

The transformation of the vowel system in Gallic Latin as evidenced in inscriptions and the problem of dialectal positioning of Roman Gaul

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ABSTRACT

The present study analyzes the transformation of the vowel system and especially the process of vowel mergers based on the Latin inscriptions of the Gallic and Germanic provinces. With the help of the Computerized Historical Linguistic Database of the Latin Inscriptions of the Imperial Age (<http://lldb.elte.hu/>), it tries to draw and then compare the phonological profiles of the selected provinces and to describe the dialectal position of Gaul and the Germanic provinces regarding vocalism in three periods (AD 1–300, 301–500 and 501–700). The analysis, which also covers comparisons with certain provinces of Italy, Spain and Dalmatia, is carried out considering four aspects: the ratio of vocalic versus consonantal changes, the ratio of vowel mergers compared to vocalic changes, the ratio of *e-i* and *o-u* mergers compared to each other, and the ratio of vowel mergers by stressed and unstressed syllable. As a result of the present study, it was revealed that Gallic provinces cannot be treated as a unit or as clearly separate from the other areas studied according to either aspect of the study, especially not in the early, pre-Christian period. Gallic provinces appear to behave in the same or a levelled manner at most in the later and/or latest periods. The Germanic provinces, especially Germania Superior, have, albeit with some delay, adapted to the Gallic provinces in their late development. The present study, which continued József Herman's research, managed to explore the hitherto little-known linguistic and dialectological features of Latin in the Gallic and Germanic provinces.

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KEYWORDS

Latin, Gaul, inscriptions, vocalism, vowel mergers, dialectology

1. INTRODUCTION

Although Adams has already discussed some of the (mainly lexical) regional features of Gallic Latin through the analysis of non-epigraphic corpora,¹ Herman's work *La langue latine dans la Gaule romaine* continues to be decisive for the linguistic, dialectological characterization of the Gallic Latin sound system as evidenced in inscriptions.²

Herman, with the intention of exploring the intrinsic features of late Gallic Latin language (and at the same time summarizing the results of previous research done by himself and others³), described the most characteristic features of the area's sound system as follows.⁴ In the Christian era,⁵ Gaul was characterized by mobile vocalism and stable consonantism.⁶ In the development of vocalism, particularly with regard to the merger of *ī* and *ē*, Gaul was more advanced than the other provinces, but the merger of *ū* and *ō* was also occurring at the same rate as expected relative to the frequency of these vowels, perhaps with some delay.⁷ Gaul also outperformed the other Western provinces in that these vowel mergers (according to the general frequency of the vowels in question) occurred in equal proportions in stressed and unstressed syllables, whereas in other provinces the stressed syllable continued to resist these mergers.⁸

¹ADAMS, J. N.: *The Regional Diversification of Latin 200 BC–AD 600*. Cambridge 2007, 240–258, 276–369.

²HERMAN, J.: *La langue latine dans la Gaule romaine* (1983). In HERMAN, J.: *Du latin aux langues romanes. Études de linguistique historique*. Réun. S. Kiss. Tübingen 1990, 147–163.

³That is, HERMAN, J.: *Aspects de la différenciation territoriale du latin sous l'Empire* (1965). In HERMAN: *Du latin aux langues romanes* (n. 2) 10–28. and GAENG, P. A.: *An Inquiry into Local Variations in Vulgar Latin as Reflected in the Vocalism of Christian Inscriptions*. Chapel Hill 1968.

⁴HERMAN: *La langue latine* (n. 2) 158–159.

⁵The term “Christian era” refers to the period between the 4th and 7th centuries both in Herman's analysis and in this study (see below).

⁶HERMAN: *La langue latine* (n. 2) 158: “Dans la domaine phonétique, on est d'abord frappé par une relative stabilité du consonantisme et une relative mobilité du vocalisme.” As far as conservative consonantism is concerned, according to HERMAN: *La langue latine* (n. 2) 159, only negative statements can be made, such as that the so-called *b-v* merger, which is so common in Rome, Calabria in southern Italy, and Dalmatia, does not exist in Gaul (“pratiquement absente”). It is clear from the relevant data in Tables 1–3 below that Herman's statement can only be considered valid for the early period. In the later and especially the latest period, the provinces of Gaul and the Germanic provinces began to catch up with the other areas. Lugudunensis, for example, was essentially on a par with Venetia et Histria in terms of B/V confusions in the latest period (see Table 3 below).

⁷HERMAN: *La langue latine* (n. 2) 158: “Pour le vocalisme, le trait le plus saillant, mis en évidence par tous ceux qui ont comparé la Gaule avec d'autres provinces, est l'avance de la Gaule dans la fusion des timbres de *ī* et *ē*, comme en témoignent de nombreuses confusions, notamment dans les inscriptions chrétiennes. Les confusions *ō ~ ū* se présentent — peut-être avec un certain retard — dans les proportions attendues d'après la fréquence de ces voyelles.” Herman's finding is based on data in GAENG (n. 3) 67, 95, 277ff.

⁸HERMAN: *La langue latine* (n. 2) 158: “Il a été noté que la Gaule devance les autres provinces occidentales d'un autre point de vue également: ces changements semblent atteindre dans une proportion identique la syllabe accentuée et la syllabe atone, alors que, dans d'autres provinces, la syllabe accentuée reste plus longtemps épargnée.”



Concerning the emergence of Vulgar Latin vowel system, Gaul overtook Italy itself (including Rome), where only Italy's *Regio X* (Aquilaia and its close vicinity) could keep pace with it.⁹ These, then, are the most important findings of Herman's 1983 summary of the main features of the Gallic Latin vowel system.

Since a sizeable portion of the material of the provinces that Herman included in his analysis are already processed in the Computerized Historical Linguistic Database of the Latin Inscriptions of the Imperial Age (hereafter the LLDB Database), I aimed to review Herman's conclusions in light of the digitalized data and, where necessary, supplement and revise them. In addition to the four Gallic provinces (Aquitania, Belgica, Lugudunensis and Narbonensis), I included Venetia et Histria (*Regio X*) from northern Italy, Apulia et Calabria (*Regio II*) from southern Italy, the city of Rome from central Italy, Dalmatia from Illyricum, and Lusitania from Spain. I also included the two Germanic provinces, Germania Inferior and Germania Superior,¹⁰ with the aim of establishing whether or not these provinces (co-administered with Belgica for some time in terms of financial administration) belong dialectologically to the same group as Gallic provinces. Furthermore, since Herman treated Gaul as a substantially homogeneous dialectological area and thus compared Gaul's developmental trends to other areas, I wish to examine whether there are internal territorial differences between the four Gallic provinces in the development of vocalism.

In addition, in my paper, beside the comparative analysis of the later epigraphic material of the Christian period, I include in the analysis the inscriptional corpus of the early, Pre-Christian period of the Empire (which Herman essentially ignored in his study), asking to what extent the antecedents of the developmental tendencies of the late Christian period in the early pre-Christian period can be traced, if at all. Moreover, the very long Christian period was divided in two: a period from the fourth to the fifth century and one from the sixth to the seventh century. This way three study periods were defined in the end, one early (1–300 AD), one later (301–500 AD), and one latest (501–700 AD). Accordingly, with the help of the LLDB Database I will try to draw and then compare the phonological profiles of the selected provinces in these three periods, and to describe the dialectal position of Roman Gaul regarding vocalism in all three periods.

⁹HERMAN: *La langue latine* (n. 2) 158: "Il semble donc que, dans la constitution du système typiquement préroman des phonèmes vocaliques, la Gaule ait devancé les autres provinces et même l'Italie, y compris Rome."; and note 36: "De ce point de vue-là, la Gaule est pourtant concurrencée par la région X de l'Italie (Aquilée et ses environs)."

¹⁰For the Latin of some cities of the Germanic provinces in the light of local inscriptions, see more recently: WILLMS, L.: *Augusta Treverorum Vulgaris: Linguistic Change and Cultural Integration in the Late Antique and Early Medieval Inscriptions of Trier* (Germany). *Acta Antiqua Hung* 59 (2019) 651–661 and WILLMS, L.: *Colonia Agrippina Vulgaris: Linguistic Change and Cultural Integration in the Vulgar Latin Inscriptions of Cologne*. In MARTÍN RODRÍGUEZ, A. M. (ed.): *Linguisticae Dissertationes. Current Perspectives on Latin Grammar, Lexicon and Pragmatics. Selected Papers from the 20th International Colloquium on Latin Linguistics (Las Palmas de Gran Canaria, Spain, June 17-21, 2019)*. Madrid 2021, 199–216.



