Hauchumsprung and the historical phonology of Greek *h

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Abstract

Ancient Greek underwent a sporadic sound change that copied an *h from the second syllable of a word to the first syllable, applying when the first syllable was vowel-initial, and perhaps also when it was stop-initial; this complements the analyses proposed so far in Greek historical phonology, particularly Sturm (2016, 2017), in accounting for the various sources of Proto-Greek *h. This change, Hauchumsprung, is unusual among recorded sound changes for involving the copying of a consonant over intervening material. Hauchumsprung, the φρουρά rule, and Grassmann’s Law can be unified as three different footprints of a single sound change: one that copied aspiration from the middle of a word to the beginning of a word in early Greek.

Keywords

Greek – aspiration – Grassmann – Hauchumsprung – historical – phonology

Higgins: “In Hertford, Hereford, and Hampshire, hurricanes hardly ever happen.”
Eliza: “In ‘Ertford, ‘Ereford and ‘Ampshire, ‘urricanes ’ardly hever ‘appen.”
Higgins: “Oh, no, no! Have you no ear at all?”

My Fair Lady
This paper is about the ancient Greek sound change informally called *Hauchumsprung* (Lejeune 1972):

If a word began with a vowel or *w* and exhibited an *h* between the first and second syllabic s, either intervocalic or as part of a cluster including a sonorant, the *h* was copied into the onset of the initial syllable.

Ringe, forthc.

As we'll see, a survey of the Greek lexicon shows that something like *Hauchumsprung* (or *H-sprung* for short) is active in at least Attic Greek, and sometimes other dialects—but the change seems to be sporadic and rare. Section 1 summarizes what’s already known about the origins of *h* in other environments in Greek; section 2 presents some positive examples of *H-sprung*, along with a connected change that I call the *φρουρά* rule; and section 3 presents the exceptions to *H-sprung*. Section 4 proposes that *H-sprung* and the *φρουρά* rule, along with a hypothesized precursor to Grassmann’s Law, are part of a more general sound change—‘Urhauchumsprung’—copying aspiration from the middle of a word to the beginning.

1 Ancient Greek *h*

The historical phonology of *h* in Greek is mostly well-understood. There are four regular sources of early Greek *h*:

1. *s* in most positions
2. *Hf* word-initially
3. insertion before word-initial *u*
4. *u̯* word-initially, under particular conditions

Like Iranian and Armenian, Greek has debuccalization of PIE *s* to *h* in most positions. Word-initially, *s > h* is conventionally spelt in the ancient Greek alphabet using the ‘rough breathing’ sign ’ over a following vowel, as in *sept̚m ’seven’ > ἕπτα; the ‘smooth breathing’ ’ spells a word-initial vowel without an *h* before it. In psilotic dialects of Greek (from ψιλός ‘smooth’), we see a regular loss of initial *h*. Intervocally, *h* disappears in all dialects except Mycenaean, the earliest attested Greek: *ǵénh, esos ’race (gen.sg.)’ > *genehos > γένεως.

Next to stops and word-finally, *s* stays as a sibilant: *hrost ’he/she/it is’ > ἔστι, *ulkwos ’wolf’ > λύκος. Most other positions are covered by the case where *s* is next to a resonant, either initially or medially, in which case it becomes *h*. Initially, *hR > *R > R*, with mostly the same outcome as an initial resonant. Medially, *hR* and *Rh* have a complicated range of outcomes; the most
common in Attic-Ionic and in the West Greek dialects is a singleton *R with compensatory lengthening of the preceding vowel, and in Thessalian and Lesbian, a geminate RR with no lengthening of the vowel.

The second source of *h is word-initial *H, where *H is any of the three PIE laryngeals: *Híekʷr ‘liver’ > ἵππος. A third source is word-initial *u, as in ὕδας ‘sea serpent’ < *uđréh₂: so words in non-psilotic dialects aren’t allowed to begin with **u-. Sturm (2017) argues that words with inherited initial h (from other sources) before u came to be more common than words beginning with plain u, so speakers analogized h to all originally u-initial words.

