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LACHMANN'S LAW (PART 1)

Abstract

The first part of the paper deals with various approaches to the solution of Lachmann's law in Latin.

Keywords

Lachmann's law; Latin; Neogrammarian; generative grammar; glottalic theory

1 Introduction

Lachmann's Law is traditionally defined as the law in Latin where short vowel in original PIE root ending in media is lengthened before participle suffix –to– : RVD–to > RVT–to (*legō* – *lēctus*). The law was formulated by Lachmann in his commentary to Lucretius in 1850. The verbal forms undergoing Lachmann's law are e.g., *legit* – *lēgit* – *lēctus* “read”, *edit* – *ēdit* – *ēsus* “eat”, *agit* – *ēgit* – *āctus* “act”, *frangit* – *frēgit* – *frāctus* “break”. Vowels which are regularly prolonged in passive participle (which is the the position where Lachmann's law can be mostly observable) are *a*, *u*, *o* > *ā*, *ū*, *ō*. Vowel “*e*” is also prolonged to “*ē*” (*edō* – *ēsus*, *legō* – *lēctus*, *regō* – *rēctus*, apart from *sedeō* – *sessus*). High front vowel “*i*” is normally not prolonged to “*ī*” – so *findō* – *fissus*, *scindō* – *scissus* but *videō* – *vīsus* is taken as an counterexample.

In the following lines I propose the following structure: first I will deal the history of research then I review the data and propose my proposal my solution of the problem.

2 History of research¹

2.1 The Neogrammarian approach

Osthoff (1884, 112 – 113) tried to explain the influence of long perfects with –*ē*– vocalism to past participles as “Formübertragung” while considering the

¹ The overview and criticism of various approaches also in Strunk (1976) who, however, did

possibility that older short forms could remain parallel with the results of Lachmann's Law.

On the other hand, Saussure (1895) explained Lachmann's Law as an analogical introduction of a voiced consonant which should trigger lengthening of the preceding vowel: **aktos > agtos > āgtos > āktos > āctus*. But this is just ad hoc solution which applies only to Lachmann's Law without any general appearance.

2.2 Rejection of Lachmann's law

The existence of Lachmann's law was rejected by Kent (1928). According to Kent, all cases of lengthening are explained by analogy in combination with the avoidance of homonyms of divergent meaning.² From the roots ending in a voiced unaspirated consonant, Kent excludes all past passive participles which end in *-nctus*, *-nsus*; those participles have always long root vowel before *-n* – *cīnctus* (*cingō*, *cingere*, *cinxī*), *fūnctus* (*fungō*, *fungī*), *iūnctus* (*iungō*, *iungere*, *iūnxī*), *līnctus* (*lingō*, *lingere*, *līnxī*), *mānsus* (*mandō*, *mandere*, *mānxī*), *pēnsus* (*pendō*, *pendere*, *pependī*), *spōnsus* (*spondeō*, *spondere*, *spospondī*) etc. Excluded are also participles ending in voiceless consonant and with zero grade in the root – *dictus* (*dīcō*, *dīcere*, *dīxī*), *ductus* (*dūcō*, *dūcere*, *dūxī*), *ictus* (*īcō*, *īcere*, *īcī*), *ductus* (*dūcō*, *dūcere*, *dūxī*) etc.

Past passive participles and perfects could analogically adopt a long or short vowel from the present:³ *doctus* (*doceō*, *docere*, *docuī*), *frictus* (*frīgō*, *frigere*, *frīxī*), *ēnectus* (*ēnecō*, *ēnecāre*, *ēnecuī*), *sectus* (*secō*, *secāre*, *secuī*), *coctus* (*coquō*, *coquere*, *coxī*), *flexus* (*flectō*, *flectāre*, *flexī*), *nexus* (*nectō*, *nectere*, *nexī*), *pexus* (*pectō*, *pectere*, *pexī*), *plexus* (*plectō*, *plectere*, *plexī*), *fassus* (*fateor*, *fatērī*), *-fessus* (*-fiteor*, *fitērī*), *messus* (*metō*, *metere*), *passus* (*patior*, *patī*), *quassus* (*quatiō*, *quaterē*), *raptus* (*rapiō*, *rapere*, *rapuī*).

Long vowel in past participles could be analogically transposed from long perfect⁴ forms: *āctus* (*ēgī*), *frāctus* (*frēgī*), *lēctus* (*lēgī*), *pāctus* (*pēgī*), *pīctus* (*pīnxī*),

not propose anything new apart from the complicated analogical phonetic – morphological explanations, see pp. 62–64 in his publication. Another useful summary of the research can be found in Collinge (1985, 105–114). Since then several important papers have been published, e.g., Kortlandt (1989; 1999; 2006/2007), Drinka (1991) or Jasanoff (2004). As the Lachmann's law problem is generally dispersed in various papers and works, I find it useful to sum up the main theories here.

² Kent 1928, 188

³ Forms completed by the author.

⁴ Kent 1928, 186

rēctus (*rēxī*)⁵, *tāctus*⁶, *tēctus* (*tēxī*), *cāsus*⁷, *ēsus* (*ēdī*), *fūsus* (*fūdī*), *vīsus* (*vīdī*). The problems are with short forms – *rictus*, *strictus* (*stringō*, *strīnxī*), – *cessus* (*concedō*, *concessī*), *fissus* (*findō*, *fidī*), *fressus* (*frendō*), *passus* (*pandō*, *pandī*), *scissus* (*scindō*, *scidī*), *sessus* (*sēdī*). Kent solves those counterexamples simply – as a result of analogy: *cessus* for **ce* – *sessus*, *fressus* as an alternative form to *frēsus*, *passus* as an anomaly form being replaced by *pāsus* and *scissus* as a form being distinguished from – *cīsus* (from *caedō*), so *abscissus*, *excissus* contra *abscīsus*, *excīsus*).⁸ Long participle *āctus* should have taken the long form from perfect which is *ēgī*. This contradicts the analogical development, so Kent assumes the old form **āgai* which should influence the participle. The old form should be reflected in OIcl *ōk*, Gr. perfect *ēcha*, *ēgmai*⁹. The new form *ēgī* should be an analogical perfect from *fēcī*. It is quite clear that this evolution is purely arbitrary and it is not clear why *fēcī* should influence just **āgai*. Moreover, Kent supposes that *ēgī* – *āctus* influenced *frēgī* – *frāctus* and *pēgī* – *pāctus*¹⁰. In my opinion, we can see here the concept of analogy ad absurdum which, as *deus ex machina*, can be freely used to explain all possible anomalies from regular development. No wonder Lachmann's Law is treated as a law which does not exist but there is just a combination of massive analogical processes and homonym avoidances. Taking this claim seriously, we could use analogical process as the explanation of every sound law possible as well as deviations from such laws.¹¹

2.3 Phonetic explanation

Maniet's (1956) article was inclined to explain the mechanism of lengthening Phonetically and also dealt with two possible explanations – the influence of supine on the past participle and the introduction of the e-grade into the past participle forms. Having, e.g., the past participle *gnātus* (**gen-* + *ē-élargissement* + *tos* > **genātos* > **gnātos* (zero grade) > *gnātus*), that form was replaced by *genitus* according to the supine *genitum*. Similarly, the supine from *cadō* was **kādtum* and this form replaced the old past participle **kadtos* > **kādtos* > *cāsus*.

The phonetic lengthening is shown on the superlative form *māximus* < **mags-*. Comparative form is *maior* < **magios* with short “*a*”. The long “*ā*” in the super-

⁵ The form “*rēxī*” is an example of “overlapping exponence” (Spencer 1991, 51–52) where a single category is realized by a more than one marker. The correspondence between many – to – one. In “*rēxī*”, the perfective is marked by – *s* – and – *ē* –. Spencer claim that a certain morphosyntactic category for certain lexemes is signalled by root allomorphy as well as by an affix.

⁶ According to Kent, the length in participle is according to *frāctus*, *pāctus*.

⁷ Probably analogical according to other participles.