2. METHODOLOGY

Before I go into the detailed analysis, the following features of methodology must be highlighted. Throughout my analysis, the method of József Herman will be followed:¹¹ I will analyse the distributional structures of purely phonological ‘errors’ recorded from Latin inscriptions by excluding data that have morpho-syntactic or other non-phonological interpretations¹² as well as the purely orthographic errors as non-linguistic ones.¹³ I will consider all types of

¹¹For Herman’s methodology, see HERMAN, J.: *Differenze territoriali nel latino parlato dell’Italia tardo-imperiale: un contributo preliminare*. In HERMAN, J. – MARINETTI, A. (edd.): *La preistoria dell’Italiano. Atti della Tavola Rotonda di Linguistica Storica. Università Ca’ Foscari di Venezia 11–13 giugno 1998*. Tübingen 2000, 123–135 and ADAMIK, B.: *In Search of the Regional Diversification of Latin: Some Methodological Considerations in Employing the Inscriptional Evidence*. In BIVILLE, Fr. et al. (edd.): *Latin vulgaire – latin tardif IX. Actes du IX^e colloque international sur le latin vulgaire et tardif, Lyon, 6 – 9 septembre 2009*. Lyon 2012, 123–139.

¹²Throughout the current investigation I will consider only those data forms with phonetic main codes (chosen from the list labelled as ‘Vocalismus’ in the Database) that do not have a nominal or verbal morphosyntactic alternative code (chosen from the lists labelled as ‘Nominalia’ or ‘Verbalia’ in the Database), such as (é: > I) FECIRVNT for *fecerunt* (LLDB-7226, *CIL* 3, 10743, 3), (i > E) MENVS for *minus* (LLDB-2594, *ILJug* 2, 708, 7), (ó: > V) AMVRE for *amore* (LLDB-8255, *RIGC* 1, 147, 6), (ú > O) NOMERO for *numero* (LLDB-554, *AE* 1912, 192, 2), (ó > V) MEMVRIA for *memoriam* (LLDB-585, *AE* 1969–70, 575, 7), (é > I) VALIRIO for *Valerio* (LLDB-45520, *AE* 1913, 137, 2), (i: > E) FELIVS for *filius* (LLDB-131428, *ICUR* 7, 17782, 2), (ú: > O) INMONES for *immunis* (LLDB-12585, *InscrAgu* 3, 3393, 3), (e: > I) FILICITER for *feliciter* (LLDB-10024, *CIL* 13, 7201, 6), (i > E) INVEDA for *invada* (LLDB-3074, *CIL* 13, 1483, 6), (o: > V) NEGVTIATOR for *negotiator* (LLDB-124770, *AE* 1888, 25, 3), (u > O) TVMOLVM for *tumulum* (LLDB-24, *CIL* 3, 9527, 11), (o > V) CORPVRA for *corpora* (LLDB-9446, *CIL* 3, 9567, 4), (e > I) SEMPPIR for *semper* (LLDB-13644, *CIL* 13, 2484, 3), (i: > E) VETALIS for *Vitalis* (LLDB-5244, *CIL* 13, 11591, 2), (u: > O) MOSIVO for *musivo* (LLDB-25818, *CIL* 11, 273, 7) etc. This procedure is necessary because forms like ANNVS for *annos* (e.g. LLDB-11843, *CIL* 5, 1628, 3; o: > V/decl. IV pro II), MENSIS for *menses* (e.g. LLDB-7012, *CIL* 12, 2095, 10; e: > I/acc. pl. -IS pro -es) and IACIT for *iacet* (LLDB-14646, *CIL* 3, 9527, 1; e > I/-IT pro -et (in 3. pers. praes. impf. verborum)), QVIESCET for *quiescit* (LLDB-8015, *RIGC* 1, 47, 1; i > E/-ET pro -it (in 3. pers. praes. impf. verborum)) etc. can be interpreted not only as incidences of phonological changes but also as incidences of confusions between either cases, declensions or conjugations – and these are not separable. Accordingly, I have also excluded data forms with an alternative code chosen from the list labelled as ‘Syntactica etc.’ in the Database, e.g. archaisms such as VIVOS for *vivus* (e.g. LLDB-231, *ILJug* 1, 117, 9; u > O/archaismus) or possible recompositions such as PERDEDIT for *perdidit* (LLDB-4335, *CIL* 12, 5862, 6; i > E/recompositio) etc. For resolving abbreviations of inscriptional corpora used in this survey see: http://lldb.elte.hu/admin/abbrev_bibl.php.

¹³The following codes were excluded as purely orthographic phenomena: g > C, qu > CV, H > ø, aspiratio vitiosa, ch > C, ph > P, th > T, PH ~ F, c > K, k > C, x > SX/CS/XS/XSS/XX, i (= /j/) > II, áe > E, é > AE, é: > AE, ae > E, e > AE, e: > AE, ae/áe > AI, i: > II, e: > EE, a: > AA, o: > OO, u: > VV. Purely orthographic phenomena here include not only spelling patterns based on different (substandard) practices (which were to be avoided in standard orthography), such as CV instead of QV, CS instead of X, or geminating vowels as VV to denote long u, but also which testify to linguistic changes that have already taken place (are no longer active), such as not writing H (H > ø), writing it in the wrong place (*aspiratio vitiosa*), or confusing AE and E, cf. HERMAN, J.: *Vulgar Latin*. Trans. by R. Wright. University Park, Pennsylvania 2000, 31 and 38. Similarly, I have also excluded data forms that either contextually (e.g. syncopated forms of *saeculum* in verse) or technically (e.g. readings uncertain for whatever reason) might be regarded as correct, and are therefore labelled as “fortasse recte” in the Database. Moreover, I excluded items imported from other provinces (labelled as “Import from” in the Database) such as military diplomas and pottery, since most items of these latter group are imported goods as well and it is very difficult to link them to a single province such as the ‘Vascula Gallica’ (labelled as “pottery” in the Database).



phonological changes recorded in the LLDB Database, with particular emphasis on the substantial vowel mergers in the vowel system.¹⁴

As it is well known, the orthographic confusions¹⁵ between E and I and between O and U represent the Vulgar Latin vowel mergers of long \bar{e} and short i into a closed e , and long \bar{o} and short u into a closed o in stressed syllables, alongside the same mergers in unstressed syllables, with an extension to short e and short o respectively.¹⁶ These changes (i.e. $\acute{e} i > e$, $\acute{e} > e$, $\bar{e} e i > e$; $\acute{o} u > o$, $\acute{o} > o$, $\bar{o} o u > o$) occurred in the great majority of the Romance languages, and lead to the emergence of a system that can be called ‘Proto-Western-Romance’. At the same time, the evidence from Romance languages suggests that this reorganization of vowel quality did not occur in Sardinia,¹⁷ and occurred only partially in some of the Latin spoken in the Balkans, i.e. in the forerunner of the later Rumanian language.¹⁸ However, these territorial differences do not matter in the present case, because in the current study I have included only territorial units

¹⁴Additionally, the $b-w$ merger in the consonant system (apparent in the confusion of the letters B and V) will also be taken into account to some extent. It was included in the discussion as a contrast group, as a kind of index of productivity. The method of contrasting the vowel mergers with the $b-w$ merger was previously applied in the analysis of Sardinian Latin e.g. by LUPINU, G.: Contributo allo studio della fonologia delle iscrizioni latine della Sardegna paleocristiana. In MASTINO, A. et al. (edd.): *La Sardegna paleocristiana tra Eusebio e Gregorio Magno: atti del Convegno nazionale di studi, 10-12 ottobre 1996*. Cagliari 1999, 227–261, 238ff., as well as of African Latin by ADAMS (n. 1) 642–649 and ADAMIK, B.: The transformation of the vowel system in African Latin with a focus on vowel mergers as evidenced in inscriptions and the problem of the dialectal positioning of Roman Africa. *Acta Classica Universitatis Scientiarum Debreceniensis* 56 (2020) 9–25, 12ff.

¹⁵In this survey for denoting the various types of misspellings in inscriptions, I use the code-system of the Computerized Historical Linguistic Database of Latin Inscriptions of the Imperial Age (see https://lldb.elte.hu/admin/abbrev_codes.php); as for the format of the codes, the sign “>” is to be interpreted as “represented in the inscriptional text as”, e.g. “ $\acute{e} > I$ ” means “a Classical Latin stressed long e is represented in the text by the letter I”.

