THÈSE
INAUGURALDISSERTATION

EN VUE DE L'OBTENTION DU
DOCTORAT DE L'UNIVERSITÉ DE TOULOUSE
DÉLIVRÉ PAR L'UNIVERSITÉ DE TOULOUSE 2 - LE MIRAIL
DISCIPLINE: SCIENCES DU LANGAGE

ZUR ERLANGUNG DER DOKTORWÜRDE
DER NEUPHILOLOGISCHEN FAKULTÄT
DER RUPRECHT-KARLS-UNIVERSITÄT HEIDELBERG

PRÉSENTÉE ET SOUTENUE PAR
VORGELEGT VON
DANIELA MÜLLER

DEVELOPMENTS OF THE LATERAL IN OCCITAN DIALECTS AND THEIR ROMANCE AND CROSS-LINGUISTIC CONTEXT

JURY
Jonathan Harrington (Professor, Ludwig-Maximilians-Universität München)
Francesc Xavier Lamuela (Catedràtic, Universitat de Girona)
Jean-Léonard Léonard (Maître de conférences HDR, Paris 3–ILPGA et ILF)
Edgar Radtke (Professor, Ruprecht-Karls-Universität Heidelberg) (directeur)
Patrick Sauzet (Professeur, Université de Toulouse 2–Le Mirail) (directeur)

ÉCOLE DOCTORALE: CLESCO
UNITÉ DE RECHERCHE: CLLE-ERSS
DIRECTEURS DE THÈSE: PATRICK SAUZET ET EDGAR RADTKE
RAPPORTEURS: DANIEL RECASENS (CATEDRÀTIC, UNIVERSITAT AUTÒNOMA DE BARCELONA)
ET JONATHAN HARRINGTON (PROFESSOR, LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN)
le 1er décembre 2011

There is a theory which states that if ever anyone discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable.

Douglas Adams, The Restaurant at the End of the Universe, 1980, p. 7

ABSTRACT

This thesis analyses sound changes that affected the lateral approximant inherited from Latin in Occitan dialects, in the Romance languages, and in a number of other languages from around the world. Chapter 1 gives a comprehensive overview of the research carried out on the lateral approximant; it discusses articulation and acoustics as well as abstract representations of the sound. Chapters 2 to 5 are devoted to specific sound changes which occurred in Occitan dialects at different points in time. These developments are systematically compared to similar phenomena in Romance and other languages. In chapter 2, I discuss the vocalisation of the dark lateral in preconsonantal and word-final position as well as intervocalically. It is argued there that Occitan and more generally Romance followed an unexpected pathway towards vocalisation, which cannot be explained by phonetic factors alone. Chapter 3 deals with palatalisation of the lateral in onset clusters. Rather than in articulatory assimilation, I propose that the origin of this sound change is to be sought in the frication which accompanied the obstruent + lateral onset clusters. Rhoticisation of the lateral, and its opposite, lambdacisation of the rhotic, is the topic of chapter 4. In this chapter, I discuss duration factors in these sound changes and present experimental evidence to substantiate the idea that duration plays an important role. Finally, chapter 5 looks at the developments of the Latin geminate lateral in Gascon and other Romance dialects; according to common opinion, the Latin geminate lateral underwent a retroflexion process, and I discuss how this might have been possible from a phonetic point of view.

Key words

Sound change – laterals – Occitan – Romance linguistics – phonetics

RÉSUMÉ

Cette thèse se propose d'analyser les changements phonétiques qui ont affecté l'approximante latérale héritée du latin dans les dialectes occitans, dans les langues romanes ainsi que dans un certain nombre d'autres langues du monde. Le premier chapitre donne une vue d'ensemble des recherches phonétiques sur la latérale. Les aspects articulatoires, acoustiques et les questions de représentation abstraite y sont notamment discutés. Les chapitres suivants, 2 à 5, sont consacrés à certains changements phonétiques spécifiques survenus dans les dialectes occitans à des moments divers de leur histoire. Ces évolutions seront comparées de façon systématique à des phénomènes semblables dans les autres langues romanes et non-romanes. Le chapitre 2 traite de la vocalisation de la latérale vélarisée en position préconsonantique et finale de mot aussi bien qu'à l'intervocalique. Je propose dans ce chapitre que l'évolution de la vocalisation de la latérale en occitan et dans les langues romanes en général ne peut être expliquée à partir des seuls faits phonétiques. Dans le chapitre 3, je discute de la palatalisation de la latérale dans un groupe consonantique en attaque syllabique. J'y fais l'hypothèse que l'origine de ce changement phonétique est à rechercher plutôt dans la friction qui accompagne le groupe consonantique du type obstruante + latérale que dans une assimilation de type articulatoire. La rhotacisation de la latérale, et son contraire, la latéralisation d'une rhotique sont traitées dans le chapitre 4. Dans ce chapitre, je discute des facteurs de durée dans ces changements phonétiques et je présente des résultats expérimentaux qui soutiennent l'idée que la durée y joue un rôle important. Finalement, le chapitre 5 regarde de près l'évolution de la latérale géminée latine en gascon et dans d'autres dialectes romans; étant donné qu'il est communément admis que cette évolution est due à un processus de rétroflexion, je discute les chemins possibles de ce changement d'un point de vue phonétique.

Mots-clés

Changement phonétique – latérales – occitan – linguistique romane – phonétique

PUBLICATIONS

Some ideas and figures have appeared previously or will appear soon in the following publications:

- Müller, Daniela & Sidney Martín Mota (2009), "Acoustic cues of palatalisation in plosive + lateral onset clusters". In Proceedings of Interspeech 2009, Brighton, 6.-10. September 2009, Rundle Mall: Causal Productions; 1695-1698.

- Müller, Daniela (2010), "Phonetic factors influencing /l/-rhoticisation in Greek". In Botinis, Antonis (ed.), Proceedings of the third ISCA Tutorial and Research Workshop on Experimental Linguistics, Athens, 25-27 August 2010; 117-120.

- Müller, Daniela (in press), "Le sort de /l/ dans les dialectes occitans : vélarisation et palatalisation". In Rieger, Angelica (ed.), L'Occitanie invitée de l'Euregio. Liège 1981 - Aix-la-Chapelle 2008. Bilan et perspectives/ Occitània convidada d'Euregio. Lièja 1981 – Aquisgran 2008. Bilanç e amiras/ Okzitanien zu Gast in der Euregio. Lüttich 1981 – Aachen 2008. Bilanz und Perspektiven. Actes du neuvième Congrès International de l'AIEO, Aix-la-Chapelle, 24-31 août 2008. Aachen: Shaker.

- Müller, Daniela (in press), "Un estudi critic de l'evolucion /lː/ > /ɖ/ > /d, d͡ʒ, tʃ/ en gascon e en gardiòl". In Actes du colloque « Nouvelle recherche en domaine occitan : approches interdisciplinaires » Albi, 11-12 juin 2009.

- Müller, Daniela (to appear), "Retroflexion de la laterala geminada latina en Gasconha – apròchis a travèrs l'istòria de la lingüistica". In Actes du dizième Congrès International de l'AIEO, Béziers, 12-19 juin 2011.