⁸ Kent 1928, 185

⁹ Kent 1928, 186

¹⁰ *ibid.*

¹¹ “I regret the appearance of Lachmann's law, in one or another of its forms, in virtually all the recent handbooks” (Kent 1928, 188).

lative is unexpected unless we postulate a sort of analogy or a rule that lengthens that vowel. In my opinion the explanation can be either due to the influence of regressive assimilation **mags* – > *maks* – > *māks* – or due to the introduction of e-grade into the root and the following lengthening.

As Maniet aptly observes, this kind of lengthening is only in Latin, it is not of Proto-Indo-European origin because it does not occur in Celtic languages.¹² Irish superlatives *nessam* “the nearest” or *tressam* “the strongest” show short root vowel.

Another interesting proof of phonetic lengthening is the observation that “i, e, a, o” lengthen before s+voiced segment, e.g., **prismos* > *prīmus*, **se(k)sdecem* > *sēdecim*; also before n+s/f, like **inferī* > *īferī*.¹³ This is actually true compensatory lengthening.

2.4 Rule ordering¹⁴

A great debate started in late 1960s. Kiparsky (1965)¹⁵ posited two ordered rules in which first the vowel is lengthened before a voiced obstruent and then regressive assimilation followed. Lachmann’s law is seen here as a **rule insertion** which seems to be an essential concept of Kiparsky’s approach. According to this rule the vowel was lengthened before *–gt–* and *–dt–* :

[– consonantal] > [+long] / ____ [+obstruent, +voiced] [+obstruent, –voiced].

A modification of that rule can be:

V > [+long] / ____ [+obstr, –asp, +voiced]¹⁶

The underlying forms are *–gt–* and *–dt–*, so **agtos* > *āctus*, **edtos* > *ēsus*. The sound change here is taken as an example of rule insertion (or rule addition in the series of other rules). A rule insertion is taken as a proof of a grammatical change and an underlying form is considered as a condition to make a change operate. It seems to be a plausible explanation but it would mean that the vowel should be lengthened every time it occurs before media. But Kiparsky’s rule insertion does not explain why the lengthening does not apply in cases like *lassus* < **ladtos*, *tussis* < **tudtis*. Moreover, it also does not explain why the lengthening does not occur before voiced aspirates, like *trahō* – *tractus*, *fodiō* – *fossus*, *iubeō* – *iussus*.¹⁷ An

¹² This idea, obviously omitted by other authors, was elaborated later into Kortlandt’s theory.

¹³ Maniet 1956, 234

¹⁴ Osthoff, 1884, 114

¹⁵ In his unpublished dissertation *Phonological Change* (MIT 1965). I was unable to obtain the dissertation, although most authors dealing with Lachmann’s law quote it. I therefore use secondary information from the published articles dealing with the subject (Watkins 1968, 56).

¹⁶ According to Drachmann 1980, 92.

¹⁷ See also Jasanoff 2004, 406–409.

alternative solution would be that lengthening happens in certain morphological domain¹⁸ but still, the rule seems to be applicable only to Latin past participles only without any other typological parallels. And, as Jasanoff aptly notes, Kiparsky's sound change is just a rule, based on acoustic and articulatory facts, an ad hoc rule that omits the real speaker.¹⁹ As Collinge (1975, 227) remarks, although a rule ordering is a handy tool to explain changes in phonological system of language, the rule:

V > [+long] / ___ [+obstruent, +voice] [+obstruent, - voice]

is just unnatural. Should the rule of lengthening be purely phonetic, we should also expect lengthening in other grammatical forms, like *grex – gregis* "herd"²⁰ Kiparsky's ideas were heavily popularized by King (1969) within the general aim of combining historical linguistics and generative grammar. Two rules are taken into account, the regressive voicing assimilation rule (originally Indo – European):

[+obstruent] > [α voice] / _____ [+ obstruent, α voice]

and Lachmann's Law:

V > [+long] / _____ [+ obstruent, + voice] [+ obstruent, - voice]

while the former rule is considered as an example of rule addition into the grammar of a language (here Latin) where it applied to derivation between the systematic phonemic and surface phonetic.²¹

Lachmann's Law rule should apply before the assimilation rule:²²

Base form	<i>agō</i>	<i>agtum</i>	<i>fakiō</i>	<i>faktum</i>
LLrule	- - - -	<i>āgtum</i>	- - - - -	- - - - -
Ass.rule	- - - -	<i>āktum</i>	- - - - -	- - - - -
Final form	<i>agō</i>	<i>āktum</i>	<i>fakiō</i>	<i>faktum</i>
Latin spelling	<i>agō</i>	<i>āctum</i>	<i>faciō</i>	<i>factum</i>

It is clear that the from those rule successions the lengthening of perfect forms are excluded or simply omitted. As noted above, it is not explained why the rules should apply only to past participles and not to perfect forms. To do so, we would need another rule insertion to make the perfect form long and another one to dis-

¹⁸ Watkins 1968, 86

¹⁹ Jasanoff 2004, 207

²⁰ Baldi 1991, 7

²¹ King 1969, 126–127

²² King 1969, 44

tinguish this lengthening from the absence of length in present forms, in short, using the concept of rule insertion, we need at least two rules to explain the quantitative difference *agō* and *ēgī*. The final algorithm becomes puzzling.

Paradoxically, the boost of rule insertion concept did not last long and was rejected by King himself in (1973). Rule insertion as a process of rule addition inside the grammar were dropped off and replaced by reorderings of constraints, some cases of rule insertion were even admitted as incorrect analyses. Lachmann's Law as an example of rule insertion, is however still regarded as a sort of rule addition – after morphophonemic rules but before the fonetic rules, so not completely abandoned.²³

2.5 Kuryłowicz and Watkins' morphological explanation

Kuryłowicz in his 1968 paper adduced that in PIE there was never an opposition *gt/kt/gd*, so devoiced *kt* is an Indo – European inheritance. Kuryłowicz explains Lachmann's Law in a morphological way – that lengthening resulted due to the position in the system of opposition active – pasive, infectum – perfectum.²⁴

According to Kuryłowicz, we have the opposition *legit* (present active) *lēgit* (perfectum active), *legitur* (perfectum active) *lectus* (perfectum active). Lengthening of the perfective form *lēctus* is conditioned by the perfect endings – *ī*, – *istī* etc. Perfective active *lēgit* is in correlation to passive perfective *lectus* and causes its lengthening > *lēctus*. So the verbal forms are *legere* – *lēgit* – *lēctus*, *edere* – *ēdit* – *ēctus*, *videre* – *vīdit* – *vīsus*, *emere* – *ēmit* – *ēmtus*, also *regere* – *rēxit* – *rēctus*, *tegere* – *tēxit* – *tēctus*, *agere* – *ēgit* – *āctus*, *cadere* – *cecidit* – *cāsus*. It is obvious that lengthening is limited to roots ending in – *d*, – *g*, – *m*. Absence of lengthening in forms *iacere* – *iēcī* – *iactus*, *facere* – *fēcī* – *factus* is explained by identity absence of root identity between perfect active forms and the rest of forms in the system.²⁵ The same principle operates in *findere* – *fidī* – *fissus*, *scindere* – *scidī* – *scissus*, where only phonetic conditions are met (*d* in roots), and in *relinquere* – *reliquī* – *relictus*, *vincere* – *vīcī* – *victus*, where neither morphological nor phonetic conditions are present. On the other hand, Kuryłowicz has to operate with analogical lengthening in *fundere* – *fūdī* – *fūsus* (like *ēdit* – *ēsus*) and *tundere* – *tudī* – *tūsus* according to *fūsus*.²⁶ Nasal presents should block the influence of the present stem with past participle form, but Kuryłowicz does not explain why similar nasal presents actually do influence participles, because we have *tangō* – *tāctus* or *frangō* – *frāctus* but this is also an ad hoc solution.²⁷

²³ King 1973, 576

²⁴ Kuryłowicz 1968, 296

²⁵ It is “morphological” condition in Kuryłowicz theory.