¹⁶For the respective mergers, see some illustrative examples from the Gallic material: ($\acute{e} i > e$) $\acute{e} > I$, FICIT for *fecit* (LLDB-78123, *CIL* 13, 3516, II 8), $i > E$, MENVS for *minus* (LLDB-8209, *CIL* 13, 3683, 5); ($\acute{o} u > o$) $\acute{o} > V$, AMVRE for *amore* (LLDB-13599, *CIL* 13, 2478, 7), $u > O$, NOMERO for *numero* (LLDB-8202, *CIL* 13, 3683, 2); ($\bar{e} e i > e$) $e > I$, DIVOTA for *devota* (LLDB-3099, *CIL* 13, 1491, 2), $e > I$, MATIR for *mater* (LLDB-8100, *CIL* 13, 3909, 5), $i > E$, DECEMA for *decima* (LLDB-4378, *CIL* 12, 2091, 12), ($\bar{o} o u > o$) $o > V$, NEGVCIIATORIS for *negotiatoris* (LLDB-27420, *CIL* 13, 2391, 2), $o > V$, PECTVRE for *pectore* (LLDB-13658, *CIL* 13, 2484, 4), $u > O$, TITOLVM for *titulum* (LLDB-8309, *RICG* 1, 184, 3). At the same time, in the present study I also took into account the relatively rare and scattered letter confusions that occurred in the case of vowels that did not participate in the vowel merger. These occasional letter confusions are probably also attributable to spelling uncertainty caused by this merger (which is even more likely in the case of the long unstressed i and u , after their shortening, especially in word-final syllables, cf. HERMAN: Vulgar Latin (n. 13) 28), e.g.: ($\acute{o} > V$) PVPVLO for *populo* (LLDB-8204, *CIL* 13, 3683, 3), ($\acute{e} > I$) VIOLINTIA for *violentia* (LLDB-27413, *CIL* 13, 2386, 8), ($i > E$) EDS for *Idus* (LLDB-8088, *CIL* 13, 3907, 5), ($u > O$) PEDATORA for *pedatura* (LLDB-2944, *CIL* 13, 960, 1–2), ($i > E$) VARIES for *variis* (LLDB-10222, *CIL* 12, 2179, 6), ($u > O$) FRONITI for *fruniti* (LLDB-12199, *InscrAqu* 3, 3129, 6).

¹⁷This reorganization did not occur in most of Africa either. The vocalism of Latin in later Africa Proconsularis including Numidia turned out to be of the same type as of the later Latin in Sardinia, while the vocalism of the Latin in later Mauretania Caesariensis might have started to develop toward the eastern or Balkan type of vocalism, see ADAMIK: The transformation (n. 14) 22–23.

¹⁸Cf. HERMAN: Vulgar Latin (n. 13) 32–33. Vowel quality in Sardinia remained as it had been all along, even though the length distinctions were lost here just like everywhere else ($\bar{i} i > i$, $\bar{e} e > e$, $\bar{o} o > o$, $\bar{u} u > u$). At the same time, in Rumanian, which is the single persistent representative of Balkan Latin, a development is observable halfway between the two; front vowels merge, just like in most Romance languages, but the difference in quality is preserved in back vowels ($\acute{e} i > e$, $\acute{e} > e$, $\bar{e} e i > e$, $\bar{o} o > o$, $\bar{u} u > u$), just like in Sardinia.



belonging to the later so called ‘Proto-Western-Romance’ area¹⁹ and I am interested in the inner dialectological division and development of this large area in terms of the selected linguistic phenomena.

3. ANALYSIS OF THE DATA FROM THE SELECTED PROVINCES

Now let us turn to the analysis of the data from the selected provinces. In order to see the changes over time, as mentioned, I divided the relevant material in three periods: an early one from the 1st through the 3rd century (see Table 1), a later one from the 4th through the 5th century (see Table 2), and a latest one from the 6th through the 7th century (see Table 3).²⁰ The data in each of the three tables are displayed in the following manner. Under the name of each province, there is a row of information with data. Column 1 displays the total number of all phonological data forms. Column 2 has the ratio of vocalic versus consonantal changes (abbreviated as V and C). Column 3 shows the exact numbers and proportions for E/I and O/V confusions within vocalic changes, and the exact numbers and proportions of B/V confusions within consonantal changes. Column 4 shows the totalized percentage of E/I and O/U faults compared to all vocalic errors, while column 5 the E/I to O/U ratio, and column 6 the incidence of these confusions in stressed and unstressed syllables.

Data typed in italics indicate that the sample size is less than ideal for drawing valid conclusions. In the first column, italics are used if the total number of phonological data forms is less than 100, in the second, third, and fourth columns, if the total number of vowel or consonant related data forms is less than 50, and finally, in the fifth and the sixth columns, if the total number of vowel merger data forms is less than 20. The conclusions drawn from these data sets should be treated with caution. This type of weighting helps us make a realistic assessment of the data for each area and period.²¹ This way the data in Tables 1–3 represent the basic data sets for our interpretation to be presented.²²

¹⁹Dalmatian late Latin and Dalmatian Romance also belonged to the Western-Romance vowel system, cf. OMETLCHENKO, S. W.: *A Quantitativ and Comparative Study of the Vocalism of the Latin Inscriptions of North-Africa, Britain, Dalmatia and the Balkans*. Chapel Hill 1977, 119 and HADLICH, R.: *The Phonological History of Vegliote*. Chapel Hill 1965, 83f.

²⁰In fact, I was looking for data forms that could be dated between the selected centuries, technically looking for the AD 1–300, 301–500 and 501–700 periods in the ‘Date’ module of the extended search engine of the Database (http://lldb.elte.hu/admin/search_2.php) using the ‘Period A’ submodule. This way those data forms are displayed where the arithmetic mean of the indicated period falls within the period specified in the search query. E.g. with a search query for AD 301–500, data forms with a date 291–350 (mean: 320.5) or 471–510 (mean: 490.5) will be displayed, as well as data forms with a period narrower than the search query, such as 431–450 (mean: 440.5), and where a single year is indicated, such as 331. At the same time, data forms with dates such as 271–310 (mean: 290.5) or 491–530 (mean: 510.5) will be excluded – they fall into the earliest (1–300 AD) and latest (501–700 AD) period, respectively.

²¹For this type of weighting, see ADAMIK, B.: A study on the dialectology of Vulgar Latin vocalic mergers: the interaction between confusion of vowel quality, syncope and accent. In GARCIA LÉAL, L. – PRIETO ENTRIALGO, C. E. (eds): *Latin vulgare – latin tardif XI: XI Congreso Internacional sobre el Latín Vulgar y Tardío (Oviedo, 1-5 de septiembre de 2014)*. Hildesheim – Zürich – New York 2017, 183–194, 185.

²²All the data displayed in Tables 1, 2, and 3 represent the status of the LLDB Database on 31/05/2022. To learn more about the search and charting modules of the LLDB Database, see ADAMIK, B.: Computerized Historical Linguistic Database of the Latin Inscriptions of the Imperial Age: Search and Charting Modules. In GRADVOHL, E. – SZABÓ, Á. (edd.): *From Polites to Magos. Studia György Németh sexagenario oblata* [Hungarian Polis Studies 22]. Budapest–Debrecen 2016, 13–27.