ACKNOWLEDGMENTS

A number of people have assisted this thesis in its transition into the real world, and I would like to thank them for their efforts.

I'd like to thank Patric Sauzet for his support throughout the past ten years and for innumerable last-minute reports and recommendation letters. Thanks are also due to Edgar Radtke for accompanying my academic development since my very first year and for supervising this co-tutelle thesis.

I am greatly indebted to Daniel Recasens for his close reading of preliminary versions of this thesis and his perspicacious and perspicuous comments and remarks. I hope that this final version will live up to them.

Several of my colleagues have read draft versions of some chapters: Mark Jones has given me useful comments, suggestions, and research ideas on /l/-palatalisation in onset clusters (chapter 3), and Chiara Celata and Thomas Field have provided important feedback on the chapter on retroflexion of Latin /lː/ in Gascon and in other Romance dialects (chapter 5). Moreover, a large number of colleagues have responded to several of my queries on LinguistList with references and discussions of topics pertaining to /l/ in a wide variety of languages; thank you to all!

My early research on /l/-palatalisation in onset clusters (chapter 3) was carried out with Sidney Martín Mota, and Ana Paula Huback pointed me towards the idea of frequency effects.

Finally, Athanassios Vergados and József Krupp made sure that the translations from Latin in Appendix A are correct. My office-mates Stéphanie Lopez and Aurélie Guerrero corrected the French short abstract, Aurélia Lassaque the extended French summary, and Bill Spruiell, Trey Jones, Mikael Thompson, and Thomas Reiss prevented me from doing any harm to the English language. Especially Tom Reiss spent long dull hours and interesting minutes on reading and re-reading (and arguing about spelling) every single word written in this thesis rather than on, say, mowing the lawn.

CONTENTS

INTRODUCTION

The evolution of language has attracted a lot of attention over the centuries, and sound change perhaps even more so than anything else. Changes in pronunciation relate not only to one sound becoming another sound or many sounds merging into one sound or vice versa, they can also affect the language's functioning as a whole, by being incorporated at a very early stage into the morphological domain, by being conditioned by syntactic circumstances, by being correlated with fine semantic and pragmatic distinctions and by being carriers of social information about the speaker, her background and the context of the utterance. This thesis will attempt to throw some light on a small part of the phenomenon, taking as a starting point a sound which has rarely been addressed in a monograph: the lateral approximant.[1] These sound changes are discussed as their occur in the dialects of Occitan. Indeed, Occitan with its very diverse dialectal developments, which have been rather well-documented over the centuries, is an excellent illustration of the phenomena studied in this thesis. However, since phonetic explanations are only justified if the phenomenon at hand turns out to have a large cross-linguistic incidence, each sound change is also traced in the other Romance languages and beyond. In this sense, all the chapters will show that the diversity of sound changes affecting the lateral consonant in Occitan dialects is neither unparalleled nor unprecedented.

Intended readership

The readership addressed by the present study is rather diverse: phoneticians will find chapter 1 useful, where I have compiled the state-of-the-art of the research on laterals; linguists interested in sound change will find the case studies in chapters 2-5 worth reading; Romance scholars and dialectologists, especially Occitanists, can find information of the place of the sound changes with respect to not only other Romance languages, but also to the larger cross-linguistic context.[2]

Occitan dialects

Occitan is a Gallo-Romance language spoken in the area depicted in Figure 1 on page 2. Bec (1963) provides an excellent and concise introduction to its history and its present state. The figure also shows

---

[1] Earlier monographs on the lateral or on a specific sound change involving the lateral include de Kolovrat (1923a), Bothorel (1967), and Jänicke (1997).
[2] Propinquity to Romance studies is signalled by the use of small capitals for Latin words and other etyma of Romance.

Figure 1: Occitan dialects. Map created by the Unité mixte de service de l'Université de Toulouse 2 - Le Mirail, used by permission. The numbers refer to the isoglosses which are described in the text.

the inter-dialectal limits which are described as follows (from Patric Sauzet, p.c.):

- Isogloss 1 separates the Northern Occitan dialects (Lemosin, Auvernhat, Provençal Alpin) from the Southern Occitan dialects (Gascon, Lengadocian, Provençal): In the Northern dialects, the Latin velar stops palatalised in front of a back vowel (/ka, ga/ > /t͡ʃa, d͡ʒa/ or /ʃa, ʒa/), while they are preserved as such in the Southern Occitan dialects, e.g. the Late Latin word CAMMĪNUS ('path'), of Gaulish origin, has given forms such as /ʃaˈmi/ or /t͡ʃaˈmi/ "chamin" in the Northern Occitan dialects, while the Southern Occitan dialects generally pronounce /kaˈmi/ "camin".[3]

- Isogloss 2 separates Gascon from the remainder of the Occitan dialects: In Gascon, word-initial /h/ developed into /f/, e.g. Latin FACERE is /ˈhɛ/ "hèr" or /ˈha/ "har" in Gascon, but /ˈfajɾe/ "faire" or /ˈfa/ "far" in other Occitan dialects.

- Isogloss 3 separates Lengadocian from Provençal: The definite plural article, which developed from Latin ILLOS, is "los" in Lengadocian, but "leis" in Provençal, e.g. /luˈzɥɛls/ "los uèlhs" ('the eyes') in Lengadocian, but /lejˈzɥe/ or /liˈzjø/ "leis uèlhs" in Provençal.

- Isogloss 4 separates the Northern Occitan dialects Lemosin and Auvernhat: While in Lemosin, the form of the partitive article is "de + def. article", in Auvernhat it is only "de" without the

---

3 The pronunciation variants given here are not intended to be exhaustive.

definite article following, e.g. "del bòsc" or "de la lenha" ('wood') in Lemosin, but "de bòsc", "de lenha" in Auvernhat.

- Isogloss 5 separates the Northern Occitan dialects Auvernhat and Provençal Alpin: In Auvernhat, the first person plural ending is /-e/ or /-i/, while in Provençal Alpin it is /-u/, e.g. /ˈʒydi/ in Auvernhat, but /aˈʥyu/ in Provençal Alpin.

The Occitan dialectological data adduced in this thesis have been gathered primarily from the linguistic atlases covering the Occitan-speaking area, as follows:

ALP Jean-Claude Bouvier & Claude Martel (eds.) (1975-1986), *Atlas linguistique et ethnographique de la Provence*. Paris: CNRS.

ALCE Pierrette Dubuisson & Gérard Taverdet (eds.) (1971-1982), *Atlas linguistique et ethnographique du Centre*. Paris: CNRS.

ALLY Pierre Gardette (ed.) (1950-1976), *Atlas linguistique et ethnographique du Lyonnais*. Lyon: Institut des Langues Romanes des Facultés Catholiques & Paris: CNRS.

ALMC Pierre Nauton (ed.) (1957-1963), *Atlas linguistique et ethnographique du Massif Central*. Paris: CNRS.