The final source is word-initial *u, under a set of conditions that Sturm (2016) analyses as the presence of a following turbulent segment. In ἵστωρ ‘one who knows’ < *uístōr < *uистем, we see h (giving this rule its traditional name of the ‘ἵστωρ rule’); but ἔτος ‘year’ < *uétos is vowel-initial. Accepting Sturm’s rule means we don’t need Ringe’s addendum about H-sprung also affecting initial *u: we can treat any *u-initial words giving us later h as instances of the ἵστωρ rule, not H-sprung.

2 H-sprung

2.1 Examples of H-sprung

– εὔω ‘singe’ < *h₁eus-. Comparing Sanskrit oṣati and Latin ūrō gives us *h₁eus-e-/o-, which in Greek gives *h₁eus-e/o- > *ewhō > *hewhō > εὔω. The copying of the *h from the onset of the second syllable to the beginning of the word is an example of H-sprung.

– ἤως ‘dawn’ < *h₂eus-ōs. This root also appears in Latin aurōra and Sanskrit uṣās- (in the zero-grade). We apparently have *h₂eus-ōs > *awhōs > *hawhōs > *hāwōs > *hāōs > ἤως in Attic specifically, with H-sprung giving an initial h. Ionic has ἤως without the Attic shortening of *e before another vowel, and Argolic has epigraphic ἢτ’ ἢτω preserving the original *w; based at least on the Attic form, we have an initial h and no H-sprung. The isolated derivative ἦρι ‘early’ < *āri < *awheri < *h₂eus-er-i also doesn’t show H-sprung.

– ἧμαι ‘sit’ < *h₁eh₁s-. From *h₁eh₁s- attached to a 1sg. *-maí, we apparently have *ēsmai > *eímai > *héhmai > Homeric ἦμαι, with the initial h by H-sprung seen in derivatives like ἐφημαι, ἐφημαι, καθῆμαι. We see h throughout the paradigm, including in 3sg. ἦσται with no historical *h cluster, so Ringe (forthc.) proposes analogy with the H-sprung forms.

– ἦμεῖς ‘we’ < *ns-me. From PIE *ns-me, seen in Avestan ahma and Sanskrit asmān, we have Attic ἦμεῖς, Doric ἄμες, and Aeolic ἄμμες. The long vowels in
Attic and Doric, and the geminate in Aeolic, are outcomes of the *hm cluster; the h in Attic and Doric must be from H-sprung. Sihler (1995) proposes analogy with ὑμεῖς ‘you (pl.)’, which gets its h regularly before initial *u-.

- ἱναι ‘reins’ < *h2.ens-. Beekes and van Beek (‘BvB’; 2010) compare Latin ānsa ‘handle’ and Irish ēsi (pl.) ‘reins’ to reconstruct *h2.ens-, which has to give us Greek *h2.ens-iai > *ansiai > *anhaiia > *hainiaia > ἱναια. Unexpectedly, the root appears without aspiration in Laconian ἄνιχσιθν (Colvin 2006).

- ὁμός ‘way, course’ < *h1.oj-s-mo-. Alongside vowel-initial ὁμός, we have a form ὁμος with initial h, as well as a compound φροίμιον (see below) showing aspiration; the root is *h1.oj- ‘go’ in the o-grade.

Following Ruijgh (1967: 61), Ringe (forthc.) suggests that H-sprung could also be used to explain ἀρμα ‘chariot’ < *h2.erm̥, from a root *h2.er- ‘fit’ also seen in ἀράμα. Brugmann (1907) explains ὅνος ‘ass’ as cognate with Latin asinus, supposedly both borrowings from the same language, through an earlier *osonos > *hoonos > ὢ ὅνος ‘the ass’; but this is very speculative.

Finally, as a productive grammatical residue of H-sprung, the language regularly adds h to the beginning of augmented forms of h-initial verbs (Lejeune 1972). From ἐπομαι ‘follow’, we have an imperfect εἱπόμην < *he-ep- < *e-hep-, with transfer of *h to the augment by H-sprung.