Table 1. Phonological changes in the early (1-300 AD) provinces in LLDB

1	2	3	4	5	6
1. Aquitania					
100% = 229	V 30.6% = 70	100% = 70, E/I 18.6% = 13, O/U 10% = 7	E/I+O/U = 20 = 28.6%	E/I:O/U = 1.9	E/I/O/U:É/Í/Ó/Ú = 11 : 9 = 1.2
	C 69.4% = 159	100% = 159, B/V 1.3% = 2			
2. Belgica					
100% = 183	V 41.5% = 76	100% = 76, E/I 13.2% = 10, O/U 1.3% = 1	E/I+O/U = 11 = 14.5%	E/I:O/U = 10	E/I/O/U:É/Í/Ó/Ú = 8 : 3 = 2.7
	C 58.5% = 107	100% = 107, B/V 0.9% = 1			
3. Lugudunensis					
100% = 273	V 33.3% = 91	100% = 91, E/I 18.7% = 17, O/U 5.5% = 5	E/I+O/U = 22 = 24.2%	E/I:O/U = 3.4	E/I/O/U:É/Í/Ó/Ú = 17 : 5 = 3.4
	C 66.7% = 182	100% = 182, B/V 1.6% = 3			
4. Narbonensis					
100% = 507	V 39.6% = 201	100% = 201, E/I 21.4% = 43, O/U 2.5% = 5	E/I+O/U = 48 = 23.9%	E/I:O/U = 8.6	E/I/O/U:É/Í/Ó/Ú = 28 : 20 = 1.4
	C 60.4% = 306	100% = 306, B/V 1.6% = 5			
5. Germania Inferior					
100% = 279	V 36.6% = 102	100% = 102, E/I 9.8% = 10, O/U 1% = 1	E/I+O/U = 11 = 10.8%	E/I:O/U = 10	E/I/O/U:É/Í/Ó/Ú = 4 : 7 = 0.6
	C 63.4% = 177	100% = 177, B/V 3.4% = 6			
6. Germania Superior					
100% = 661	V 39.5% = 261	100% = 261, E/I 12.3% = 32, O/U 2.3% = 6	E/I+O/U = 38 = 14.6%	E/I:O/U = 5.3	E/I/O/U:É/Í/Ó/Ú = 25 : 13 = 1.9
	C 60.5% = 400	100% = 400, B/V 5.5% = 22			
7. Venetia et Histria					
100% = 337	V 39.2% = 132	100% = 132, E/I 21.2% = 28, O/U 6.8% = 9	E/I+O/U = 37 = 28.6%	E/I:O/U = 3.1	E/I/O/U:É/Í/Ó/Ú = 30 : 7 = 4.3
	C 60.8% = 205	100% = 205, B/V 6.8% = 14			
8. Apulia et Calabria					
100% = 307	V 37.5% = 115	100% = 115, E/I 14.8% = 17, O/U 4.3% = 5	E/I+O/U = 22 = 19.1%	E/I:O/U = 3.4	E/I/O/U:É/Í/Ó/Ú = 14 : 8 = 1.8
	C 62.5% = 192	100% = 192, B/V 26% = 50			
9. Roma					
100% = 4,305	V 44.7% = 1,926	100% = 1,926, E/I 10.4% = 200, O/U 4.6% = 89	E/I+O/U = 289 = 15%	E/I:O/U = 2.2	E/I/O/U:É/Í/Ó/Ú = 211 : 78 = 2.7
	C 55.3% = 2,379	100% = 2,379, B/V 21.7% = 517			
10. Dalmatia					
100% = 946	V 41.4% = 392	100% = 392, E/I 23.2% = 91, O/U 3.3% = 13	E/I+O/U = 104 = 26.6%	E/I:O/U = 7	E/I/O/U:É/Í/Ó/Ú = 70 : 34 = 2.1
	C 58.6% = 554	100% = 554, B/V 7.2% = 40			
11. Lusitania					
100% = 634	V 38.2% = 242	100% = 242, E/I 16.5% = 40, O/U 7% = 17	E/I+O/U = 57 = 23.5%	E/I:O/U = 2.4	E/I/O/U:É/Í/Ó/Ú = 38 : 19 = 2
	C 61.8% = 392	100% = 392, B/V 1.8% = 7			



Table 2. Phonological changes in the later (301–500 AD) provinces in LLDB

1	2	3	4	5	6
1. Aquitania					
100% = 30	V 66.7% = 20	100% = 20, E/I 35% = 7, O/U 25% = 5	E/I+O/U = 12 = 60%	E/I:O/U = 1.4	E/I/O/U:É/Ī/Ō/Ū = 9 : 3 = 3
	C 33.3% = 10	100% = 10, B/V 30% = 3			
2. Belgica					
100% = 130	V 63.8% = 83	100% = 83, E/I 65% = 54, O/U 15.7% = 13	E/I+O/U = 67 = 80.7%	E/I:O/U = 4.2	E/I/O/U:É/Ī/Ō/Ū = 35 : 32 = 1.1
	C 36.2% = 47	100% = 47, B/V 2.1% = 1			
3. Lugudunensis					
100% = 54	V 66.7% = 36	100% = 36, E/I 44.4% = 16, O/U 25% = 9	E/I+O/U = 25 = 69.4%	E/I:O/U = 1.8	E/I/O/U:É/Ī/Ō/Ū = 12 : 13 = 0.9
	C 33.3% = 18	100% = 18, B/V 27.8% = 5			
4. Narbonensis					
100% = 124	V 69.4% = 86	100% = 86, E/I 47.6% = 41, O/U 19.8% = 17	E/I+O/U = 58 = 67.4%	E/I:O/U = 2.1	E/I/O/U:É/Ī/Ō/Ū = 35 : 23 = 1.5
	C 30.6% = 38	100% = 38, B/V 7.9% = 3			
5. Germania Inferior					
100% = 39	V 56.4% = 22	100% = 22, E/I 22.7% = 5, O/U 36.4% = 8	E/I+O/U = 13 = 59.1%	E/I:O/U = 0.6	E/I/O/U:É/Ī/Ō/Ū = 9 : 4 = 2.2
	C 43.6% = 17	100% = 17, B/V 0% = 0			
6. Germania Superior					
100% = 88	V 55.7% = 49	100% = 49, E/I 59.2% = 29, O/U 12.2% = 6	E/I+O/U = 35 = 71.4%	E/I:O/U = 4.8	E/I/O/U:É/Ī/Ō/Ū = 28 : 7 = 4
	C 44.3% = 39	100% = 39, B/V 0% = 0			
7. Venetia et Histria					
100% = 585	V 42.4% = 248	100% = 248, E/I 49.2% = 122, O/U 11.3% = 28	E/I+O/U = 150 = 60.5%	E/I:O/U = 4.4	E/I/O/U:É/Ī/Ō/Ū = 110 : 40 = 2.8
	C 57.6% = 337	100% = 337, B/V 21.1% = 71			
8. Apulia et Calabria					
100% = 93	V 41.9% = 39	100% = 39, E/I 41% = 16, O/U 28.2% = 11	E/I+O/U = 27 = 69.2%	E/I:O/U = 1.5	E/I/O/U:É/Ī/Ō/Ū = 17 : 10 = 1.7
	C 58.1% = 54	100% = 54, B/V 51.9% = 28			
9. Roma					
100% = 8,064	V 37.1% = 2,988	100% = 2,988, E/I 22.2% = 664, O/U 9.2% = 276	E/I+O/U = 940 = 31.4%	E/I:O/U = 2.4	E/I/O/U:É/Ī/Ō/Ū = 695:245 = 2.8
	C 62.9% = 5,076	100% = 5,076, B/V 39.3% = 1,993			
10. Dalmatia					
100% = 406	V 53% = 215	100% = 215, E/I 36.3% = 78, O/U 13% = 28	E/I+O/U = 106 = 49.3%	E/I:O/U = 2.8	E/I/O/U:É/Ī/Ō/Ū = 72 : 34 = 2.1
	C 47% = 191	100% = 191, B/V 26.7% = 51			
11. Lusitania					
100% = 65	V 58.5% = 38	100% = 38, E/I 26.3% = 10, O/U 5.3% = 2	E/I+O/U = 12 = 31.6%	E/I:O/U = 5	E/I/O/U:É/Ī/Ō/Ū = 10 : 2 = 5
	C 41.5% = 27	100% = 27, B/V 25.9% = 7			