ALAL Jean-Claude Potte (ed.) (1975-1992), *Atlas linguistique et ethnographique de l'Auvergne et du Limousin*. Paris: CNRS.

ALLOC Xavier Ravier (ed.) (1978-1982), *Atlas linguistique et ethnographique du Languedoc occidental*. Paris: CNRS.

ALG Jean Séguy & Xavier Ravier (eds.) (1954-1973), *Atlas linguistique de la Gascogne*. Paris: CNRS.

ALLOR Jacques Boisgontier (ed.) (1981-1986), *Atlas linguistique et ethnographique du Languedoc oriental*. Paris: CNRS.

Sound change

This thesis is about sound change, although cases of synchronic variation, taken as a pool for potential sound changes, are also discussed. Just like any academic work, the analyses of the case studies offered in chapters 2-5 are underpinned by theoretical ideas which I will now present in the following paragraphs.

John Ohala has argued that sound change originates in perception (e.g. Ohala 1983*a*, 54, Ohala 1989, 179, 186, Ohala 2005*a*, 419, among many other publications). When the listener misperceives a signal, either because of lack of attention of some kind or because the signal itself is ambiguous, she is likely to store a new exemplar (for exemplar theory, see below) that diverges in some respect from a previously stored token of the same sound or word-type, which she may then

choose to try and reproduce in her own production. This is what Ohala (1997, 47) calls a "mini sound change": a momentary change in the mental representation of some sound, sound sequence or word. Cues for one sound can be mistaken as cues for another sound or several other sounds. When phoneticians conduct perception experiments, they are generally trying to establish which sounds or sound sequences are likely to give rise to some "mini sound change" and how frequent a particular type of "mini sound change" is expected to be.

Inevitable variation in articulation, due to variation in speech rate, to various physical constraints, to adaptation to social situations, or to performance errors (slips of the tongue) in production, complicates the picture. Moreover, the speaker may emphasise an articulatory component of the sound sequence she thought she heard, assuming it was intended by her interlocutor, even when it was not. All this variability in production will lead to more 'noise' in the signal.[4] Listener-speakers, however, are generally aware of all this variability and normally take it into account when perceiving speech. Thus, despite synchronic variation in both speech perception and production being the pool from which sound change (or phonologised variation) arises (Ohala 1989, 175-176, Ohala 1992c, 39), the language or dialect remains stable enough to fulfill its purpose of serving as a medium of communication, without becoming petrified nor changing so rapidly as to prevent efficient communication. This means that only a few very of the "mini sound changes", which abound in natural communication, will give rise to more stable sound changes of the kind discussed in the present thesis.

It is evident from the foregoing paragraphs that production and perception are intimately intertwined in the process of sound change. It is a continuous give-and-take between these two aspects of language, and the accounts of the sound changes affecting /l/ in this thesis will try to show this as much as possible. Nevertheless, this thesis is concerned more with the initiation of a particular sound change than with its spread, although questions pertaining to the latter aspect will occasionally be discussed too. Even for ongoing sound changes, such as /ɬ/-vocalisation in Brazilian Portuguese (see chapter 2.1), it is difficult to obtain a general picture answering the questions of which section of the speech community contributes in which measure to sound change, where does it originate (in which geographic location, in which phonetic context), how is it perceived by listeners (does it carry prestige or is it stigmatised), in which part of the vocabulary does it become entrenched first and with which frequencies. This problem is even greater for sound changes which occurred centuries, sometimes millennia ago. Where possible, some attempts have been made to take

---

4 What is noise and what is not in the speech signal is not easy to determine. Given the importance of redundant cues to the identity of speech sounds and their place within the phonetic context of an utterance, as well as the still largely underestimated role of fine phonetic detail, it is perhaps inexact to talk about 'noise' at all.

into account the contribution of frequency of occurrence of sounds or sound sequences to a particular sound change (see chapters 2.1.3, 3.3.2, and 5.3.2).

Frequency effects and considerations are a basic tenet of the usage-based exemplar theory advocated by Joan Bybee (for a very comprehensive overview see Silverman 2006, 42-46). It is thought that exemplars, i.e. the detailed representation in memory of specific acoustic (and perhaps also articulatory) events[5], lead to the formation of categories in language: frequent very similar exemplars will form a category prototype, according to phonetic context (see Bybee 2001, 37-38). For instance, the prototype of a lateral, formed over the most frequently occurring exemplars, in a front high vowel context may be a very clear, perhaps even slightly palatalised lateral, while the prototype of a lateral in a back or low vowel context may be a darkish or dark lateral. Given moreover that categories are known to have fuzzy rather than clear-cut boundaries, some exemplars will inevitably be ambiguous with respect to their categorisation with one or the other prototype (a useful model for categorisation of any given exemplar is the Perceptual Assimilation Model of Catherine Best and colleagues (Best et al. 2001, 777, 785-786, 789-791)).

In departing in this way from the traditional phonemic principle, which aimed at distinguishing sharply between phonemes and allophones, at least in theory, we face a notational problem, namely what do the slashes (/l/) and the brackets ([l]) refer to? In this thesis, I almost invariably use slashes because I consider sounds and sound sequences which are stored in memory and are thus what the listener intends to pronounce and perceives from the actual physical signal. It has to be kept in mind, however, that it is still the actual sounds and articulations which interact in the physical world. The only cases where readers will see brackets is in the transcription of words taken from the linguistic atlases of the Gallo-Romance area, since these are transcriptions of individual tokens of words or sounds.[6]

Although in this thesis I shall discuss the sound changes described and analysed in chapter 2-5 as if they occurred in an isolated 'phonetic space', this is clearly an oversimplification of the issue at hand, designed only to make the study easier. Every 'exemplar', i.e. every representation of a sound, sound sequence, word or even larger construction, which exists at many different levels of abstraction, is

---

5 'Representation' is understood as 'mental image' or 'neural pattern', in the sense of "pattern that is coherently related to something" or "set of correspondences between physical characteristics of the object and modes of reaction of the organism according to which an internally generated image is constructed". Moreover, as pointed out by Damasio, no two representations are ever exactly alike; they can be, and often are, however, extremely similar, down to fine details, giving the illusion of some shared representation (Damasio 1999, 320-321).

6 These transcriptions being actually more a transcription of what the field worker heard or thought he heard, it can be argued that the use of slashes would be justifiable as well.

connected with the many different domains of language (the morphological, the semantic, the social, etc.) at each of these levels (Hawkins 2003). Let me add that the limit between a descriptive account and an explanatory account of a problem or observation is as fuzzy as most category boundaries (see Berg 1998, 8-9); therefore, some people will find the analyses presented in this thesis as lacking in, say, abstraction or theoretical unequivocality (but on the other hand the move from informal to formal notation cannot be equated with a move from description to explanation (Berg 1998, 2)). Moreover, given the existence of what Berg (1998, 9) calls the "infinity of the causal chain", i.e. the idea that "[t]here is no point at which the ultimate explanation has been reached (unless the ultimate explanation is taken to be a divine entity)" (on this topic see also Garcia 1990) and the fact that any phenomenon in the real world is extremely likely to have multiple, possibly interconnected, causes (Berg 1998, 10), exhaustive and comprehensive explanation of any fact is theoretically unattainable. The contribution of this thesis to linguistics will therefore be somewhat more modest. I will nevertheless identify a number of specific hypotheses and research questions that should be attended to in future studies, in order to provide a thorough basis on which further research can be carried out. It is most likely that some, if not the major part of the hypotheses proposed in this thesis, will turn out to be unsatisfactory: such is the way of science, according to the desideratum of Popper (1961, 16), who demands that "[w]henever we try to propose a solution to a problem, we ought to try as hard as we can to overthrow our solution, rather than defend it".