²⁶ Kuryłowicz 1968, 297

²⁷ See also Jasanoff 2004, 410

According to Kuryłowicz, lengthening appeared in Latin when intervocalic mediae aspiratae were fricativized and were in opposition to pure mediae. The proof should be the neutralization of that opposition after nasals like *umbilicus*, *mingere*, also lack of influence of *ōdisse – ōdit – ōsus to fodere – fōdī* (<? *fōDī) also *trahere – traxī – tractus*, *vehere – vexī – vectus*, *iubēre – iussī – iussum*. Long forms *tangere – tetigī – tāctus*, *frangere – fregī – frāctus*²⁸ and *pangō*, *pāctus* should have original long root vowel (or it was imitated according to any of the former forms). Kuryłowicz also sees parallels with **pepagit – *pāktos* as parallel to Greek *epágēn: pēktós*. So length **pāg – >pāctus* is reflected by Gr. *pēgnūmi*, Gr. *pēktus*.

Kuryłowicz thinks that length in *pāctus* is inherited, which is not, as shown by Lubotsky (1981).²⁹ It is also very dubious how length was transformed from the original long perfect to past participle when we have reduplicated perfect with short root vowel and short vowel in the reduplicated syllable – *pepigī, tetigī...* Therefore, the influence of originally long *pāctus* to **taktos, fraktos >tāctus, frāctus* must be rejected. The problem of Kuryłowicz' solution also obviously lies in the examples like *fodiō – fōdī – fossus* "dig" which have original voiced aspirate and long perfect but it is not explained why this long perfect fails to trigger lengthening in passive participle. Also examples like *veniō – vēnī – ventus* are curiously explained as a phonetic shortening of the combination ov V+n+l,r;³⁰ but it does there are unexplained counterexamples like *spōnsus, tōnsus, tēnsus, pēnsus* where the combination of –nt– did not or did (?) provoke change of vowel length.³¹

Anyway, Kuryłowicz' explanation of Lachmann's Law is morphological³². From the various means of Latin perfect forms it takes only "lēgī" type which triggers the length in passive participle.³³ The rest forms are variously remorphologized but this re-morphologization completely excludes the real speaker and puts him into the position of unnecessary complicated analogical solution of just the only grammatical problem.

Watkins (1968) adduces counterexamples *lassus* <**ladto* – (Goth. *lats*), *tussis* <**tudti* – (*tundō*, OInd. *tudāti*). Moreover, Watkins thinks that Lachmann's Law grade in Gr. *pēktós, rēktós* was indeed original but not for Latin, whence for the latter form we would expect **wrēg– :wrag–* >Gr. *rēgnumi:errágēn*, Lat. **dhēk– : *dhak–* (*fēcī: faciō*) > **dhēkto–* but we have **dhakto–* (*factus*). He also points to the complexity of Kuryłowicz' analogical construction which cannot explain why *fundere – fūsus* is lengthened but not *findere – fissus*. For Watkins the situation with lengthening is more similar – primary verbs with initial short root

28 Kuryłowicz (1968, 298) has also *pāctus* which should be *pactus*.

29 See Lubotsky 1981 for interpretation of *pēgnūmi* which is now called Lubotsky's law.

30 Kuryłowicz 1968, 297

31 See also Drinka 1991, 69

32 Similarly in Kuryłowicz 1968, 526–528

33 See also Otkupščikov 1984, 88

vowel lengthenend the vowel in perfectum. So *emere* – *ēmī* ~ *agere* – **āgī* > later *ēgī* according to *faciō* – *fēcī*. Watkins also hints that there is a correspondence between long vowel perfect and reduplicated perfect – *agere* – ***āgī* – *āctus* ~ *pangō* – **pepagī* – *pāctus*. So here we again see analogy but much more simple than in Kuryłowicz’ conception.³⁴ Watkins actually tries to reduce Kuryłowicz’ arguments to two processes – the original one *legō* – *lēgī* – *lēctus* and the analogical one *agō* – *ēgī* – *āctus* with the aim of putting both processes into one category where length in the perfect produces morphological length in past participles. As for *agō* – *ēgī* the complication lies in the absence of ***āgī* form, so it is not clear how and why the “e” could be analogically put into the perfect form when the simple solution is just ***āgī*.³⁵

The problem with *fodiō* – *fōdī* – *fossus*, *sedeō* – *sēdī* – *(ob)sessus* is obviously with the lack of lengthening in the participle. For Watkins the perfect *fōdī* never existed; it is an analogical form according to *ōdī* (*odiō* – *odīre*). Therefore, no lengthening is possible in *fossus*. As for *sessus*, Watkins considers the unexpected brevity in the perfectum as influenced by the supine form *sessum*.³⁶ Watkin’s solution seems to be just an ad hoc prerequisite that short vowels in present should prolong the same or a different vowel in perfect forms (obviously without any coda constraint). It is not explained why such a process should take place and why such long forms should trigger Lachmann’s law in some forms and not in others, e.g., *faciō* – *fēcī* – *factus*, *vincō* – *vīcī* – *victus*.³⁷ Phonetic conditions are ignored and morphological forms are the only means of causality.³⁸

2.6 Numerology

Foley (1969) rejected the interpretation of Lachmann’s Law as ordered rule based process (first lengthening, then voice assimilation) as being ad hoc (no relation of lengthening to other types of lengthening in Latin) and language idiosyncratic (typological lengthening). As to other types of lengthening in Latin, Foley adduces compensatory lengthening (CL) like *dēns* < **dents*, *nīdus* < **nizdos*. Foley concludes that the general rule for Latin CL is that a vowel is prolonged before [+consonantal [+continuant] segment. Similarly, Foley supposes that a similar process occurred in examples like 2sg **eds* > **ēds* > **ēts* > **ēss* > *ēs*. The ordered rules are as follows: Lachmann’s Law – vowel lengthening > voice assimilation > assibilation > cluster reduction.³⁹ As for participle forms like

³⁴ Watkins 1968, 61–63

³⁵ Jasanoff points to the lengthened preterite **h₂ēg* – being also present in *lēgī*, *ēmī*, *ēdī*, *rēgī* (Jasanoff 2004, 410).

³⁶ Watkins 1968, 64–65

³⁷ See also Drinka 1991, 55

³⁸ See also Collinge 1975, 229

³⁹ Foley 1969, 135. As for *dēns*, the process is similar: **dents* > *dēnss* > *dēns* (vowel lengthening > assibilation > cluster simplification).

āctus, Foley also sees the lengthening as a rule ordered process. However, the situation is a bit complicated here. In forms like *sancīre* – *sānctus*, which Foley adduces as an example of that kind of lengthening, a complicated rule should take place. First, “t” should cause lengthening, although it is not clear why and how.⁴⁰ If preceded by a consonant, “t” converts it to a continuant – **sanctus* > **sānXtus*. Then, a cluster simplification should follow, but the resulting form could be **sānus* or *sātus*. To avoid that process Foley posits a rule that inserts a continuant between two stops. The distinctive features of that continuant are determined by the features [voice] and [compact]. Voicing is determined by the second stop, the compact feature depends on the first stop. Between “g” and “t” a segment “X” is therefore inserted, so **sanktus* > **sankXtus*. The same process of “a continuant insertion” functions in 2sg **edt* > **edst* and also in *agtus* > **agXtus*. Now, the problem with cluster simplification Lachmann’s Law still remains because lengthening would fail in **sankXtus* because the [+continuant] segment “n” is not followed by a [+voiced] consonant. Therefore, Foley posits a bit clumsy ordered cluster simplification – the more complex clusters are simplified in descending order.⁴¹ So **sankXtus* > **sanXtus* > **sānXtus* is simplified earlier than **agXtus* > **āgXtus* > **āXtus* and **ēds* > **ēs*.

It is not quite clear how Foley arrives at the final form *sānctus* < **sānXtus* and *āgtus* < **āXtus*, but it is obvious that in the former example it can be reached by place assimilation. Anyway Lachmann’s Law is viewed here as a part of much more general vowel lengthening in Latin under similar process.