Table 3. Phonological changes in the latest (501-700 AD) provinces in LLDB

1	2	3	4	5	6
1. Aquitania					
100% = 136	V 82.4% = 112 C 17.6% = 24	100% = 112, E/I 45.5% = 51, O/U 41.1% = 46 100% = 24, B/V 16.7% = 4	E/I+O/U = 97 = 86.6%	E/I:O/U = 1.1	E/I/O/U:É/Í/Ó/Ú = 61 : 36 = 1.7
2. Belgica					
100% = 161	V 74.5% = 120 C 25.5% = 41	100% = 120, E/I 59.1% = 71, O/U 26.7% = 32 100% = 41, B/V 4.9% = 2	E/I+O/U = 103 = 85.8%	E/I:O/U = 2.2	E/I/O/U:É/Í/Ó/Ú = 47 : 56 = 0.8
3. Lugudunensis					
100% = 410	V 80.5% = 330 C 19.5% = 80	100% = 330, E/I 57.9% = 191, O/U 31.8% = 105 100% = 80, B/V 21.3% = 17	E/I+O/U = 296 = 89.7%	E/I:O/U = 1.8	E/I/O/U:É/Í/Ó/Ú = 192 : 104 = 1.8
4. Narbonensis					
100% = 741	V 74.1% = 549 C 25.9% = 192	100% = 549, E/I 54.8% = 301, O/U 27.3% = 150 100% = 192, B/V 9.9% = 19	E/I+O/U = 45 = 82.1%	E/I:O/U = 2	E/I/O/U:É/Í/Ó/Ú = 292 : 159 = 1.8
5. Germania Inferior					
100% = 45	V 57.8% = 26 C 42.2% = 19	100% = 26, E/I 38.5% = 10, O/U 34.6% = 9 100% = 19, B/V 5.3% = 1	E/I+O/U = 19 = 73.1%	E/I:O/U = 1.1	E/I/O/U:É/Í/Ó/Ú = 11 : 8 = 1.4
6. Germania Superior					
100% = 172	V 74.4% = 128 C 25.6% = 44	100% = 128, E/I 53.2% = 68, O/U 35.9% = 46 100% = 44, B/V 25% = 11	E/I+O/U = 114 = 89.1%	E/I:O/U = 1.5	E/I/O/U:É/Í/Ó/Ú = 61 : 53 = 1.1
7. Venetia et Histria					
100% = 66	V 62.1% = 41 C 37.9% = 25	100% = 41, E/I 56.1% = 23, O/U 19.5% = 8 100% = 25, B/V 20% = 5	E/I+O/U = 31 = 75.6%	E/I:O/U = 2.9	E/I/O/U:É/Í/Ó/Ú = 24 : 7 = 3.4
8. Apulia et Calabria					
100% = 140	V 35.7% = 50 C 64.3% = 90	100% = 50, E/I 42% = 21, O/U 34% = 17 100% = 90, B/V 46.7% = 42	E/I+O/U = 38 = 76%	E/I:O/U = 1.2	E/I/O/U:É/Í/Ó/Ú = 26 : 12 = 2.2
9. Roma					
100% = 351	V 51.6% = 181 C 48.4% = 170	100% = 181, E/I 26.5% = 48, O/U 12.2% = 22 100% = 170, B/V 49.4% = 84	E/I+O/U = 70 = 38.7%	E/I:O/U = 2.2	E/I/O/U:É/Í/Ó/Ú = 39 : 31 = 1.3
10. Dalmatia					
100% = 79	V 81% = 64 C 19% = 15	100% = 64, E/I 40.6% = 26, O/U 32.8% = 21 100% = 15, B/V 60% = 9	E/I+O/U = 47 = 73.4%	E/I:O/U = 1.2	E/I/O/U:É/Í/Ó/Ú = 33 : 14 = 2.4
11. Lusitania					
100% = 641	V 37.8% = 242 C 62.2% = 399	100% = 242, E/I 38.8% = 94, O/U 14% = 34 100% = 399, B/V 10.5% = 42	E/I+O/U = 128 = 52.8%	E/I:O/U = 2.8	E/I/O/U:É/Í/Ó/Ú = 91 : 37 = 2.5



In Tables 4.1–4.4, further charts are added for interpreting and summarizing the data displayed in Tables 1, 2, and 3. They will help us compare and rank the selected provinces as for the chosen categories, and discover the tendencies of phonological changes between the early, later, and latest period. Accordingly, I shall analyse the charts of Tables 4.1–4.4, and with their help I will try to describe the dialectal position of the selected provinces with special regard to the Gallic ones regarding vowel mergers in all three periods. Let us start with the analysis of the ratio of vocalic and consonantal changes, since this is a very basic, but still significant aspect for creating a dialectological profile of the selected areas in all three periods. The data are displayed in charts 1a, 1b, 1c, and 1d of Table 4.1.

3.1. Analysis by the ratio of vocalic versus consonantal changes

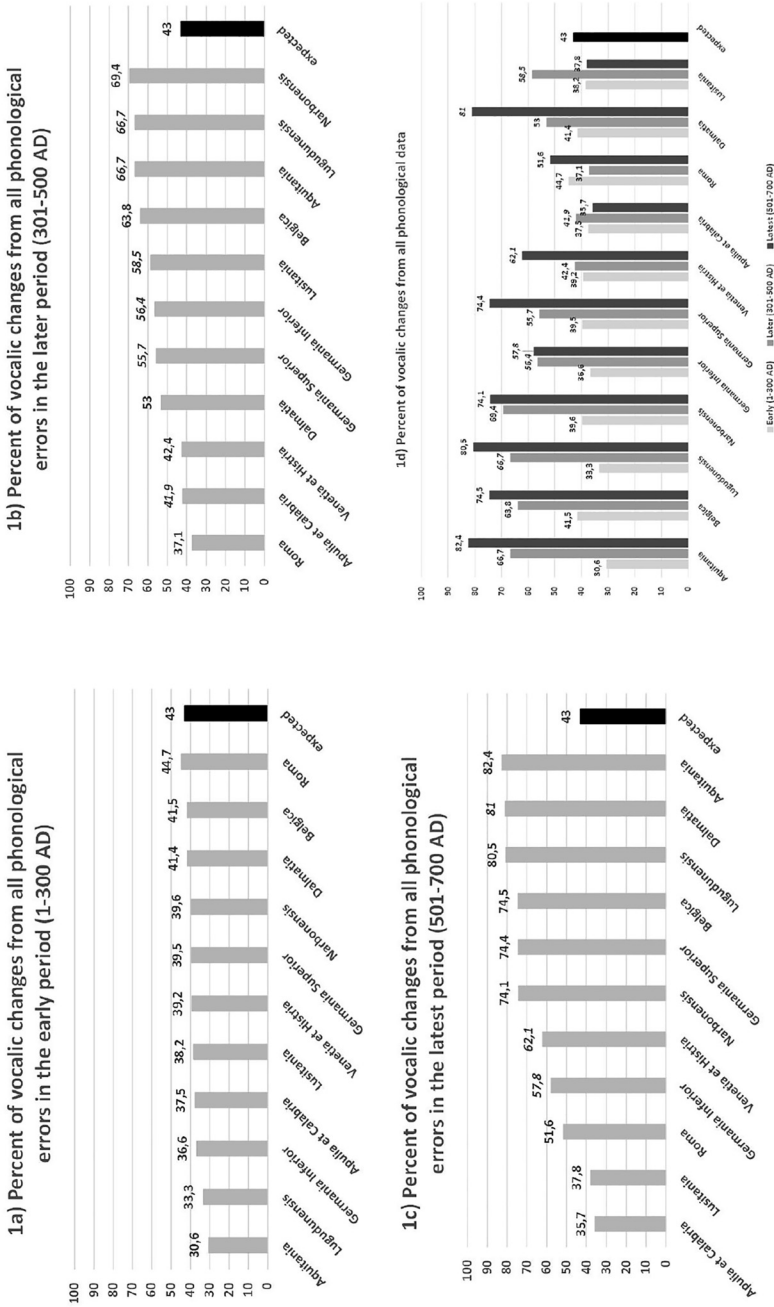
If the reader turns their attention to the provinces ranked by the ratio of vocalic versus consonantal changes in the early period (Table 4.1, Chart 1a), it becomes immediately obvious that, as opposed to the later and latest periods (Chart 1b and 1c), in the early period the consonantal changes dominate over the vocalic ones in all areas except the city of Rome where the rate of vocalic changes is slightly higher (44.7%) than the expected rate of vocalic changes (43%). This expected ratio corresponds to the average distribution of vowels and consonants in Latin, according to which about 43% of Latin sounds are vowels and about 57% are consonants.²³ This means that in the early period in the provinces under investigation, the transformation of the consonant system was usually more intensive than that of the vowel system, with the exception of the city of Rome where, to a small extent, the transformation of the vowel system seems to be more intensive. At the same time, there are differences between the selected areas in the distribution of the phenomena even if they are not as remarkable and significant as those in the later and latest periods. However, these differences are not really suitable for discovering characteristic territorial groupings between the provinces or groups of provinces studied in the early period. Beyond the prominence of Rome, it can be said at most that at that time two of the Gallic provinces (Aquitania and Lugudunensis) seemed to be lagging behind in the development of the vowel system. The corresponding proportions in the other provinces (including Narbonensis and Belgica at the forefront) are not significantly lower than expected.

In the later period, however, the situation changed dramatically (see Chart 1b). In the 4th and 5th centuries the provinces under study already show a characteristic grouping and are clearly divided into three groups. Compared to the early pre-Christian era in most areas, in 8 of the 11 provinces, the transformation of the vowel system became more intensive than that of the consonant system. These 8 provinces can be divided into two groups, one with the more intensive vocalism (of percentages between 60% and 70%), consisting of the 4 Gallic provinces, and another with also intensive vocalism (of percentages between 50% and 60%), with both Germanic provinces among its members (Dalmatia and Lusitania also belong to this group). Compared to the early, pre-Christian era, Aquitania and Lugudunensis (both by 66.7%) not only caught up with the other provinces of Gaul (i.e. Narbonensis of 69.7% and Belgica 63.8%), but

²³See HERMAN, J.: *Statistique et diachronie: essai sur l'évolution du vocalisme dans la latinité tardive* (1968). In HERMAN: *Du latin aux langues romanes* (n. 2) 196–203; 196. Herman's calculations are essentially confirmed by my own calculations, according to which in a Latin text of 50,070 letters (Cicero, *Ad Atticum*, Liber I) the proportion of vowels is 43.7% (21,892), that of consonants is 55.2% (27,630), and that of diphthongs is 1.1% (548).