The approach in this thesis is decidedly historical, in that I shall trace the history of the explanations people offered for the specific sound changes discussed in chapters 2-5. Not only do we need to know where we position ourselves within our field and the history of our field, but it can also prevent us from inventing the wheel over and over again. It is also a dialectological work, not only by its main focus on the dialects of Occitan, but because of the importance of geographical variation, be it inside a given language or cross-linguistically, for the study of sound change. Some varieties may have advanced further on any given evolutionary path or may have taken, at some point or the other, a different pathway altogether. Still others may never have advanced at all for this particular aspect of their phonetics. Finally, it is a phonetic study that aims at illustrating how knowledge about the articulation and the acoustics of a sound can contribute to dialectology and historical linguistics alike.

A few words on methodological choices

Since this is a phonetic study, I make minimal use of the terms "segment" and "phoneme" which refer to long-standing, but not always

well-defined concepts in phonological theory. Similarly, I use the term "syllable" as is usual in phonetics, simply as a prosodic unit.

I use the term "sound" rather than "segment" when referring to the lateral or to any other sound, be it vowel or consonant because of the idea of definable limits the term "segment" carries with it. The 'boundaries' of a sound may be more or less well-defined, according to its nature. But sounds are not merely juxtaposed, as has been recognised by phonological theories which arose in response to Classical Generative Phonology (Chomsky and Halle 1968), such as Feature Geometry (Clements 1985) and others, but to meager explanatory success. It may well be that a sound such as the aveolar tap is much better understood when considering it as a modified vocalic sound, i.e. an acoustic carrier characterised by periodic noise which is briefly and saliently interrupted or at least substantially reduced in intensity. In this sense, "sound" is as much a good characterisation of any sound as would be "segment", but without carrying a historical, phonological-conceptual ballast. For a discussion of these issues, see also Ohala (1992a), Ohala (1995, 716), Silverman (2006, 202-215); for a non-segmental model of speech perception see Hawkins (2003).

Regarding the term "phoneme": while it is clear that categorisation of some sort occurs in perception, I will not review and discuss the many different views of what constitutes a phoneme, views that have considerably evolved since the inception of the idea. The clear-cut boundary, neatly conceived on a theoretical level, has often proven elusive in actual application to languages, and criteria of parallel and complementary distribution often reveal only marginal contrasts. Moreover, the term still evokes the idea of the "phoneme" being the input to a process which yields something phonetic as output, something which doesn't agree at all with the concept of exemplars as mental representations in memory described in the previous section. Therefore, I shall talk about categorisation and recategorisation, but not about phonemes. For further thoughts about the term "phoneme" and its nature, see Ohala (1992b, 373-374), Berg (1998, 15), Silverman (2006, 215).

The "syllable" is a tad more difficult. There is no denying that consonants and vowels readily form prosodic units, i.e. syllables of the CV type. There has been, however, continuing disagreement of how to make members of consonant clusters fit into a syllable, especially when they are not ordered in a way from least vocalic to most vocalic and back again. Discussion in the literature about concepts such as "ambisyllabicity", "extrasyllabicity", "floating segments" and the like reflect the unease of researchers vis-à-vis this topic. Furthermore, a number of phonological theories have attributed independent status to the syllable, regardless of the sounds which are thus described as clustering together. The syllable, of various theoretical shapes, has been and is sometimes still considered a skeleton which can, but

does not necessarily have to be filled with what is called 'phonetic substance'. I do not think this does justice to the fact that the syllable is an emerging property of clustering speech sounds, not vice versa. Therefore, I shall use the term "syllable" in this thesis in a fairly simple way: to indicate a low-level prosodic unit which may bear stress. "Syllable onset" is to be understood as that which comes before the vowel or the potentially stress-bearing vowel-like sound, while "syllable coda" is that which comes after. Consequently, "syllable onset" is, in the context of this thesis, synonymous with "word-initial" or "postconsonantal position", and "syllable coda" is synonymous with "word-final" or "preconsonantal position".

Outline of the thesis

As the main topic of this thesis is the development of the lateral in Occitan dialects and elsewhere, I shall start with giving an overview of the phonetic characteristics of this sound in chapter 1. The remaining chapters will be devoted to four different developments, namely vocalisation of the dark lateral (chapter 2), palatalisation of /l/ in onset clusters (chapter 3), rhoticisation of the lateral (and, to a lesser, extent lambdacisation of the rhotic) (chapter 4), and finally, the developments of the Latin geminate lateral in the Gascon dialect of Occitan, which are commonly ascribed to retroflexion (chapter 5). Similar developments in the other Romance languages and dialects, and to a minor extent, in languages around the world are also studied, as far as the available information on their phonetics and historical evolution permits. Each of the case studies will therefore begin with a description of the sound change at hand in Occitan, in the other Romance languages and dialects, and in languages across the world. This description will then be followed by a summary of the phonetic research pertaining to the sound change studied, and finally, the last section of each chapter will be devoted to a critical evaluation of foregoing explanations and to my own analyses of each phenomenon. Only chapter 5 will be organised in a somewhat different way, in that it seemed more adequate to present the many historical opinions on the evolution of Latin geminate /lː/ in Gascon and elsewhere before moving on to the phonetic questions. The reader interested in a specific language will find the index at the end of this work useful.

CHARACTERISTICS OF THE LATERAL APPROXIMANT

Most general introductions to phonetics and even a number of studies specifically aimed at the description and analysis of sound changes related to the lateral are content to describe /l/ as being articulated with a central tongue tip closure in the dento-alveolar region and one or two side channels allowing the air to escape. I will expand on this description and summarise the research available on the subject of the lateral's articulation, acoustics, and formal representation.[1]

I shall start this chapter by looking at the findings concerning the articulation of laterals in Section 1.1. For reasons of clarity I have separated the movements of the tongue tip from those of the tongue body; 1.1.1 discusses the former, 1.1.3 discusses the latter, and 1.1.2 describes their interaction. I will proceed by identifying the main results across studies dealing with the lateral in a number of different languages. Section 1.2 will then be concerned with the acoustics of the lateral, and it is here that I discuss the question of the side channels. Similarly, I have separated the acoustic characteristics of the lateral from the articulatory movements that effected them. It goes without saying, however, that all these different aspects of the lateral, articulation and acoustics, are intimately intertwined, and I will therefore try to relate one to the other and vice versa in Section 1.1 and 1.2 wherever possible. In Section 1.3, I will then introduce the two theoretical frameworks on which I draw in the analysis of the sound changes presented in later chapters (chapters 2-5) – the Degree of Articulatory Constraint Model of Daniel Recasens as well as Catherine Browman and Louis Goldstein's Articulatory Phonology – and describe how they deal with the lateral and what needs to be said about such representations. Finally, Section 1.4, dedicated to phonology, gives an overview of the kind of problems people faced when venturing into the question of abstract representation of the lateral by using distinctive features of any valued kind.