The more coherent and theoretically better-founded explanation of Lachmann’s Law lengthening appeared in Foley’s *Foundations of theoretical phonology* from 1977. Foley claimed that the difficulties with Lachmann’s Law are through the assumption that phonetically natural classes determine phonological processes.⁴² Therefore, the interpretation like this requires the assumption that the law should apply uniformly to all vowels in the same environment. But this is not so, so forms that do not obey Lachmann’s Law (e.g., *strictus*) are simply regarded as counterexamples with various possible explanations. For Foley, Lachmann’s Law is just one of the many phonological processes that presume that consonants and vowels have different relative phonological strength. This strength is responsible for phonological processes to operate or to be absent. For example Romance vowels have the relative phonological strength:⁴³

<i>i</i>	<i>e</i>	<i>u</i>	<i>o</i>	<i>a</i>
1	2	3	4	5

while the relative strength of voiced consonants taking part in Lachmann’s Law is:

<i>d</i>	<i>g</i>
1	2

⁴⁰ Foley 1969, 135

⁴¹ Formulation of the rule is mine.

⁴² Foley 1977, 138

⁴³ Foley 1977, 129

Relative strength means the relation of the elements to one another in a phonological system and their propensity to undergo lenition. Foley claims that the relative strength of course depends on a language and tries to explain Lachmann's law as a result of the total value due to the combination of vowel and consonant elements.

In this conception, Lachmann's Law lengthening is actually strengthening and according to Foley, it applies differently to the vowel with different phonological strength.⁴⁴ The preference is the combination of strong vowels with weak consonants.

As fo "a", which is the strongest vowel, lengthening always applies – *āctus*, *tāctus*, *pāctus*... The high front vowel "i" is the weakest, so lengthening does not apply – *strictus*, *scissus*. The vowel "e" with the strength 2 lengthens depending on the combination with a consonant. When combined with "d", which has the strength 1, lengthening does not occur – *sessus*, *fressus*⁴⁵, when combined with "g", which has the strength 2, the lengthening applies – *lēctus*, *rēctus*, *tēctus*. Vowel "u" has the strength value 3, so when combined both with "d" and "g", it lengthens – *fūsus*, *tūsus*, *frūctus*. So before "g", all vowels lengthen apart from "i", before "d" only strong vowels "u" and "a" lengthen. Numerically, the total strength number must not be less than 4:

$i+d = 2$ *scissus*

$i+g = 3$ *strictus*

$e+g = 3$ *sessus*

$e+g = 4$ *rēctus*

$u+d = 4$ *fūsus*

$u+g = 5$ *frūctus*

$a+d = 5$ *cāsus*

$a+g = 6$ *āctus*⁴⁶

The result of this analysis is that Foley sees Lachmann's Law as a normal development of strengthening process. In my opinion, there are three problems with this analysis. First, the numerical symbols in Foley's analysis do not explain why lengthening occurs in past passive participles only and why the lengthening is absent in other forms, like present ones – *agō*, *legō*, *fregō*. Second, the numerical computation of the combination vowel+consonant is purely adhoc, it has no explanatory value because it is only the numerical symbolism of the actual behavior of certain structures. To say that "i" before "d" does not explain, is the same as to say that "1" + "1" is "2". The mechanism of change is reduced to formal behavior of two successive elements. Third, although Foley successfully eliminates the number of counterexamples to Lachmann's Law (like absence of lengthening of "i"), three counterexamples still remain and are explained quite curiously.

⁴⁴ Foley does not examine the causes of lengthening, he is interested on in the input elements.

⁴⁵ The counterexample is *ēsus*. To explain this anomaly, Foley supposes the original length in Balto-Slavic **ēdmi*. This would lead to the PIE form **h₁ēdmi*, which is unacceptable to me.

⁴⁶ Adapted from Foley 1977, 140.

For “*ēsus*”, which is combination of “*e+d*” (numerically 3) and no lengthening is expected, Foley posits long e-grade **ēd* – . Participle form *vīsus*, where the length is anomalous because of the numerical value 2 (*i+d* = 2) is explained as the combination of glide form “;” + “i” + “d” with the background idea that the underlying form of “;” is actually “u”. The total numerical value is 5 (3+1+1) and this causes lengthening.

Of course, this idea is simply bizarre and the magic of numbers is simply modified to apply to this unique syllabic structure. Moreover, “;” in **id – tus* is obviously onset of the syllable and should not have any effect on the total syllable weight.⁴⁷ Foley does not hide that his approach is quite different from traditional ones and that he operates with the concept that phonological changes do not occur to groups of sounds but to individual elements.⁴⁸ Although this atomization successfully explains why certain elements lengthen or not, it does not explain why this happens only in isolated structures and reduces the phonological process to a primitive pythagorean mathematics.

Collinge in his 1975 paper heavily criticized the Osthoff – Kuryłowicz – Watkins morphological hypothesis as the only condition for Lachmann’s Law. The whole concept is taken as a “dazzling array of special arguments which leave only a lively sense of cumulative dissatisfaction.”⁴⁹ Collinge suggested that the solution should be phonetic. He proposed series of nine duration levels in Latin ranging from maximally short (e.g., prevocalic position like in “*chaos*” to maximally long syllables (e.g., long vowels in closed syllable like *pāstor*).⁵⁰ Lachmann’s Law should be active between grades 4 and 6. Grade 5 should reflect past participles like *factus* which have short vowel and tenuis in root. This *–ac–* is considered to be the extension of the vocoid articulation into the syllabic release consonant; the resulting vowel is therefore short. Grade 5 responds to *āctus*. The original syllable contains short vowel and media (**agto–*) and the “checking” (or probably parsing) rests on the following consonantal sequence coda+onset (i.e. over the syllabic boundary). The resulting sequence is long (there may be voicing assimilation which is irrelevant for lengthening process).⁵¹

2.7 Lengthening rules independent of Lachmann’s law?

Perini (1978) thinks that Lachmann’s Law is not a rule at all and suggests its elimination from Latin grammars. According to Perrini, the lengthening rule existed in Latin before the operation of Lachmann’s Law. That rule is the one that lengthens root vowels before active perfect endings, so *legit* contra *lēgit*:

⁴⁷ Foley 1977, 141

⁴⁸ *ibid.*

⁴⁹ Collinge 1975, 228

⁵⁰ Collinge 1975, 237–240

⁵¹ Collinge 1975, 238–239

V > [+long] / ____ C₀ + +affix
 +perfect
 +active

This rule should be marked and apply only to verbal forms that respect it. Lengthening in passive perfect like *āctus* is the same process apart from that a feature [+active] is dropped. For Perini, Lachmann's Law is therefore no law but just a variant of existing rules.

This very simplified solution was challenged by Klausenburger (1979) who admits that the general rule of lengthening in perfect active does not necessary mean an automatic lengthening of passive participle. The counterexamples are e.g., *vincit – vīcit – victus* “conquer”, *facit – fēcit – factus*⁵² “do”, *rumpit – rūpit – ruptus*⁵³ “break”, *capit – cēpit – captus* “capture”. Klausenburger's explanation is just simple – the lengthening is morphologically conditioned and Perini's general rule (concerning Lachmann's Law) should therefore be modified: active perfect endings, so *legit* contra *lēgit*:

V > [+long] / ____ C + +affix
 [+voice] +perfect
 –active

Similar remark was made by Joseph (1979) claiming that in Perini's interpretation actually any feature could be dropped so just positing that we omit feature [–active] does bring any solution and obscurs the motivation of change.⁵⁴

Stephens (1979) in his remark obviously misunderstood the mechanism of rules leading to Lachmann's Law because he assumes inherited **lektos* as changing to **legtos* (leg+tos). It is not quite clear if this is a misprint or the interpretation of the author. Stephens notices that Lachmann's Law concerns only verbs having normal grade in the present but PIE lengthened grade in the perfect, although not every verb with lengthened grade in the perfect undergoes Lachmann's Law. Analogical transfer of long vowel from perfect active to perfect passive is purely arbitrary. Moreover, a subgroup of verbs having –s – from original PIE aorist also has lengthened grade (*regere – rēxī – rēctum*). So Stephens adds to previous rules the [+stem formative] feature which should cover the examples of lengthening in s – perfects. However, all this also does not explain the mechanism of Lachmann's Law.