2.2 The φροιμά rule

There are a few attested forms (Sihler 1995:173,) that apparently show a medial *h aspirating an initial stop, all from compounds of προ-: φροιμά ‘watch’ < *pro-horā, φρούδας ‘having gone’ < *pro-hodos, φροίμιον ‘prelude’ < *pro-hoimion. Sihler proposes that προ- ~ προ- is a new alternation in some idiolects by analogy with lautgesetzlich alternations like ἐπ- ~ ἐφ-; but this would require a strange analysis by the learner in which ἐπ- and ἐφ- are separate allomorphs conditioned by the phonology of the root, rather than straightforward outcomes of a regular process turning /p+h/ into /pʰ/.

Instead, we could notice that the φροιμά rule has the same effect as H-sprung, except in a complementary set of environments. We could collapse the two by widening the definition of H-sprung to include voiceless stops as targets—simplifying the statement of the change, meaning *h now aspirates everything that can be aspirated.

The form φροίμιον is interesting and potentially awkward, because if the φροιμά rule really is the same as H-sprung, we would need it to have applied twice in the history of the same form: *h1.oi̯smion > *oi̯mion > *hoimion by H-sprung, then *pro-oi̯mion > φροίμιον, also by H-sprung. But we can give ourselves a possible solution in terms of relative chronology. If pro- was affixed to a form *oi̯mion, and then vowel contraction happened before H-sprung, we would get *prooi̯mion > φροίμιον with only one round of H-sprung. This means
φροίμιν and οἷμος got their aspiration in parallel, by both being input to H-sprung, not because the former is derived from the latter.

There are a few more words with no evidence of aspiration, even though they contain an initial voiceless stop followed by *h in the next syllable: πέος ‘penis’ < *pes-os; κεάζω ‘split’ < *kes-; κρήνη ‘well’ < *kresn-; τρέω ‘flee’ < *tres-. As Jay Jasanoff (p.c.) points out, we can take this as evidence that the φρουρᾱ́ rule applied after the loss of intervocalic *h. This means the three φρουρᾱ́ forms are all later formations, which fits with their productive status as compounds; so the *h in *pro-horā etc. must have survived thanks to being in initial position.

3 Exceptions to H-sprung

- ἀφχω ‘begin’. There are a few potential etymologies of this verb: Klingen- schmitt (1974) proposes *h2r̥ske/o- from some root *h2er-, while LIV2 proposes *(h2)r̥gh-ske/o- from a root *h2ergh-, also found in modern German ragen ‘rise’. In most *CsC sequences in Greek (including this one), *s was lost, so this word might not be expected to show H-sprung anyway.

- αὔριον ‘tomorrow’ < *h2eus-r- ‘dawn’. BvB (2010) compare Lithuanian aušrà ‘dawn’ and Sanskrit usrā́ ‘morning’, both derivatives of *h2eus- ‘dawn’. Unlike in ἕως, from the same root, we don't see H-sprung: *h2eus-r- > *ausrion > αὔριον (**)αύριον).

- εἰμί ‘be’ < *h1es-. None of the forms of the copula have a initial h in any Greek dialect; Attic has εἰμι, εἶ, ἐστι, ἐσμέν, ἐστέ, εἰσι in the present tense, for example. In εἰμι < *ehmi, εἶ < *ehi, and εἰσι < *ehenti, we’d expect H-sprung to apply. Ringe (forthc.) suggests levelling from vowel-initial ἐστι and ἐστέ, which keep *s before a stop, as has already happened in ἐσμέν (expected **εἰμέν); but speakers would have to level the lack of *h without levelling the full stem, or else we’d see **ἐσμί, **ἐςί, etc. Jeremy Rau (p.c.) points out that the copula was enclitic on the previous word, in which case the beginning of the root might not count as ‘word-initial’ for the purposes of H-sprung.