---

[1] In this chapter, I will only be concerned with the lateral approximant since it is by far the most common type of lateral. Lateral fricatives will be discussed in 3.3.4.1. For an overview of the place of the lateral in sound inventories, see Maddieson (1980), Maddieson (2011). For a discussion of the inclusion of the lateral in the class of liquids (together with the rhotics) and their functional properties as both vowel-like and consonant-like sounds, see Proctor (2009, ch. 2).

Figure 2: Mid-sagittal views of a German clear /l/ (left) and a Russian dark /ɫ/ (right) (reproduced from Recasens et al. (1996, fig. 1), originally from Ladefoged and Maddieson (1986), used by permission).

1.1   ARTICULATION OF THE LATERAL

> (l) is formed when the Tongue is so applied to the Roof, and the upper Teeth, that the Voice cannot, but by a small Thred, as it were, get forth by the Sides of the Tongue; for if you compress the Cheeks to the Grinders, you stop up the Passage of the Voice, and it will be very difficult for you to pronounce this Letter, [. . .]. (Amman 1694, 52-53)

Much has been written on the articulation of the lateral since Amman and his (and our) forebears more than a millennium earlier devoted themselves to the description of the lateral (see Chapter A for the Latin grammarians of the Roman era). One of the most fundamental distinctions that researchers have come to recognise is the existence of clear and dark laterals, whose dichotomy, of course, is to be found on the extreme ends of a continuum (see the mid-sagittal views in Figure 2 on page 10). In this thesis, I shall refer to the clear lateral as /l/ and to the dark lateral as /ɫ/. In cases where the precise quality of the lateral is unknown or unsure, I shall use /l/ as a cover term, confusing as this may be.

In the two subsections to follow, I will discuss the main findings which have crystallised out of the mass of research conducted on the lateral in a large number of languages, mostly English.

1.1.1   *Tongue tip and blade*

Apicality correlates with dark /ɫ/, and laminality, to a lesser extent, with clear /l/. This tendency has first been observed by Bothorel (1967, 147) in his cross-linguistic study of laterals in the languages of Europe. It has since been substantiated by numerous studies. It holds, for instance, for the German clear lateral (Recasens et al. 1996, 180-181), the clear lateral in American English (as uttered by trained phoneticians), at least in some speakers (Narayanan et al. 1997, 1070), and for the

interdental clear laterals[2] of Melpa, a Papuan language, and Kaititj, an Australian language (Ladefoged et al. 1977, 47, 49). Not all clear laterals, however, follow this picture: In the Romance languages and dialects Valencian Catalan, Western Lengadocian Occitan, French, Italian, and Sardinian, /l/ has been found to be apical rather than laminal (Recasens and Espinosa 2005, 22 for Valencian Catalan, Maurand 1974, 168-169 for Western Lengadocian Occitan, Bothorel et al. 1986, 212-215 for French, Recasens and Farnetani 1994 for Italian, Contini 1987, 375 for Sardinian). Among the American English trained phoneticians of Narayanan et al.'s study, those speakers whose clear /l/ was apical exhibited a slightly raised and retracted posterior tongue body, which the authors interpret as a consequence of the apical articulation in their /l/ (Narayanan et al. 1997, 1072). On the other hand, those speakers who had a laminally-articulated clear /l/ showed a slight tongue root retraction as opposed to tongue body retraction and raising (Narayanan et al. 1997, 1070). Recasens et al. (1996, 180-181) consider active predorsum lowering as it occurs in dark(ish) laterals as preventing a laminal articulation. Finally, Lindblad and Lundqvist (2003, 1901) propose that apicality is due to the low jaw position of the lateral: since a low jaw position entails a lower front tongue position, the greater distance between the roof of the mouth and the coronal part of the tongue favours an apical rather than a laminal contact. Given these considerations, one wonders whether the apical clear laterals reported in many languages are not further down on the darkness scale than their laminal clear counterparts, and whether the apical clear laterals allow for greater coarticulatory variation than the laminal ones. These questions can only be addressed by a large-scale empirical study looking at tongue tip movements in laterals across languages.

Clear laterals tend to have an alveolar place of articulation, and dark laterals tend to have a dental place of articulation. This tendency, related to the apicality vs. laminality issue discussed above, has also been noted by Bothorel (1967, 147) in his dissertation on laterals. The observation is true for the apical clear laterals of the Ambialet variety of Western Lengadocian Occitan (Maurand 1974, 166), French (Recasens and Espinosa 2005, 4), and Spanish (Recasens and Espinosa 2005, 7). The apical clear laterals of Valencian Catalan become somewhat fronted when they become darker in word-final position (Recasens and Espinosa 2005, 20). Dark /ɫ/, on the other hand, has been almost invariably found to be dental or dentoalveolar in a large number of languages including Catalan (Recasens and Farnetani 1994), American English (Giles and Moll 1975, Recasens and Farnetani 1994, Browman and Goldstein 1995, Recasens and Espinosa 2005, 4, 7), Thuringian Ger-

---

2 As opposed to the interdental darkish laterals of the Southern Italian variety of (Pre)Sila (Loporcaro and Mancuso 1998) and of Upper Arièja Occitan (Rohlfs 1929, Companys 1957).

man (Hocheichsfeldisch and Hennebergisch varieties, where the sound is even described as interdental) (Hentrich 1919, 72), Breton, Albanian (Bothorel 1969-1970, Ladefoged and Maddieson 1996, 186-187), Russian (Straka 1942, 16, Straka 1979, 370-373, Ladefoged and Maddieson 1996, 186-187, Proctor 2009, ch. 7, ultrasound study), and Turkish (Zimmer and Orgun 1999). Why this is so has been investigated by Daniel Recasens and his colleagues in a number of publications on dialects of Catalan (Recasens and Farnetani 1990, 963, Recasens and Farnetani 1994, Recasens et al. 1996, 179, Recasens and Espinosa 2005, 11, Recasens 2007*a*, 389, Recasens 2009, 470, 478): assuming that the tongue tip is slightly constrained in a dark /ɫ/ or a contextually darkened clear /l/ (for the concept of constraint, see below Section 1.3), the raising of the tongue body and the lowering of the predorsum lead to the tongue tip moving forward in the direction of the upper incisors and, in some cases, as in (Pre)Sila Italian, Upper Arièja Lengadocian Occitan or Thuringian German, even further. In a dialect with overall dark laterals such as Majorcan Catalan, practically no continuous closure fronting of the tongue tip takes place, i.e. no sliding movement of the articulatory contact along the roof of the mouth during the production of the sound occurs, presumably because the location of the tongue tip closure is already at the upper incisors, while dialects with moderately dark laterals such as Eastern Catalan or with laterals which undergo contextual darkening such as Valencian Catalan show continuous closure fronting in speech production. From this follows the next observation.