Table 4.1



also preceded one of them, i.e. Belgica, in the development of vocalism. The two Germanic provinces, co-administered with Belgica for financial administration, apparently developed with the same intensity in this period in terms of vocalism (55.7% and 56.4%, respectively) and clearly began to catch up with the Gallic provinces.²⁴

In the latest period, in the 6th and 7th centuries, the intensity of the change in vocalism increased further in most of the studied areas, and it was below the expected level (i.e. 43%) only in 2 areas: Apulia et Calabria (with 35.7%) in southern Italy and Lusitania (with 37.8%) in Hispania. The four Gallic provinces (with percentages between 74% and 83%) are again in the group with the more intense vocalism, but Germania Superior has already caught up with them with the same intensity (i.e. 74.4%). The positions of Dalmatia in the lead (with 81%) and the position of Germania Inferior in the middle (with 57.8%) are not certain due to the low number of data forms.²⁵

My analysis by the ratio of vocalic versus consonantal changes confirms Herman's more general conclusion that in the Christian period, Gaul was characterized by mobile vocalism and stable consonantism (cf. Chart 1b and 1c). However, Herman's conclusion can be supplemented by some new observations: 1) This was not the case at all in the early period, when half of the Gallic provinces were characterized by balanced development, as the percentages of Narbonensis and Belgica (39.6% and 41.5, respectively) were only slightly lower than expected (43%), and the other half of the Gallic provinces were characterized by conservative vocalism, as the percentages of Aquitania and Lugudunensis (30.6% and 33.3%, respectively) were significantly lower than expected (43%). 2) In the Christian era, the Germanic provinces began to catch up with the Gallic provinces, and in the case of Germania Superior, the catching up was certainly over by the end of the era. In a dialectological sense, Germania Superior formed a group with the provinces of Gaul in the latest period in terms of the phenomenon under study.

Finally, it is worth looking at Chart 1d comparing the 3 periods studied, which shows that vowel changes have gradually intensified over time in most areas. In 8 of the 11 territorial units a straight development was observed in the 3 periods with a gradual increase in intensity:²⁶ it is perhaps not by chance that out of the 8 affected areas, 4 were Gallic and 2 Germanic provinces.

3.2. Analysis by the percentage of E/I and O/U confusions

Now, examining the provinces ranked by the percentage of E/I and O/U confusions counted against all vocalic errors in the early period (Table 4.2, Chart 2a), at first it is visible that the joint rate of E/I and O/U faults is everywhere quite low (with percentages between 10.8% and 28.6%),

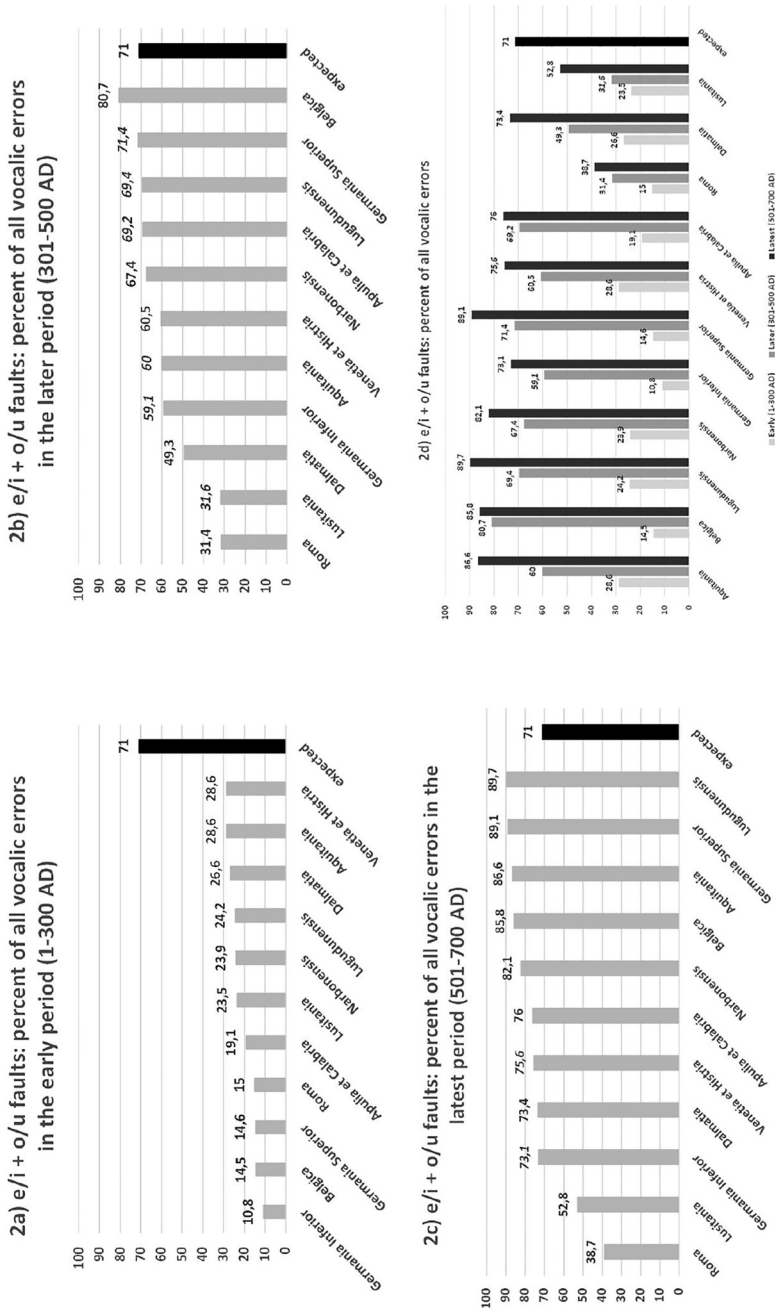
²⁴At the same time, it is noteworthy that in this later period a group of 3 areas can be distinguished, where the development of vocalism has slowed down, as the rate of vowel errors was more or less below the expected rate, i.e. 43%: interestingly, all three areas are in Italy. What is most surprising here is that Rome moved from the first place in the early era to the last place in the later era.

²⁵Rome (with 51.6%), on the other hand, and Venetia-Histria in particular (with 62.1%), have apparently begun to catch up with the lead, although the low figure for the latter, in northern Italy, calls for caution too.

²⁶In one area (Rome), growth is visible after a later period decline in the latest period, and in two areas (Apulia et Calabria and Lusitania) a decline after a later period growth in the latest period, resulting in lower percentages than in the early period.



Table 4.2



far below the expected 71%, in the early, pre-Christian period (while 31.4% and 38.7% are the lowest measured rates in the later and the latest periods). This expected 71% ratio corresponds to the average proportion of *e-i* and *o-u* vowels in the Latin vowel system that could have been affected by the vowel merger.²⁷ Although the rates of E/I and O/U faults are low everywhere, it seems there is a more innovative group (with percentages above 20%) and a more conservative group (with percentages below 20%). Interestingly, 3 of the 4 Gallic provinces are in the more innovative group (with Aquitania in the lead) and 1 (Belgica) in the more conservative group, along with the 2 Germanic provinces: these three are the most conservative of all the provinces studied. With regard to the phenomenon under study, therefore, a smaller dialectological difference may be observed between the group of Belgica and the two Germanic provinces and the group of the other three Gallic provinces. However, the less differentiated nature of the pattern of the early period does not allow for any further conclusions to be drawn.