⁵² No counterexamples because the root **dheh₁* – adds the suffix **k* – (de Vaan 2008, 198).

⁵³ No LL because of the root **reyp* – (LIV, 510–511).

⁵⁴ Joseph 1979, 364

2.8 Lachmann's law as part of multiple processes

Gaberell Drachman (1980) dealt with Lachmann's law from a broader point of view. Breaking the mechanism of the law into separate parts of change, Drachman tries to explain the law as a multiple conditioned process. He uses special terminology for each part. According to Drachman, among factors contributing to the operation of Lachman's law are: **patient** – a segment undergoing a change (the lengthened vowel); **agent** – a segment triggering a change (root final voiced stop); **environment** – negative (inhibiting or blocking a change) or sponsoring (triggering a change); **directionality** of change (from left to right or right to left).⁵⁵ Patient – the root vowel that lengthens is considered in terms of strength. In the hierarchy, “*i*” is considered the weakest, status of “*u*, *e*” and “*o*” is unclear, “*a*” is the strongest. The similar hierarchy can be observed in the agent – vowels are lengthened less before voiceless spirants, more before voiced stops and nasals and almost regularly before voiced spirants.⁵⁶

As for environment, the obvious problem with Lachmann's law is that lengthening does not occur before voiced aspirates. Therefore, Drachman accepts Foley's conception of weak and strong consonants by postulating that voiced aspirates are weaker than voiced stops, therefore no lengthening can be observable before them. In association with it, an ordering paradox pops up – either vowel lengthening precedes devoicing assimilation > voiced aspirates cause lengthening, or devoicing assimilation precedes vowel lengthening > no lengthening can be observable.⁵⁷ According to Drachman, the lengthening occurs or does not occur in a domain vowel + consonant. Lengthening in the domain vowel + [+voiced, + aspirated] should have had lower “threshold” than voiceless assimilation, therefore, in the combination VD^{ht} – only assimilation happened, not lengthening.⁵⁸

Drachman thinks that what we observe in Latin past participle is the pressure of the system to restore voiced stop with subsequent lengthening. The process operates with the simultaneous vowel and consonant hierarchy: vowel strength (left to right) *i* – *e* – *u* – *o* – *a*; consonant strength (manner of articulation – *v* – *w* – *r* – voiced spirant – voiced stop – voiceless sonorant – voiceless stop; place articulation: *k* – *t* – *p*; *g* – *d* – *b*).

An interesting remark Drachman made for environment responsible for operation of Lachman's law. Left environment (which is actually the syllable onset) is responsible for lengthening if the onset contains initial [+labial] segment, so **g*”*resus* > *fr̄esus*, but **g*ressus > *gressus*. Absence of onset (after the loss of

⁵⁵ Drachman 1980, 80

⁵⁶ An interesting observation is that certain cluster trigger or block the lengthening, V > [+long] / __ns, nf, nkt nks, gn, (dēns, sānctus, īgnis). Lengthening occurs before the group n+spirant cluster. On the other hand, the cluster n+alveolar stop at the end of the word does not provoke the root vowel lengthening: V > [– long] / __nt #, (amant).

⁵⁷ So either **agtos* > **āgtos* > *āctus* or **agtos* – > **aktos* > *āctus*.

⁵⁸ Drachman 1980, 93

laryngeals, obviously) also triggers the lengthening of the nucleus – *ēsus*, *ōsus*, *āctus*. Right environment (root coda) depends on relative strength of the segments. Root final “g” is considered weak and provokes lengthening. The cluster “ss” is taken as stronger and should the root nucleus be long, it must contain a weak vowel. The problem is, however, whether “u” has the same strength as “o”, because we have *fūsus* but *fossus*.

In sum, Lachman’s law in Drachman’s interpretation is the result of various “constraints” interacting together with simultaneous morphologization.

2.9 Back to phonetic explanation – Otkupščikov

Otkupščikov made an intriguing criticism of previous conceptions of Lachmann’s law.⁵⁹ Otkupščikov criticizes Maniet’s claim that supinum influenced past participle forms by introducing e-grade into the root. In Otkupščikov’s opinion, supine form was too rare to influence other more common forms. Moreover, analogical forms *ēsum* > *ēsus* do not explain why the same influence failed in *sesum* – *sessus*, or *dictum* – *dictus*⁶⁰, *ruptum* – *ruptus*. We should suppose that supine influenced past participles in both length and brevity, which solves nothing. Otkupščikov therefore thinks that where the brevity in participles is, the regressive voiced assimilation is of PIE origin and no lengthening operated (if we take the influence of root voiced consonant into account). Correspondences in Old Indic or Greek seem to support the hypothesis – Lat. *pictus*, OInd *pictáh*; Lat. *fissus*, OInd. *bhittáh*; Lat. *sessus*, OInd. *sattáh*; Lat. *scissus* – Gr. *skistós*.⁶¹ If length is observed, those forms are Latin neologisms. The big mistake of Kuryłowicz – Watkins’ solution is, according to Otkupščikov, the wrong presumption that all forms of the Latin past participle existed already in the proto – language, even if in PIE we have parallel *-n* – and *-t* – past participle suffixes. The Indo – Iranian, Germanic and Slavic languages have both suffixes in past participles; Latin and Lithuanian use only *-t* – now. Otkupščikov envisages the substitution of adjectival forms with *n* – suffix by *t* – suffix (both suffixes existed simultaneously in PIE, so **agnos* > *agtos* > *āctus*. As for the lengthening, it can be phonetically conditioned due to the regressive voiced assimilation or, as Otkupščikov also reasons, lengthening could be triggered by compensatory lengthening thanks to syncope, **agnos* > **agetos* (introduction of e-grade ?) > *āctus*. The annoying question that rises here is how we prove that syncope operated also in past participle form with long vowels (should there were any) or why syncope did not always produce lengthening, like *dictus* or *ruptus*. Otkupščikov aptly observes that the forms which in Latin or in other Indo – European languages preserved the old *n* – suffix underwent Lachmann’s law: **agnos*, *n*– suffix Lith *agnùs*, *men*– suffix Lat. *agmen*, past participle *āctus*; **pagnos*, *n*– suffix Lat. *pinos*, *men* – suffix in Latin

⁵⁹ Otkupščikov 1984

⁶⁰ No LL because of the root **dejk* – (LIV, 108–109)

⁶¹ Otkupščikov (1984:84).

pagmentum, *r-* suffix OInd. *pajrá* – , past participle *pāctus*; **legnos*, *n-* suffix Lat. *lignum*, *men-* suffix in Lat. *ablegmina*, past participle in *lēctus*.⁶²

Otkupščikov's solution of Lachmann's law is therefore the combination of phonetic and word – formation processes. Phonetically, voiced regressive assimilation occurs with possible triggering of the root vowel. Simultaneously, this change operates on the background of the Latin tendency to unify past participle forms with the *t-* suffix only.

2.10 *N – infix transfer*

Bridget Drinka in her (1991) article dealt with Lachmann's law from a new and innovative approach. Drinka also noticed the obvious connection between Winter's law and Lachmann's law. This comparison is quite anomalous among scholars outside the Leiden school. For Drinka, Winter's law was not conditioned by segments outside the syllable in contrast to Lachmann's law, where the condition "voiceless obstruent must followed the root" existed.⁶³ It is dubious whether this is the real condition triggering Lachmann's law. We can agree that morphologically Lachmann's law operated only in past participles with the "* –*tos*" suffix, but it is questionable if the "*t*" itself in the suffix triggers the lengthening of a vowel in preceding syllable.