The tongue tip location of dark /ɫ/ shows little variability, while in clear /l/, it is more strongly influenced by the phonetic context, both the surrounding vowels and the position within the syllable or word. This is probably due to the relatively low degree of constraint of the tongue tip in the lateral and has been shown for the dark laterals of Catalan (Recasens et al. 1996, 175-177, Recasens and Espinosa 2005, 11, Recasens 2009, 460) and American English (Giles and Moll 1975, 211, Recasens and Farnetani 1990). As hypothesised in the previous paragraph, there is not much room for the tongue tip to front in a dark lateral, even if it is only slightly constrained. The fact that it can become interdental also seems to argue for its low degree of constraint. In addition, as Recasens et al. (1996, 175-177) and Recasens and Espinosa (2005, 11) point out, the high degree of constraint of the tongue body in the dark lateral (see below 1.1.3) and hence its low degree of variability across phonetic contexts also contributes to the observed low variability of the tongue tip closure location. For the clear laterals, findings from Italian (Farnetani 1990, 114), Spanish (Navarro Tomás 1917, 269) and German (Recasens et al. 1996, 175-176) substantiate the claim that the vocalic context has a significant influence on the precise location of the tongue tip in the clear lateral: this is thought to be due to the lower degree of constraint of the tongue body in clear /l/ than in

dark /ɫ/ which is therefore subject to coarticulatory influences from surrounding vowels and capable to transfer these influences in turn to the equally slightly-constrained tongue tip.

Tongue tip closure is longer in dark /ɫ/ than in clear /l/. Comparison of the duration of tongue tip closure in Italian clear /l/ vs. Catalan dark /ɫ/ (Recasens and Farnetani 1994, 198, 200) and Valencian Catalan clear /l/ vs. Majorcan Catalan dark /ɫ/ (Recasens and Espinosa 2005, 12) shows that the tongue tip closure is significantly longer in dark laterals vs. clear laterals, across syllable positions.

In clear /l/, the onset of the tongue tip closure coincides with voicing onset word-initially and with voicing offset word-finally, while in dark /ɫ/, the onset of the alveolar closure may precede voicing onset word-initially, but follows voicing offset word-finally. This was shown for Italian clear /l/ and the dark /ɫ/ of Catalan and American English by Recasens and Farnetani (1994, 198, 200); a later study by Recasens and Espinosa (2005) found differences in coördination between voicing and tongue tip gesture in Majorcan Catalan vs. American English dark /ɫ/: In American English, but not in Majorcan Catalan, voicing offset in word-final position could occur before the tongue tip reached the alveolar ridge. In Majorcan Catalan word-final dark /ɫ/, voicing offset took place during the tongue tip closure period. In the word-final clear /l/ of Valencian Catalan, on the other hand, voicing offset coincided with or followed the release of the tongue tip closure (such a coördination may explain the excrescent schwa following a word-final clear /l/ observed, e.g., in contemporary French). In contrast to Italian clear /l/, the word-initial clear /l/ of Valencian Catalan had its voicing onset only during the second half of its tongue tip closure period, just like the word-initial dark /ɫ/ of Majorcan Catalan (Recasens and Espinosa 2005, 16, 22). Unlike Valencian Catalan clear /l/, however, Spanish word-final clear /l/ has its voicing offset before the release of the tongue tip contact (Navarro Tomás 1917, 273) – as a consequence of these findings it is apparent that more observations in more languages will be needed to ascertain the tendencies regarding the coördination of voicing and tongue tip movement across laterals of different degrees of darkness or clearness.

1.1.2   *Tongue tip – tongue body coördination*

Some languages with overall clear /l/ may show Tongue body (TB) - Tongue tip (TT) gesture lag syllable-finally. This amounts to saying that in some clear-/l/-languages, /l/ is darker or less clear syllable-finally than syllable-initially.[3] This is true at least for Italian (Recasens and Farnetani 1994,

---

3 Unless, of course, there is a marked tendency towards predorsum raising in a clear lateral, in which case the syllable- or word-final lateral would tend toward palatalisation. Such a trend, however, is cross-linguistically rarer than darkening and has not yet been investigated experimentally.

201), Valencian Catalan (Recasens and Espinosa 2005, 21), Québec French (one out of two speakers, Gick et al. 2006, 59-60, 66), and Northern Ireland English (Newton 1996, 178).

Languages with moderately and very dark /ɫ/ show simultaneous TB-TT gestures or a TT-TB lag in the syllable onset and a TB-TT gesture lag in the syllable coda. This kind of tongue tip – tongue body gesture coördination has been shown to exist in European Portuguese (Oliveira et al. 2010), Squamish Salish (Gick et al. 2006, 61, 66), American English (Browman and Goldstein 1992, 166, Sproat and Fujimura 1993, 298, 300), Greater Manchester British English (Newton 1996, 178), and Western Canadian English (Gick et al. 2006, 59). The latter variety of English differs from American English in that the negative lag in prevocalic position is greater in Western Canadian English than in American English, while the TT lag in postvocalic position is smaller in Western Canadian English than in American English. The authors, however, rightly caution against generalising for a whole dialect from the data of just two speakers (Gick et al. 2006, 65), and this, in fact, holds for almost all of the studies discussed in this chapter. The Serbo-Croatian dark /ɫ/ has no TB-TT lag syllable-finally, but instead simultaneously occurring gestures across syllable positions (Gick et al. 2006, 60, 66). In this respect, Gick et al. (2006) propose that simultaneous tongue tip and tongue body gestures in /ɫ/ in prevocalic position enhance the acoustic effect of darkness. While this seems to make a lot of sense, it would be interesting to see how it bears out in a perception study, using perhaps synthetic stimuli.

In intervocalic position, the tongue tip and tongue body gestures tend to occur simultaneously. Such was at least the case in the languages tested in Gick et al. (2006)'s ultrasound study (pp. 67-68). Given the existence of /ɫ/-vocalisation in intervocalic position (see Section 2.2), we would hypothesise that at least some languages or dialects or individual speakers would show a TB-TT lag in their intervocalic dark /ɫ/, unless this change is triggered by acoustic equivalence. For clear /l/, such a lag is not expected. Whether these hypotheses will withstand cross-linguistic examination is an issue for future studies.

1.1.3   *Tongue body*

Clear /l/ shows coarticulatory influences from the vocalic context. This is thought to be a consequence of the relatively low degree of constraint of the tongue body in clear /l/ and has been observed time and again, for instance by Chafcouloff (1972, 103), Recasens et al. (1996, 175), Recasens and Espinosa (2005, 7-8), and specifically for the languages listed in Table 1 on page 15.

Such overwhelming evidence confirms a strong trend, but no rule without exceptions: At least the clear laterals of Alguerese Catalan, Czech, Danish, and Standard German show little influence of the

Table 1: List of languages presenting coarticulatory influences in clear /l/.