- ἔφις ‘good’, ἕφι ‘well’. Comparing Sanskrit su- and Hittite aššu- gives *h1su- ‘good’ (BvB 2010), which should give **ἑφι- under H-sprung. The use of this root as an adjective only appears in epic, but we do see εὑ- as the first part of a compound in Attic.

- ὀρρός ‘rump’, οὐρά ‘tail’. BvB (2010) compare a cognate set including modern English arse and Old Irish err ‘tail’ to reconstruct a root *h1ers-h2-. In the o-grade, this gives us a doublet *h1ors-h2 > *orsa > i) οὐρά, with ⟨ου⟩ spelling the output of compensatory lengthening, and 2) ὀρρός, with assimilation *rs > ρρ. We don’t see **ὀρρος or **οὐρά by H-sprung.
− ὁὖς ‘ear’, oblique stem ὤτ-. The PIE paradigm of this word has nominative and accusative *h₂ṓus, genitive *h₂éuos. The oblique cases should show H-sprung from an innovated *h₂ou̯s-nt- > *ousat > *ouhat- > ὤτ- (BvB 2010). Ringe (forthc.) suggests that the lack of initial h is by analogy with ὕψ ‘eye’, which could also be the source of the o-grade vowel in the oblique cases; another possibility, pointed out by an anonymous reviewer, is levelling from nominative-accusative *h₂ṓus.

− ὀμός ‘shoulder’ < *h₃ems-o-. From cognates including Sanskrit āṃsa- and Latin umerus, we can reconstruct *h₃ems-o-; the long vowel in Greek could be an inherited lengthened-grade or an irregular outcome of the first compensatory lengthening, but we don’t have an aspirated **ὀμός.

− ὄνος ‘price’ < *uos-no-. The root *uos- is still preserved in Hittite yāši-i ‘buy’, and the *no- derivative appears in Sanskrit vasná- ‘price’ and Latin vēnum ‘object for sale’; Greek shows ὄνος rather than **ὀνος. Along with ὀμός, this form is independently odd for having the wrong outcome of the first compensatory lengthening.

Ringe’s condition that H-sprung is blocked by an o vowel is based on ὀφρά, ὀφανός, ὀφρέω, ὀς, ὀμός, and ὄνος, but this doesn’t account for αὔριον, εὖ-, and perhaps ἄρχω and εἰμί (if these are real counterexamples). Based on these etymologies, it seems that H-sprung wasn’t a regular sound change in Greek.

### 4 Discussion

Except for ἥμεῖς, none of the apparent positive examples of H-sprung seem explainable either by analogy with other forms or by re-evaluating the relevant etymologies; there are no forms of these paradigms that regularly show initial h, and the cognates from elsewhere in IE are clear enough that the words couldn’t have begun with *Hᵲ or *ṻ. If this is right, then although H-sprung wasn’t a regular sound change, we have to accept it at least as a sporadic change to this set of words.

As far as I know, H-sprung is unusual and possibly unique among recorded sound changes for copying a consonant over intervening material. There are attested sound changes that copy vowels over intervening consonants, as in the change in Hoocąk (Siouan) that breaks up consonant clusters by inserting a copy of the following vowel (Rankin et al. 2006), or perhaps Avestan i-epenthesis (Martínez and de Vaan 2014). There are attested sound changes that move consonants over intervening syllables, as in the long-distance displacement of liquids in the Occitan dialect of Bagnères-de-Luchon (Grammont 1905). And there are synchronic rules that can copy a consonant over inter-
vening vowels, as in the morphological reduplication processes well known from Indo-European, or the Amharic-based secret language used by sex workers in Addis Ababa that doubles all word-final consonants across an epenthetic schwa (McCarthy 1984). But none of these are quite parallel to *H-sprung*: a sound change (not a synchronic rule) that copies (not moves) consonants (not vowels).

The closest process I know of is the quite rare copying of /r/ across syllables in some varieties of American English (Hall et al. 2017), as in *farmiliar* for *familiar*, or *phortographer* for *photographer*. If *H-sprung* really is a sporadic sound change, this sporadic AmE *r*-copying would be a good parallel.