Drinka also discusses the glottalic approach to the solution of Lachmann's law, i.e. the one by Kortlandt and by Baldi. It is not clear to Drinka how "*t*" in Latin would cause the glottalic consonant to retain glottalization and how the lengthening could operate. This is because her misunderstanding of the Kortland's conception of glottalic consonants. Kortlandt always speaks about preglottalic consonants ²*C*. It means that in Kortlandt's interpretation there were never forms like *C*², therefore clusters *C*²*T* did not exist. Preglottalized consonants could be dissolved into ²*C* (full glottal stop + consonant) with subsequent compensatory lengthening. Paradoxically, this is also the solution offered by Baldi, whose approach Drinka also criticizes. Although dismissing both Kortlandt's and Baldi's approach, Drinka does not discuss why those explanations are unnatural.⁶⁴

Instead, Drinka offers an alternative solution to compensatory lengthening in Latin past participles due to the loss of nasal infix. This nasal infix had to be transferred from present stems to the participial forms and the whole process including the lengthening of the root vowel in participles operated in several stages.

The first stage saw the root with no *n-* infix in present stems. Those stems did not have any lengthening in past participles –*teneō* – *tentus*, *sīdō* – *sessus*, *faciō* – *factus*. The development is the same as in those roots ending with voiced aspirates –*fodiō* – *fossus*, *iubeō* – *iussus*, *vehō* – *vectus*. So in the first stage, both roots ending in plain voiced and roots ending in voiced aspirates behaved in the

⁶² Complete list of forms in Otkupščikov 1984, 89.

⁶³ Drinka 1991, 56

⁶⁴ Drinka 1991, 58

same way – no lengthening was observed regardless of the suffix * – *tos*, so “*t*” has no influence on the quantity of preceding syllable.

In the second stage, present forms of the old roots (also those with reduplicated perfects) joined verbs containing the nasax infix – *scindō* – *scissus*, according to that form > *tundō* – **tundtus*, *spondeō* – *spospondī* – **spondsus*. Similarly, “*n*” was introduced in past participles of present stems containing “*g*” in root – *pangō* – *pepigī* – **pangtus*, *tangō* – *tetigī* – **tangtus*. Drinka thinks that the insertion of the nasal from present stems to passive participles resulted in the creation of different syllable structures (apart from the further lengthening of preceding vowel). The resulting syllable structure depended on the root coda: –*Vnd.t*– > –*V̄n.s* – (**dt*>*s*, assimilation and spirantization), –*Vng.t* > –*V̄kt*– (*ng* > assimilation of place and voice). The obvious problem here is the mechanism of compensatory lengthening which Drinka omits. She points that by the “*n*” introduction to past participles “overly – heavy” syllables were created but it is actually “*t*” which contributes to the overly – heavy cluster (although “*t*” is not tautosyllabic).⁶⁵ The mechanism of compensatory lengthening is also very dubious – in the first example – *Vnd.t* – it is “*d*” causing lengthening, in the second example – *Vng.t* – is the lengthening caused by “*n*”. The plain error of that analysis is that “*t*” cannot be tautosyllabic without breaking the sonority hierarchy, so **pangtus* can be syllabified as *pang.tus* but not *pangt.us*, so do not see how those superlong syllables can be formed.

Drinka’s argument that compensatory lengthening through nasal loss is well attested in other languages cannot be taken as proof because her examples **lupons* > *lupūs*, **pedens* > *pedēs* contain tautosyllabic “*n*” whose loss causes “real” compensatory lengthening. There are no overlong syllables.

The lack of lengthening in forms containing root “*i*” – *pingō* – *pictus*, *stringō* – *strictus*, *fungō* – *factus* present also a problem for Drinka’s analysis. She explains the lack of lengthening in passive participle by a simple postulate that *n* – infix was ancient there and had not spread into the participle. According to Drinka, “*n*” is actually not an infix anymore, but it is a part of the root.⁶⁶ If forms *pingō* – *pictus* is an archaism, then *factus* and *strictus*, *fissus*, *scissus*, *mictus*, *ictus* are analogically short according to *pictus* because they have no nasal. But *quīntus* has a nasal, so Drinka’s explanation is quite ad hoc – lengthening operated under different conditions.

Anyway, in Drinka’s conception, the further step the influence of “*i* – root” forms on “*u* – root” forms. Long forms in *n* – infixed stems *vinciō* – *vīnxī* – *vīnctus* “bind”, *lingō* – *līnxī* – *līnctus* “lick”, *extinguō* – *extīnxī* – *extīnctus* “extinguish”, *cingō* – *cīnxī* – *cīnctus* “gird”⁶⁷ should influence past participles of *iungō* – *iūnxī*, *pungō* – *pupugī*, *unguō* – *ūnxī* > *iūnctus*, *pūnctus*, *ūnctus*.

⁶⁵ Drinka 1991, 62

⁶⁶ Drinka 1991, 65

⁶⁷ Length in the ppp. is not attested everywhere, moreover, the first syllable coda ends in reconstructed voiced aspirate which is irrelevant for LL.

In the next stage, length in from the above mentioned forms spread to forms without nasal presents, like *legō – lēctus*, *agō – āctus*. Counterexamples are *fodiō – fossus* and *veniō – ventus*, while brevity in *ventus* can be explained by vowel shortening before –nt– cluster.

In Drinka's analysis, perfect forms play no role; they only trigger the connection between nasal and non – nasal verbs.

The problematic nature of this kind of Lachmann's law explanation lies in the ad hoc – aid of “n” infix to cause various kinds of compensatory lengthening. Verbs are supposed to undergo changes on different chronological levels. Counterexamples to lengthening like *fissus*, *lassus*, *pessum*, *scissus*, *sessus*, *tussis* (*–dt– > –ss–) are not explained. The n– infix introduction is a very complicated process and actually selects only a group of verbs where the real compensatory lengthening should operate. The different chronological levels are just incidental and otherwise unrecorded and are not described in literature.⁶⁸

2.11 Lachmann's law in recent historical grammars

Lachmann's Law was also accepted by Sihler (1995) and Meiser (1998/2010) in the new standard historical grammar of Latin language. Sihler sticks to the traditional concept of the influence of perfectum. Lengthening in past participles occurs, wherever the root ends in “g” or “d” and where both devoicing of root – final stop in those participles and long vowel in perfect forms occur. Sihler combines phonetic and morphological explanation of the Lachmann's Law. Counterexample *stringō – strīnxī – strictus* is considered not as a counterexample but as a normal development because Sihler claims that the length in *strīnxī* is secondary. Unexpected brevity in *findō – fidī – fissus*, *pandō – pandī – passus* is thought to be due to splitting of similar forms *fūdī* “poured” and *fidī* “split” > **fudto* – > **fūssus* > *fūsus* and **fidto* – > *fissus*.⁶⁹

Meiser (1998/2010, 79 – 80) gives a useful summary of a problem including glottalic theory. Apart from the general objections against the glottalic theory, Meiser also points to the fact that in some isolated examples like *tussis*, *scissus* or *fissus*. Meiser therefore tends to explain the Lachmann's Law as “Ausgleichphänomen” in the sense of Kuryłowicz, Watkins, and Strunk.⁷⁰

Weiss (2009, 175) does not provide any discussion on Lachmann's Law theories apart from briefly mentioning some authors. Weiss sees the problem of the Law in the behavior of voiced and voiceless stops in the neutralized context – how could they be different? Therefore, Weiss thinks that voiced stops were restored on the basis of related forms. In the position before voiced stop the preceding vowels tend to be phonetically longer. When the stops underwent neutralization of voice, the vowels were lengthened phonologically. Weiss sees the similarity

⁶⁸ See also criticism by Kortlandt 1999, 246–247.

⁶⁹ Sihler 1995, 75–76

⁷⁰ Meiser 1998/2010: 79–80

of the process in the present-day English where vowels before voiced stops are phonetically longer. However, this scenario also does not explain the counterexamples with no lengthening regardless the fact that typologically there are languages which do not lengthen the vowels in the process of voice neutralization, e.g., Czech.