In contrast, in the later period (see Chart 2b), the joint rate of E/I and O/U confusions clearly and significantly increased in all areas compared to the early period. Belgica and Germania Superior, which are lagging behind in the early period, take the lead in the later period, and the 3 Gallic provinces and Germania Inferior follow them with some lag. Apart from the developmental differences between the Gallic and Germanic provinces in terms of the phenomenon studied, no significant dialectological difference can be observed between the larger geographical units studied.²⁸

In the latest period (see Chart 2c), there was a clear levelling of the 4 Gallic provinces and Germania Superior in terms of vowel mergers. At the same time, these 5 areas were somewhat separated from the other areas as the most innovative group, where the rates of errors reflecting vowel mergers (between 82.1% and 89.7%) already significantly exceeded the expected level (71%). It is also interesting to note that the two Italian provinces (Venetia et Histria in the north by 75.6% and Apulia et Calabria in the south by 76%) and Dalmatia (73.4%) appear to be dialectologically uniform in this respect, and at the same time seem to be catching up with the forefront, Gaul and Germania Superior. However, the assessment of the situation of Germania Inferior (73.1%) is not clear due to the low data availability, and the same is true for Venetia et Histria (75.6%).²⁹

²⁷Based on Herman's calculations (cf. HERMAN: Statistique [n. 23] 197), this expected ratio would be 81.4%, i.e. $(\tilde{e}+\bar{e}+\bar{i}+\bar{i}=\bar{e})$ 53.7% + $(\delta+\bar{o}+\bar{u}+\bar{u}=\bar{u})$ 27.7% = 81.4%. However, he also included occurrences in morphological (conjugation and declension) endings whereas I excluded the relevant morphologically or morphosyntactically explainable letter confusions above, cf. footnote 12. Moreover, he did not separate occurrences in hiatus, which I also excluded from the present study, as they testify to phonological processes different from vowel mergers, e.g. to consonantization such as LLDB-27675: *e* (+voc) > *i*, VINIAE for *vineae*, CIL 13, 2465, 2 or LLDB-36045: *i* (+voc) > *e*, VEATOR for *Viator*, CIL 13, 11213, 1. Although Herman's calculations are essentially verified by my own, according to which in a Latin text consisting of 50,070 letters (Cicero, *Ad Atticum*, Liber I), the proportion of vowels *e-i* and *o-u* among all vowels (21,892) is 83% (18,181), i.e. $(\tilde{e}+\bar{e}+\bar{i}+\bar{i}=\bar{e})$ 11,206 51.2% + $(\delta+\bar{o}+\bar{u}+\bar{u}=\bar{u})$ 6,975 31.9%, the occurrences in relevant morphological endings (1,077) and in hiatus (1,549) must be subtracted from that amount, resulting in 15,555, which corresponds to 71% of all vowels (21,892). In line with this, here I use this 71% as the expected ratio.

²⁸It is noteworthy, however, that Rome and Lusitania appear to be very conservative in terms of the phenomenon studied, although both have evolved since the early period.

²⁹Finally, it is worth mentioning that Rome and Lusitania, although further developed in this respect compared to the later era, still behaved conservatively. At the same time, Lusitania (52.8%) apparently began to catch up with other areas more intensively than Rome (38.7%).



In summary, based on Chart 2d, which represents the three periods together by area, it can first be stated that vowel mergers became more intense from period to period in all areas examined without exception. Then, the period-by-period analysis revealed that, although in the early period there was a smaller dialectological difference between the group containing Belgica and the two Germanic provinces and the group containing the other three Gallic provinces, by the end of the latest period the Gallic provinces and one of the Germanic provinces were dialectologically levelled in terms of vowel mergers as the most innovative group. While Herman claimed that concerning the emergence of Vulgar Latin vocalism, Gaul overtook Italy itself (including Rome), where only Italy's Regio X (Aquila and its close vicinity) could keep pace with it, now only the first part of this statement seems valid. While Gaul did overtake Italy in general, within Italy not only Venetia et Histria (Regio X) but also Apulia et Calabria (Regio II) was able to keep pace with the Gallic provinces, as now demonstrated (cf. Charts 2b and 2c).

3.3. Analysis of the E/I to O/U ratios

The picture painted so far should be refined by an analysis of the E/I to O/U ratios in the selected areas in all three periods, see charts 3a, 3b, and 3c of Table 4.3. While evaluating the rates of *o-u* and *e-i* mergers as displayed there, I use the expected ratio of 1.9 as a reference number. This reference number indicates that the number of E/I confusions in the data pool is approximately the double of O/U confusions. This number also indicates that the two changes took place more or less at the same time and with the same intensity, since the number of the *e-i* sounds is approximately the double of *o-u* sounds in Latin (and, in line with this, Herman used 2 as his reference number).³⁰ Consequently, a numerical value considerably higher than 1.9 indicates that the merger of front vowels *e-i* was more advanced than that of back vowels *o-u* in a given area, or in other words that the merger of back vowels had just started or was underdeveloped compared to the merger of front vowels.

Accordingly, let us take a look at the data from the early period (Chart 3a). It is immediately apparent that Belgica and the neighbouring Germania Inferior have the highest ratio (10), with only 1 O/U confusion per 10 E/I confusions. Although these absolute numbers are quite low (11 in both cases), they may reflect the real language situation because the total number of vowel errors is relatively high in both provinces (76 and 102, respectively). The situation is similar in Narbonensis, where there are relatively many E/I confusions (43 = 21.4%) but very few cases of O/U confusions (5 = 2.5%), which makes up for a high ratio of 8.6. In the other provinces (from Dalmatia to Aquitania), a gradual decline is visible in ratios (from 7 to 1.9), which in principle would mean that in these provinces the merger of back vowels became more and more advanced from province to province in the early period. From the chart it appears that the merger of back vowels in Lusitania, Roma and Aquitania approached or (in the case of Aquitania) even reached the expected ratio of 1.9. The provinces of Gaul and the Germanic provinces do not form a unit,

³⁰See HERMAN: Statistique (n. 23) 197. Herman's calculations, i.e. $(\check{e}+\bar{e}+\check{i}+\bar{i}=) 53.7\% : (\delta+\bar{o}+\check{u}+\bar{u}=) 27.7\% = 1.94$ (Herman used to refer to this number as a rounded 2, e.g. HERMAN, J.: Essai sur la latinité du littoral adriatique à l'époque de l'Empire (1971). In HERMAN: *Du latin aux langues romanes* (n. 2) 121-146, 139), are not entirely confirmed by my own calculations, according to which in a Latin text of roughly 50,000 letters (Cicero, *Ad Atticum*, Liber I) the ratio of *e-i* and *o-u* vowels is $(\check{e}+\bar{e}+\check{i}+\bar{i}=) 51.2\% : (\delta+\bar{o}+\check{u}+\bar{u}=) 31.9\% = 1.6$ (the difference between Herman's and my own calculations is only 0.3). As for the methodology of comparing these mergers, see HERMAN: Essai (n. 30) 139.



but appear to be at different stages of development in terms of the phenomenon studied: Belgica, Germania Inferior and Narbonensis are the most conservative in terms of merger of back vowels, Germania Superior and Lugudunensis seem catching up and Aquitania seems innovative. This conclusion seems plausible concerning Aquitania, Belgica, Lugudunensis and Germania Inferior, given that the total number of vowel errors is relatively high in each province despite the relatively low number of cases of E/I and O/U confusions. Our conclusion seems even more likely for Narbonensis and Germania Superior, which have a relatively high number of cases of E/I and O/U confusions (48 and 38, respectively, see Table 1).

In the later period (Chart 3b), the picture changed considerably. In general, in the 4th and 5th centuries, in the provinces studied the merger of back vowels began to catch up to the merger of front vowels and in some cases it reached or even exceeded that, since the O/U confusion rate reached or even exceeded the expected frequency of 1.9 as compared to the E/I confusion rate. Typically, the highest ratios are no longer around 8–10 but around 4–5, and while in the early period only 3, in the later period already 7 areas had ratios lower than 3. Most of the Gallic and Germanic provinces came to the forefront, where the intensity of *o-u* mergers essentially reached that of *e-i*, as in Narbonensis (with 2.1), and even exceeded it, as in Lugudunensis (with 1.8), Aquitania (with 1.4) and Germania Inferior (with 0.6). However, the real situation of Aquitania and Germania Inferior is difficult to assess due to the low number of cases (12 and 13, respectively), which is coupled with a very low total number of vocalic errors (20 and 22, respectively). However, Germania Superior and Belgica can still be considered clearly conservative in this respect, as their respective ratios were still above 4 (4.8 and 4.2, respectively). It can be seen, therefore, that the Gallic and Germanic provinces did not form a unit even then, but developed at different rates, whereas the amplitude of the differences decreased significantly, from $(10-1.9=) 9.1$ to $(4.8-0.6=) 4.2$.

Turning to the latest period (Chart 3c), it can be seen that in almost all of the selected areas, the intensity of *o-u* mergers undoubtedly approached, reached, or even exceeded that of *e-i* mergers, with only Venetia et Histria (2.8) and Lusitania (2.8) appearing to be slightly delayed in this respect. Typically, the highest value is now only 2.9, so the relevant ratio for each area is below 3. Moreover, the ratio of 6 areas is below the expected ratio (1.9), which shows that *o-u* mergers were more intense in these areas than *e-i* mergers. Thus the tendencies leading to the establishment of the Proto-Western-Romance system merging both front and back vowels are now clearly visible nearly everywhere. It is highly probable that the final levelling, i.e. the completion of both mergers, for all the vowels involved, was completed by the 8th century at the latest. The studied Gallic and Germanic provinces behave quite uniformly in the latest period in terms of the phenomenon under study, but even then some developmental differences can be detected between them: *o-u* mergers were also slightly more intense in Germania Superior (1.5), Aquitania (1.1), and probably Germania Inferior (1.1), slightly less intense in Belgica (2.2), and essentially as expected (1.9) in Lugudunensis (1.8) and Narbonensis (2).