### 4.1 Motor planning?

One intuitively possible explanation for *H-sprung* is in terms of motor planning. Rather than just surface assimilation caused by anticipating the spread glottis gesture one syllable too early, *H-sprung* could have originated as a speech error. In the UCLA database of speech errors described in Fromkin (1971), there are a few sporadic mispronunciations that have a similar structure to *H-sprung*:

- *John dropped his cup of coffee* → *... cuff of coffee*
- *also share* → *alsho share*
- *week long race* → *reek long race*
- etc.

This is superficially similar to phonetic anticipation, but as Fromkin argues, these errors seem to operate on phonological symbols rather than gestures: they happen at a relatively early level of production, sometimes even before the phonological rules of the language have applied.

Garrett and Johnson (2013) propose that a small number of sound changes might start off as motor planning errors of the Fromkin type: specifically, i) consonant harmony systems and ii) long-distance displacement of the type seen in Bagnères-de-Luchon. Hansson (2010) argues for a general analysis of consonant harmony systems as conventionalized speech errors: like speech errors, they tend to involve segments that are already phonetically similar, and the fact that consonant harmony tends to apply right-to-left parallels the tendency of speech errors to be anticipatory more often than perseverative.

In the absence of any more details, an account based on speech errors seems not to explain the facts of the change. For one thing, speech errors are not that common: Fromkin herself only recorded 600 errors in the database, out of three years of listening for errors in casual speech. With such a low background rate of speech errors, the chances of enough errors accumulating around one lexical item—especially as common a word as a basic pronoun like ἡμεῖς—
are intuitively very low. We’d also lose any explanation for the (albeit imperfect) conditioning of the change: there would be no particular reason why all the attested examples in Greek involve H-sprung, and not, say, T-sprung or M-sprung. In general, an account of sound change based on a purely phonological speech errors severs any explanatory link with phonetics.

4.2 Pre-Grassmann’s Law

Instead of motor planning, we should have an account of H-sprung grounded in phonetics. An interesting possibility would be to connect H-sprung to another sound change involving spreading of aspiration over a distance: Grassmann’s Law. In both Greek and Sanskrit, an aspirated stop (or h) followed by another aspirate deaspirated (or deleted, respectively), leaving fragmented alternations in inflectional paradigms: φύω ‘I grow’, πέφυκα ‘I have grown’.

The modern analysis of dissipimulatory sound changes, following Ohala (1981), is that they involve listener hypercorrection for assimilatory coarticulation. Aspirated or breathy-voiced segments have high energy in F0 and high levels of noise (Blevins and Garrett 2004), both of which can last for an extended stretch of the acoustic signal. In the case of Grassmann’s Law, the original speaker produces a phonetic output [pʰɛpʰ] faithfully reflecting a surface phonological form /pʰɛpʰ/; the listener falsely interprets this form as a coarticulated token of [pɛpʰ], and so acquires /pɛpʰ/. Diachronically, this gives us a sound change /pʰɛpʰ/ > /pɛpʰ/. But the reasoning of Ohala’s story only makes sense if the speaker was expecting assimilation of aspiration: in other words, if Greek at some point contained a (phonetic or phonological) assimilation process that was substantial enough to be worth correcting for. This hypothetical earlier assimilation process would have copied aspiration from an aspirated stop in the middle of a word to an earlier unaspirated stop.

This means we have three processes in the history of Greek—H-sprung, the φρουρά rule, and this pre-Grassmann assimilation—with very similar effects—spreading aspiration from the middle of the word to the beginning of a word. Can we treat them as part of the same change?