Language	References
British English Received Pronunciation, Newcastle and West Midlands British English (syllable-initial /l/)	Bladon and Al-Bamerni 1976, 141, fig. 2, Gartenberg 1984, 150, Recasens forthcoming
American English	Lehman and Swartz 2000, 53
African American English (word-initial /l/)	Van Hofwegen 2011, 387
Chicano American English	Van Hofwegen 2009, 313
Dutch (syllable-initial /l/)	Recasens forthcoming
Finnish	Recasens forthcoming
French	Chafcouloff 1972, fig. 1, Chafcouloff 1985, Bothorel et al. 1986, 212-215, Recasens forthcoming
German	Chafcouloff 1972, fig. 1, Recasens forthcoming
Greek	Loukina 2010, 123, table 3, Müller 2010
Hungarian	Recasens forthcoming
Italian	Bladon and Carbonaro 1978, 49-52, Marotta and Nocchi 2001, 297, table 2, Nocchi 2002, 79, table 1, Recasens forthcoming
Norwegian	Recasens forthcoming
Lengadocian Occitan	Maurand 1974, 167-169, Müller and Martín Mota 2009, Recasens forthcoming
Romanian	Recasens forthcoming
Sardinian	Contini 1987, 377
Spanish	Colton 1909, 112, Chafcouloff 1972, fig. 1, Recasens forthcoming
Swedish	Mártony and Fant 1961, Recasens forthcoming
Valencian Catalan	Recasens and Espinosa 2005, 12, Recasens forthcoming

Table 2: List of languages presenting coarticulatory influences in dark /ɫ/.

Language	References
American English	Chafcouloff 1972, fig. 1, Oxley et al. 2006, 113, Oxley et al. 2007, 532-534, Recasens forthcoming
African American English (word-final /ɫ/)	Van Hofwegen 2011, 387
Leeds British English	Recasens forthcoming
British English (Received Pronunciation) (word-final /ɫ/)	Bladon and Al-Bamerni 1976, 141, fig. 2
Majorcan and Eastern Catalan	Recasens 2009, 465-466, Recasens forthcoming
European Portuguese	Andrade 1999, 545, Recasens forthcoming
Russian	Recasens forthcoming
Northern Welsh	Morris 2011

vocalic context surrounding them (Recasens et al. 1995, 49, Recasens et al. 1996, 180, Recasens et al. 1998, 76, Recasens forthcoming).

Dark /ɫ/ also shows coarticulatory influences from the vocalic context, but to a much lesser degree. In contrast to clear /l/, dark /ɫ/ is generally taken to have a relatively strongly constrained tongue body, which is why it rather exerts influences on its vocalic context (see 2.1.2.4) than suffers such influences from it. It is nevertheless susceptible to some amount of covariation with the vowels surrounding it (Chafcouloff 1972, 103). This observation is true for the languages listed in Table 2 on page 16.

Clear /l/ shows a certain degree of dorsopalatal contact, and the jaw is lowered to avoid velarisation caused by tongue mass displacement due to active lateral side channel formation. Some degree of dorsopalatal contact is expected in a clear lateral due to predorsum raising and has been found, for instance, in Italian word-initial /la/ (Recasens and Farnetani 1994, 198, fig. 3); moreover, the Sardinian clear geminate lateral shows a greater degree of dorsopalatal contact than the singleton (Contini 1987, 376). Lindblad and Lundqvist (2003, 1901) hypothesise that jaw lowering in the clear lateral contributes to actively establishing side channels by inward lateral compression of the tongue while at the same time allowing the predorsum to rise and thus preventing the tongue body from retracting.

Dark /ɫ/ may be pharyngealised or velarised. Darkness in a lateral can be achieved by either raising the tongue body towards the soft palate (velarisation) or through a narrowing of the posterior tongue body with

the pharyngeal wall (pharyngealisation) (Recasens 1996, 64, Narayanan et al. 1997, 1072, Hamann 2003, 58). It is not yet clear whether the use of one or the other strategy is a matter of language, dialect, or individual speaker, nor do we know whether languages, dialects, or individual speakers are consistent in their choice of one strategy or the other or whether there is much intra-language, -dialect or –speaker variation. We still lack studies that address this question in a large-scale empirical fashion. In the Magnetic Resonance Imaging study of American English laterals undertaken by Narayanan and colleagues, half of their four subjects exhibited velarisation and the other half pharyngealisation in their dark laterals (Narayanan et al. 1997, 1072). Only a few other studies mention the precise location of the tongue body in dark /ɫ/, and these all report pharyngealised dark /ɫ/. The American English speaker in the experiment conducted by Honorof et al. (2011) using 2D-Electromagnetic Articulography had a pharyngealised dark /ɫ/ (Honorof et al. 2011, 28), whereas the Russian speakers in Proctor's (2009) ultrasound study also presented pharyngealisation (Proctor 2009, 135, 142, 145, 154). The same was true for the dark /ɫ/ of the Albanian speaker of Bothorel's (1969-1970, 135) radiographic study. Upon acoustic impression, Wells (1982, 411, 603, 609) judges the Scottish English variety of Glasgow as well as both Australian and New Zealand English to have a pharyngealised, /ɒ/-coloured /ɫ/.

Which muscle activity causes velarisation/pharyngealisation in dark /ɫ/? Electromyographic research on muscle activity in laterals has never really been fashionable.[4] I report in this paragraph on both studies which had a look at it, both with respect to American English. The first study, conducted by Leidner (1973, 196), Leidner (1976, 331-334), holds the styloglossus muscle responsible for velarisation since it is considered to effect tongue backing and raising and has a greater activation level in the darker preconsonantal laterals than in the less dark intervocalic laterals. In general, he found that activation levels of the genioglossus (which pulls the tongue forward and downward, Baker 2008, 175), the medial intrinsics (transversus and verticalis which are interdigitated and contribute to a vertical expansion of the tongue with a concomitant slight protrusion of the tongue tip, Baker 2008, 175), and the styloglossus, which all help to pull the predorsum down and the tongue dorsum back, were greatest following /i/ and lowest after /u/, with /a/ taking the middle position. This pattern of activation is easily explained by taking into account the amount of displacement required in order to effect the tongue body gesture for a dark /ɫ/. Not

---

4 The primary reason for this may be and have been, aside the difficulty of conveying to the Ethics Committee the importance of sticking electrodes into other people's or one's own tongue, that the muscles of the tongue are partly interdigitated with one another and that their precise location and extension varies from subject to subject, thereby reducing precision and making inter-subject comparison a difficult task (cf. Leidner 1976, 329).
A detailed overview of the anatomy of the tongue can be found in Baker (2008, ch. 3).

surprisingly, he also found in his syllable-final dark laterals a lessened activity in the tongue tip. Leidner's findings regarding the styloglossus muscle seem to have been confirmed by Sproat and Fujimura (1993, 309-310).