2.12 Jasanoff

Jay Jasanoff offered a compromise solution between Kiparsky's and Kuryłowicz' approach – the sound law on one hand, analogy on the other.⁷¹ Actually, Jasanoff claims that the sound law is created due to analogy. As a similar development to the Neogrammarian approach (à la de Saussure), Jasanoff adduces examples from Slavic consonant clusters **vedti* > *vesti* “lead” (the regressive assimilation and s – insertion) and **vezti* > *vesti* “convey” later developed to Ukr. *vezty*. This development should be parallel with de Saussure's conception of consonant assimilation.

Jasanoff also points to the effect of Latin syncope in superlative type *māximus* “the biggest”. *Māximus* is therefore explained as syncopated **magis̄mmos* > **mags̄mmos* and the following regressive assimilation to **maks̄mos* and further lengthening of the root “a” > **māks̄mos*.⁷² This process is similar to Lachmann's law in Neogrammarian approach. The obvious problem with other superlatives of the type *pessimus* is solved by postulating that long “ē” was shortened due to – *issimus* superlative type and general littera shortening, so **pedis̄mmos* > syncopated **peds̄mmos* > regressive assimilation and lengthening **pēs̄mmos* > **pēs̄smos* > shortening *pessimus*.⁷³

Syncope, assimilation of voice and lengthening are therefore put into “rule ordering” in Jasanoff's approach to Lachmann's law. First, the syncope of *māximos* type occurred. Then, root final “g” in past participle forms before suffixes beginning with voiceless obstruent (**-tos*) were restored – so **aktos*, *rektos*, *striktos* > **agtos*, *regtos*, *strigtos*. Jasanoff supports this change by the similar development in Slavic consonant clusters, where e.g., Ukr. *vesty* > *vezty* “convey”. The “z” in infinitive is restored from present stem “*vez-*”. The same restoration to past participle should apply in Latin. However, this is just arbitrary explanation because in my opinion a change like this has nothing to common with Lachmann's law. First, it is quite clear that the contrast *vesty* – *vezty* is just the only one and maybe due to the need to distinguish the similar forms. Second, the restoration of voiced

⁷¹ Jasanoff takes Kortlandt's explanation of Lachmann's law as “unacceptable” without even discussing it or explaining what the unacceptability of glottalic approach lies in, see Jasanoff 2004, 410–411, note 10. Jasanoff also does not see the obvious connection of Winter's law and Lachmann's law – the similar syllable structure, the different results.

⁷² Referring to Cowgill, W.: *Italic and Celtic Superlatives and the dialects of Indo-European*, in Cardona, G. et al: *Indo-European and Indo-Europeans*. University of Chicago Press 1970, 113–153.

⁷³ Jasanoff 2004, 411–412

fricative in Ukrainian has nothing to common with lengthening of the preceding vowel – the parallels are only apparent.

The same reintroduction of the voiced consonant to past participle from present stems should apply in roots ending in “*d*”, so **kassos, tussos, fissos* > **kadsos, tudsos, fidsos*. Again, a parallel with the Ukrainian restitution of the voiced element in *beregti* > *bereči* > *berehči* is seen.

After the restoration of voiced obstruent in past participles, Lachmann's law operated. Lachmann's law here is interpreted as a two – step process – regressive voiced assimilation and lengthening of the preceding vowel, so **agtos, regtos, kadsos, tudsos* > *āctus, rēctus, kāssus, tūssus*. Curiously, Jasanoff compares this type of lengthening to the one in Nsg of Slavic o – stems, like **bogъ* > *bóg* (Polish) or OIr. **dant* > *dét* “tooth”. However, those are two different processes having nothing to common with Lachmann's law. Both Slavic and Old Irish forms show that a syllable segment was lost.

As for lack of “*i*” lengthening, Jasanoff thinks that Lachmann's law did not cause the lengthening due to a crosslinguistic tendency of high – vowels to remain short, so *vīsus* is interpreted as a neologism to *vīdī*.⁷⁴

2.13 Glottalic theory explanation

Baldi 1991 tried to explain the mechanism of Lachmann's Law from the glottalic theory. The traditional Indo – European series of voiced unaspirated obstruents are replaced by a row of glottalic consonants: *b=p'*, *d=t'*, *g=k'*, so the forms *sessus, essus, āctus, strīctus, rectus* used to have roots **set'–, et–, ak'–, stri(n)k'–, rek'–*. Lachmann's Law can be formalized as:
VC' + to – > V̄Cto –.

Baldi's glottalic system is as follows:⁷⁵

<i>p'</i>	<i>b^h/b</i>	<i>p^h/p</i>
<i>t'</i>	<i>d^h/d</i>	<i>t^h/t</i>
<i>k^{hw}</i>	<i>g^{wh}/g^w</i>	<i>k^{wh}/k^w</i>
	allophones	allophones

From PIE to Latin the evolution of consonants is as follows: **p^h/p* > Lat. *p*, **p^het'* – “foot”, Lat. *pēs, pedis*; **t^h/t* > Lat. *t*, **t^hreyes* “three” > Lat. *trēs*; **k^h/k* > Lat. *c(h)*, **k^hmt^hom* “hundred”, Lat. *centum*; **d^h/d* > Lat. *f, d, b*, **d^hūmos* “smoke” > Lat. *fūmus*.⁷⁶ Glottalic responses to Latin are as follows: **p'* > Lat. *b*, **p'el* – “strong” > Lat. *dēbilis*; **t'* > Lat. *d*, **t'omos* “house” > Lat. *domus*; **k'* > Lat. *g*, **k'enos* “race” > Lat. *genus*; **k^{hw}* > Lat. *u/gu*, **k^wen* – “come” > Lat. *veniō*. Tra-

⁷⁴ Jasanoff 2004, 414

⁷⁵ Baldi 1991, 10–11

⁷⁶ *ibid.*

ditionally, PIE voiceless obstruents $*p, t, k > \text{Lat. } p, t, k$, PIE voiced obstruents $> \text{Lat. } b, d, g$ and PIE voiced aspirates $> \text{Lat. } b, d, g/f, f, h$. In Baldi's glottalic system, the development is as follows: PIE $*p^h/p, t^h/t, k^h/k > \text{PLat. } *p, t, k > \text{Lat. } p, t, k$; PIE $*b^h, d^h, g^h > \text{PLat. } *p^h, t^h, k^h > *ϕ, θ, X > \text{Lat. } f, f, h$; PIE $*b, d, g > \text{PLat. } b, d, g > \text{Lat. } b, d, g$; PIE $*p', t', k' > \text{PLat. } *b, d, g > \text{Lat. } b, d, g$.⁷⁷ Baldi also claims that if PIE $*p', t', k' > \text{Lat. } b, d, g$, we should have responses of Germ. p, t, k . According to traditional model, PIE voiceless $*p, k, k^w > \text{PGmc } *f, p, h, h^w$; PIE voiced unaspirated $*b, d, g, g^w > \text{PGmc } *p, t, k, k^w/k$ and PIE voiced aspirates $*b^h, d^h, g^h, g^w > *b, d, g, g^w/g$. Baldi's glottalic model supposes the following development: PIE $*p^h/p, t^h/t, k^h/k, k^wh/k^w > \text{PGmc } *f, p, h, h^w$; PIE $*b^h/b, d^h/d, g^h/g, g^wh/g^w > \text{PGmc } *b, d, g, g^w/g$ and PIE glottalic $*p', t', k', k'^w > \text{PGmc } *p, t, k, k^w$ which corresponds to Lat. b, d, g, gu .⁷⁸ Latin voiced unaspirated can also reflect glottalic consonant secondarily voiced between vowels: $tegō < *tek'ō-$, but $tēctus < *tek't^hos$. Fricatives can result from assimilation and assibilation: $fūsus < *g^hut't^hos$.