From the analysis now presented, one can get a much more nuanced and detailed picture of the dialectological characteristics of the studied phenomenon than from Herman's brief summary statement (based on Gaeng's data) that, in the Christian period concerning the development of vocalism, particularly with regard to the merger of *i* and *ē*, Gaul was more advanced than the other provinces, and the merger of *ū* and *ō* was also occurring at a rate as expected



relative to their frequency, perhaps with some delay.³¹ This perhaps overly concise description has now been supplemented by the observation that in the early, pre-Christian period the Gallic (and Germanic) provinces did not behave uniformly at all and did not form a unit with regard to the two vowel mergers, and consequently could not precede other areas: in most of these areas the *o-u* merger shows a significantly lower intensity than the *e-i* merger, except in Aquitania, where the two mergers could have taken place with the same intensity. Although a process of levelling between the Gallic provinces began in the later period, even then did they not behave uniformly with regard to the two vowel mergers. Compared to *e-i* mergers, Belgica was still lagging behind in terms of *o-u* mergers, while the other Gallic provinces were either characterized by balanced conditions or by the intensity of *o-u* mergers exceeding that of *e-i* mergers. The latest period was characterized by the same levelling process, when it no longer makes much sense to look for regional differences between the studied areas, as the difference between the highest and lowest ratios (which was 8.1 in the early period and 4.4 in the later period) was only 1.8 in the latest period. Thus, the intensity of the two types of merger was ultimately towards full levelling, i.e., the development of the same intensity, and consequently the proto-western-Romance vowel system was apparently already evolving everywhere (with some phase delays in one or two areas).

3.4. Analysis of the E/I/O/U to Ê/Ī/Ō/Ū ratios

Since Herman also described the relationship between Gaul and the other areas he studied in terms of whether or not there was a difference between stressed syllable and unstressed syllable development of vowel mergers,³² I will also examine the selected provinces in this regard (see charts 4a, 4b, and 4c of Table 4.4). Of course, I also use an expected ratio here, 1.7, which expresses that in Latin, 62.8% of vowels occur in unstressed syllables and 37.2% in stressed syllables ($62.8 : 37.2 = 1.69 = 1.7$).³³ I will compare the observed ratios of the studied areas to this expected ratio of 1.7 in all three periods. If the observed ratio in a given area is higher than the expected ratio, vowel mergers were much more intense in unstressed syllables than in stressed ones, and *vice versa*, if the observed ratio is lower than the expected ratio, the vowel mergers were much more intense in stressed syllables than in unstressed ones. If the observed ratio is the same as the expected ratio (1.7) or very close to it, the vowel mergers took place with the same intensity in stressed and unstressed syllables.

In the chart depicting early-period relationships (Chart 4a), it can be seen that in most (7) provinces the unstressed syllable was more affected in terms of vowel mergers than the stressed syllable, as the observed ratios are higher than the expected ratio. There are only 3 provinces where the observed ratio is lower than the expected ratio, and among these there are two Gallic

³¹However, Herman's characterization is based on data of GAENG (n. 3), and it should be treated with reservations for this reason alone.

³²ADAMS (n. 1) 666-668 discusses this question briefly in a slightly different context, for which see ADAMIK: A study (n. 21) in detail.

³³See HERMAN: Statistique (n. 23) 197, note 5. This is also useful for *e-i* and *o-u* mergers because there is no significant difference between the unstressed and stressed syllable occurrence rates of *e-i* and *o-u* sounds. The long or short unstressed *e/i/o/u* occurs in 81.9% of all unstressed vowels, while the long or short stressed *ê/ī/ô/ū* occurs in 80% of all stressed vowels, see the second table in HERMAN: Statistique (n. 23) 197.



provinces and one from the Germanic provinces (but in the case of the latter the data value of the observed ratio is doubtful due to low data availability). Thus, in the case of Narbonensis (1.4) and Aquitania (1.2), the merger process affected the stressed syllable to a slightly greater extent than the unstressed one, and conversely, in Lugudunensis (3.4) and Belgica (2.7) it affected the unstressed syllable to a greater extent, much more in the former province, and to a lesser extent in the latter (but in the case of Belgica, the data value of the observed ratio is questionable due to low data availability). Balanced conditions can be observed in Germania Superior (1.9) and Apulia et Calabria (1.8), where the observed ratio is very close to the expected ratio (1.7). Importantly, the 4 Gallic provinces do not form a unit in terms of the phenomenon under study, with the stressed syllable being more involved in vowel mergers in half of them and the unstressed syllable in the other half. In one of the 2 Germanic provinces (Germania Superior), a balanced situation can be observed and in the other (Germania Inferior) the situation cannot be clearly judged due to low data availability.

In the later period (Chart 4b), the Gallic provinces appear to be levelling in terms of the phenomenon under study, as in three areas (i.e. Narbonensis, Belgica and Lugudunensis) the vowel merger appears to be more intense in the stressed syllable (as the observed ratios, 1.5, 1.1 and 0.9, are here lower than the expected ratio of 1.7), while in the fourth (Aquitania) the stressed syllable seems to be more resistant to mergers (as the observed ratio of 3, is much higher than the expected ratio), but there the situation is not clear due to the low number of data. In the 2 Germanic provinces, the unstressed syllable appears to have been more affected than the stressed syllable, but sufficiently high data numbers (35) confirm this only in the case of Germania Superior (4).

In the latest period (Chart 4c), the same levels can be observed in 3 of the 4 Gallic provinces (as the observed rates are essentially the same as the expected 1.7, with 1.8 for both Lugudunensis and Narbonensis, and 1.7 for Aquitania), which means that the merger processes in these areas appear to have taken place with the same intensity or may have been completed. In the case of the 3rd Gallic province, Belgica (0.8), and the two Germanic provinces (Germania Inferior 1.4 and Germania Superior 1.1), the stressed syllable appears to be more affected by the phenomenon under study, so these three areas were still catching up with the other 3 Gallic areas.

In summary, Herman's claim that Gaul outperformed the other Western provinces in that these vowel mergers (according to the general frequency of the vowels in question) occurred in equal proportions in stressed and unstressed syllables, whereas in other provinces the stressed syllable continued to resist these mergers, is only partially correct. As demonstrated, the Gallic provinces can be treated as a unit for neither the early nor the later period, only for the latest period at most, but even then the only evident phenomenon is the levelling of the 3 core provinces, Lugudunensis, Narbonensis and Aquitania, to which Belgica and the two Germanic provinces were catching up, through more intense mergers in the stressed syllable.

4. CONCLUSIONS

In conclusion, as a result of the present study, significant progress has been made in exploring the linguistic historical and dialectological conditions of the Gallic and Germanic provinces in all four investigated aspects of the transformation of the vowel system, especially in the process



of vowel mergers. It turned out that Gallic provinces cannot be treated as a unit or clearly separate from the other areas studied in any aspect of the study, especially not in the early, pre-Christian period. Gallic provinces appear to behave in the same or a levelled manner at most in the later and/or latest periods, such as in the later (and partly the latest) period for the first aspect of the study (the analysis by the ratio of vocalic versus consonantal changes, see Chart 1b), or in the latest period regarding the second aspect (the analysis by the joint rate of E/I and O/U confusions), and (to some extent) regarding the fourth aspect (the analysis by difference between stressed syllable and unstressed syllable, see Charts 2c and 4c, respectively). However, in none of the periods can a uniform behaviour of the Gallic provinces be attested in the case of the third aspect of the study (the analysis of the E/I to O/U ratios, see Charts 3a–c), since in the latest period, when these provinces seem to be levelling, this levelling characterized almost all of the territorial units studied. The Germanic provinces (especially Germania Superior, as this is the one that can be most adequately assessed in terms of data volume) have, albeit with some delay, adapted to the Gallic provinces in their late development. Germania Superior can clearly be considered belonging with the Gallic provinces in the latest period for the first, second and third aspects of the study (1c, 2 and 3c), but this is no longer the case for the fourth aspect of the study (4c). In the end, testing Herman's concise findings against the vast body of the LLDB Database, coupled with a more structured, three-part chronological approach and consistent application of Herman's own methodology (especially consistent comparison to expected ratios), yielded considerable results. To sum up, the present study, which continued József Herman's research, managed to explore the hitherto little-known linguistic and dialectological features of Latin in the Gallic and Germanic provinces.

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