Table 1 shows an eight-way typology of aspiration effects in Greek, according to the source and target of aspiration in each change. Pre-Grassmann assimilation copied aspiration from a stop to either a stop onset or an empty onset. The φρουρά rule copied aspiration from an *h to a initial stop. H-sprung copied aspiration from an *h to an initial empty onset. We can unify these three processes under the umbrella of one single sound change, which I call ‘Urhauchumsprung’ (or ‘Ur-H-sprung’): copy aspiration from the first medial onset, whatever it is, to the beginning of the word, whatever it is. Because *h and the aspirated stop series as the only segments in Greek that carry aspiration, we
TABLE 1  The different faces of ‘Ur-H-sprung’

| Assimilation | Dissimilation |
|--------------|---------------|
| #T_H         | Pre-Grassmann  | Grassmann |
| #_H          | Pre-Grassmann  | Grassmann |
| #T_h         | φρουρά        | –         |
| #_h          | H-sprung      | –         |

TABLE 2  A relative chronology

1. Loss of intervocalic *h
2. Ur-H-sprung
3. Loss of *h in sonorant clusters, causing phonologization of half of Ur-H-sprung
4. Grassmann’s Law, hypercorrecting for the other half of Ur-H-sprung

can think of this sound change as vacuously applying whenever the target segment is anything else.

In this picture, Grassmann’s Law is a hypercorrective effect of Ur-H-sprung, undoing the stop-conditioned change labelled ‘Pre-Grassmann’—and generalizing the context of the change to all cases of an aspirated segment (stop or *h) followed by an aspirated stop.

But if Grassmann’s Law had involved hypercorrection for the other two cases of Ur-H-sprung, conditioned by medial *h, we would expect to see Grassmann-type dissimilation in the context of an aspirated segment followed by *h. In fact, one etymology tells us that Grassmann’s Law wasn’t triggered by intervocalic *h: θεός ‘god’ < *θεός, with *h < s preserved in θέσφατος ‘god-spoken’. There are also no examples of Grassmann’s Law triggered by *h as part of a cluster, and several counterexamples: θάρρος ‘bold’ < *d`hers-, φήνη ‘bearded vulture’ < *b`hesn-, χήν ‘goose’ < *g`h2`ens-, and χίλιοι ‘thousand’ < *g`hesl-. So why didn’t Grassmann’s Law also undo H-sprung and the φρουρά rule?

Table 2 shows a potential explanation in terms of relative chronology. Based on the discussion of the φρουρά rule in section 2.2, the loss of intervocalic *h must have preceded Ur-H-sprung. This means Ur-H-sprung had two triggers: i) medial *h-sonorant clusters, and ii) medial aspirated stops.

Suppose that the loss of *h in sonorant clusters—which must have happened at some point before attested Greek—happened while Ur-H-sprung was
still a synchronic phonetic process. To the first generation of language learners who failed to learn any medial *h-s, the *h-triggered half of Ur-H-sprung would have to be phonologized as part of the underlying form of each target word. Without a separate source of aspiration as part in the word, the learner would be forced to learn ἤμεῖς, ἤνιατ, etc. as beginning with genuine h.

Once there were no more instances of medial *h, Ur-H-sprung survived, but now it had a more specific scope: all remaining examples of aspiration effects synchronically derivable from Ur-H-sprung were triggered by medial stops. Grassmann’s Law involved hypercorrection for this later version of Ur-H-sprung, with no hypercorrection for the h-triggered cases because those had already been fossilized. If this is true, there’s no sleight of hand needed in explaining why Grassmann’s Law only undid half of Ur-H-sprung: in fact, Grassmann’s Law undid all cases of Ur-H-sprung that still existed at the time that it applied. This gives us an explanation for the patterns in Table 1.

5. Conclusion

The evidence from the ancient Greek lexicon is clear that there was a sporadic sound change that copied an *h from the second syllable of a word to the first syllable, applying when the first syllable was vowel-initial, and perhaps also when it was stop-initial; this complements the analyses proposed so far in Greek historical phonology, particularly Sturm (2016, 2017), in accounting for the various sources of Proto-Greek *h. This change, Hauchumsprung, is unusual among recorded sound changes for involving the copying of a consonant over intervening material. Hauchumsprung, the φρουρά rule, and Grassmann’s Law can be unified as three different footprints of a single sound change: one that copied aspiration from the middle of a word to the beginning of a word in early Greek.

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