness.

Passim, 'Kar-evan' should be 'Karčevan'.

On p. 15, example (7), the form 'týsonduɹ' should be 'ʦonduɹ' ('knee' in the Karčevan dialect).

On p. 16, example (8), the form 'go^{2}' should be 'goł' ('thief' in Classical Armenian).

The following bibliography entries should be corrected to read as printed here:

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