Lachmann's Law in Baldi's hypothesis is due to the compensatory lengthening process $CVC't^hos > CV?Ctos > C\bar{V}Ctos$ ⁷⁹ in syllable final position, so only in past participles. The same process does not operate in word final position, so there is no compensatory lengthening in Latin *grex*. As seen here, the glottalic consonant disintegrated into obstruent and glottal stop, which later caused the compensatory lengthening. The problem rises with unexpected brevity in *lassus, pessum, scissus, -sessus* and *tussis* reflecting the structure $-VSS- < * -Vt't^hos$. Baldi claims that the surface variants $-VSS- / -\bar{V}S$ are unpredictable and therefore we have various parallel lexical forms like *lītera/littera, Iūpiter/Iuppiter* etc.⁸⁰ Baldi tries to explain brevity in participles of *lassus* – type as the realization of a process that is sporadic and lexical and due to it the complex with geminates/or nongeminates can have three moras⁸¹, so:

$$\begin{array}{cc} \sigma & \sigma \\ VVS & VSS \end{array}$$

Baldi interprets the different development of $* -Vt't^hos-$ as a parasitic harmony, loss of glottalization without lengthening due to the phonetically close segments, so $*-t't^hos$ (parasitic harmony) $> -Vssus$, $*t't^hos$ (no harmony) $> -\bar{V}sus$. In my opinion, what we observe here is no unpredictable development, but a typical example of a closed syllable effect. I deal with it below in greater detail.

The most important contributions to the puzzling problem of Lachmann's law were made by Kortlandt. Three of his articles (Kortlandt 1989; 1999; 2007) successfully used the presupposition of the preglottalic consonants existence and their influence on the preceding syllable nucleus. Kortlandt's preglottalic consonants CV^2C give lengthening in Latin passive participles $*a^2gtos > \bar{a}gtus$ and

⁷⁷ *ibid.*

⁷⁸ Baldi 1991, 13

⁷⁹ The schema is mine.

⁸⁰ Baldi 1991, 17

⁸¹ Baldi 1991, 17

acute in Balto-Slavic (Winter's law) **por²gos* > *pōrgъ* (APa) with reflections. in Cz. *práh*, SCr. *präg*.⁸² With the conception of Italo-Celtic proto-language it is interesting to observe whether Lachmann's law operated in Celtic. It did not, as Old Irish *recht* "law" and Latin *rēctus*. This means that preglottalization still existed in Italic branch after the distintegration of Italo-Celtic.⁸³

Kortlandt supposes that passive participles had different ablaut forms depending on the root structure. Roots with *CeC* – structures had an e–grade form before Lachmann's law, as in *āctus*, *ēsus*, *lēctus*, *ōsus*, *rēctus*, *tēctus*, also *vectus* whose root ends in voiced aspirate **ueg^htos*. In –*essus* the e–grade was inserted after Lachmann's law, as Kortlandt claims, because the language system had a tendency to avoid zero forms –*ssus* from **–sdtos*. The form is observable in Latin *nīdus* "nest" < **nisdos*⁸⁴. Structures like *CeRC* had a zero grade *CrC*, Secondly, e–grade was introduced there later but before the Lachmann's law operated. The examples are **ghrdhtos* > **–grassos* > Latin –*gressus* "stepped" (as an example of *CrDh* stem, also in *CrD* stem like **bhrg^htos* > **bhragtos* > *frāctus*.⁸⁵ Therefore, we find length in cases w. *CeHC* – root which had both grades.⁸⁶ Kortlandt also claims that the similar structures with laryngeal and preglottalized consonant show opposite effect, so zero grade *CH^hC* > *C^hC* > *C^ḥC*, so the preglottalic feature was lost after a laryngeal, like **k^hh₂d–* > *cassō*, **lh₂dtos* > *lassus*. The similarity with Lubotsky's law is that this process results in a short vowel. We know that the structure *CHC* – gives *CaC* – in Latin.⁸⁷ Therefore, the participle forms *cāsus*, *pāctus*, *tāctus* with the forms *k^hh₂d – to –*, *ph₂d – to –*, *th₂d – to –*⁸⁸ should be reflected as **casus*, *pactus*, *tactus*. In fact, we observe length there. Kortlandt explains the situation with the later introduction of e–grade, otherwise the length is unexplainable.⁸⁹ The explanation is quite logical because the Sanskrit cognate roots of **k^hh₂d–* are *śad* – "to fall", of **ph₂d–* is *pajrá* "solid, firm" and of *tāctus*.

Blockage clusters – *NC* – prohibited the operation of Lachmann's law because in Italo – Celtic the obstruents were neutralized and developed into voiced

82 Beekes (1995, 133) uses the same results but with different notation. Preglottalized consonants should evolve to the combination of a glottal stop and a following consonant. This is also my conception. As far as I know, Kortlandt does not speak about glottal stop, mostly about preglottalized consonants and glottalic features of the preceding vowels, although in Kortlandt (1999) he writes about glottalic feature preserved as a glottal stop which causes the lengthening in Latin past participles.

83 Kortlandt 1989, 103

84 See Kortlandt 1999, 247 for details.

85 Reconstructions by Kortlandt (1999, 247).

86 *CeH^hC* form can be observed in Lubotsky's law where the anomalous short root vowel is explained by previous assimilation of the laryngeal (glottal stop) and preglottalized consonant (or a glottal stop and an unvoiced obstruent in my interpretation).

87 e.g., Beekes 1995, 142.

88 de Vaan 2008, 78, 442, 606

89 Kortlandt (1989, 104). Contrary to Kortlandt, de Vaan (2008, 606) claims that length in *tāctus* is due to Lachmann's law.

counterparts in that position: Lat. *pandō* < **-nt-*, *pingō* < **-nk'-*, *mungō* < **-nk-*.⁹⁰ However, as Kortlandt remarks, the original obstruent was often analogically restored, so *findō* – *fissus*, *scindō* – *scissus*, *stringō* – *strictus*, where the neutralization was extended to passive participles, but *passus*, *pictus*, where the neutralization from present forms were not extended to those forms.

Kortlandt's theory has been adopted by Schrijver (1991, 134–138). Schrijver observes that all vowel might be lengthened but **a* is sometimes lengthened or not, therefore the difference between *āctus* and *lassus* “tired” The latter form is considered original (**leh₁d-*) because the root should be isolated in Latin (sic). Schrijver rejects Kortlandt's explanation of *cāsus*, *pāctus* and *tāctus* and things that the glottalic feature was restored here on the basis of present and perfect forms. The restoration of glottal stop is almost the same principle as Drinka's *n-* infix – the difference is only in the quality of the segment. As my explanation is different (see below), I cannot agree with Schrijver's explanation.

The innovative concept of Kortlandt's theory is not only the mechanism of preglottalic consonants which cause the length (and the same clusters also cause Winter's law in Balto-Slavic), but also the effective explanation of various misleads of Lachmann's law due to the different ablaut grade in passive participles.

3 Summary

Taking apart fantastic hypotheses as well as various analogical explanations (being actually no explanations) the most optimal solution of the nature of Lachmann's law are Drinka's and Kortlandt's approaches. Although I have criticized many Drinka's explanations above, some examples can be explained by a secondary *n-* infix according to present forms. But I argue that the *n-* infix occurred after Lachmann's law (in the roots of the original *CV?D* – structure and the long vowel in final *CVNCTu* – form is only because the *-N-* is not moraic.

Kortlandt's application of preglottalic consonants (which disintegrated into a cluster of a glottal stop+obstruent) not only fits into the whole of Kortlandt theory of accentuation, but also easily explains why the same structures undergo Winter's law in Balto-Slavic and Lachmann's law in Latin, the fact that did not generally come into attention of many scholars. In the sequel I will check the data with respect to whether they fit into the theory and I will propose my own OT solution to Lachmann's law.

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⁹⁰ This is the old Thurneysen's observation, see Kortlandt 1989, 105.

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LACHMANNŮV ZÁKON V LATINĚ (ČÁST PRVNÍ)

První část dvojdílné studie pojednává o historii bádání v problematice Lachmannova zákona. Shrnuje dosavadní poznání a přístupy a opatřuje je kritickým komentářem. Z předložených teorií se pak autor přiklání k teorii Kortlandtově, kterou bere za základ pro vlastní interpretaci Lachmannova zákona, jež bude popsána v části druhé.

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