The other study, by Stone et al. (1992, 267-268), contests the responsibility of the styloglossus muscle in velarisation and suggests that lateral side channel formation is due to the hyoglossus muscle actively depressing the lateral margins of the tongue body (see also Sands (2007, 215-216) in 3.3.4.2 for a similar proposal). Furthermore, they propose that velarisation/pharyngealisation in /ɫ/ runs along the following lines:

> Contraction of the transverse muscle, coupled with HG [hyoglossus] contraction, would cause a convex dorsal surface. GGP [genioglossus posterior] would push the entire tongue up and forward. This raises the back and pushes the tip against the palate. Since the tongue tip is braced against the palate, the force of GGP would elevate the back of the tongue. GGA [genioglossus anterior] contraction, added to the force against the palate, would lower the middle portion of the tongue, between the tip and the raised back, facilitating the raising of the back and the tip of the tongue. In some subjects, [...], a midsagittal groove is formed in the anterior tongue during the [l], due to linguopalatal pressure and GGA contraction. If the middle tongue segment were not lowered, the upward force of the tongue might create a sagittal contour more like [i] than [l]. This explanation presumes that there is a middle portion of genioglossus that can remain uncontracted despite the contraction of GGA and GGP. (Stone et al. 1992, 268)

Another proposal concerning lateral side channel formation comes from Lindblad and Lundqvist (2003, 1900) who suggest that the formation of lateral side channels is mainly due to activity of the internal transversus lingual muscle, given its ability to narrow the tongue.

The relationship between degree of darkness and duration is unidirectional. In their study of American English clear and dark laterals, Sproat and Fujimura (1993, 300-302, 307) tried to relate the quality of dark /ɫ/, which appears in preconsonantal and word-final position, to the total duration of the syllable rime, and found that the longer the rime the darker was the /ɫ/, in other words, the greater was the lag between the tongue body and the tongue tip gestures. They assumed that this relationship was bidirectional. That this is not so has been shown by Huffman (1997, 135) who pointed out that laterals tend to be longer with increasing degree of darkness, but that longer laterals are not necessarily darker, and this was later confirmed in Van Hofwegen's (2011, 392) acoustic study of African American English laterals, testing the same claim. On the other hand, a perceptual study by Newton

in 1993, reported in Newton (1996, 169), found that British English speakers perceived synthesised longer laterals as being darker than shorter laterals with the same synthesised formant structure. It is not clear, however, whether this relationship is language-specific or a more general phenomenon, since it is also true that the British English darker /ɫ/, just like the American English one, has a longer duration than its clear counterpart (Newton 1996, 181).

1.1.4 *Origins of positional variants of the lateral*

While most languages have more or less the same quality of the lateral across syllable positions with modest variations due to their position within the word ('intrinsic allophones'), as well as to coarticulation, a few languages have taken these variants further and allowed the emergence of what is called 'extrinsic allophones'. Among these languages, we find Latin (see Chapter A), Old Armenian (Meillet 1905-1906, 237), Eastern Catalan (Recasens and Espinosa 2005, 5-6), the Cagliari variety of Campidanese Sardinian (Wagner 1941, 120, §187), several varieties of British English (Received Pronunciation, Newcastle English, Southern British English, etc.) (Bladon and Al-Bamerni 1976, Barry 2000, Scobbie and Wrench 2003, 1871, Recasens and Espinosa 2005, 5-6, Recasens forthcoming), Dutch (Recasens forthcoming), Norwegian (Recasens forthcoming), Czech (Ščerba 1910-1911, 283, Recasens forthcoming), and Latvian (Ščerba 1910-1911, 283). Empirical research has given us a measure of how to distinguish those languages with 'intrinsic allophones' from those with 'extrinsic allophones': the results of Recasens' (forthcoming) acoustic study of the lateral in 23 languages or dialects suggest that an F2 difference below 200 Hz between the clearer and darker variants of the lateral in a given language or dialect corresponds to the presence of 'intrinsic allophones', while an F2 difference greater than 400 Hz, as found in English, Czech, and Dutch, clearly indicates that the language or dialect has 'extrinsic allophones' of the lateral. Values between 200 Hz and 400 Hz in F2 difference probably belong to the category boundary which is expected to be fuzzy rather than clear-cut. Furthermore, languages may oppose clear /l/ and dark /ɫ/, for instance, East and Southern Kurdish (in all positions except word-initially, (McCarus 1958, 18, 22, McCarus 1997, 692-695)), Turkish (Zimmer and Orgun 1999), and Albanian[5] (Orel 2000, 50-52, 56-59).

So, where do the 'extrinsic allophones' come from? Two possible origins have been suggested: (1) assimilation to following back and low vowels via anticipatory coarticulation, and (2) effects of syllable position (Meillet 1905-1906). Note that this hypothesis presupposes

---

5 In the Albanian dialects spoken in Southern Italy, this contrast has further evolved into opposing /ʎ/ on the one hand and /ɫ ~ γ ~ ʁ ~ w/ on the other hand (cf. Romito and Belluscio 1996, 143).

that the dark 'extrinsic allophone' arose from a clear lateral, i.e., that the clear lateral is somehow the 'original' one. This is also the scenario which Straka (1979, 382) posits for Slavic. Similarly, the hypothesis also predicts that the dark 'extrinsic' variant is more likely to emerge syllable-finally than syllable-initially, since sounds are subject to alterations to a greater extent in the former position than in the latter. A further origin of the 'extrinsic allophones' is proposed by Sproat and Fujimura (1993, 307), who relate darkness to duration factors: they claim that shortening of a lateral leads to its becoming clearer; this proposal has been critically discussed in 1.1.3 above and will not be dealt with again.

(1) Emergence of the 'extrinsic allophones' through coarticulatory influences from the vocalic context. In some languages, such as Lithuanian (Osthoff 1893, 56-57, Meillet 1905-1906, 237), Latin (see Chapter A for references) or the Slavic languages (Straka 1979, 382), the lateral is clear before front vowels and dark before back and low vowels. In the Occitan variety spoken in the villages of Lo Pòrt and Liers in Upper Arièja (09), the lateral is clear before front vowels, but vocalised to /w/ before back and low vowels (Laurent 2002, 14).[6] It is possible to argue that the process had to start from a clear lateral since this variant is much more subject to coarticulatory influences from the vocalic context than is dark /ɫ/ (see 1.1.3 above and cf. also Chapter A for a discussion of the original quality of the Latin lateral).

(2) Emergence of the 'extrinsic allophones' as a syllable position effect. The idea here is that some prosodic positions within the syllable or the word favour a reduced articulation of whichever sound happens to find itself placed in such a position. This is, for instance, the view of Grammont (1933, 207-208) and Straka (1979, 383) with respect to the darkening of clear /l/ in intervocalic, preconsonantal, and word-final positions. For this to happen, Recasens and Espinosa (2005, 6) argue, the lateral itself must be relatively open to coarticulatory influences, and hence, its tongue body relatively unconstrained. This is the case for clear /l/. But the evolutionary path, according to this view, is unidirectional: While a clear /l/ can undergo darkening, it is an unlikely event that a dark /ɫ/ will become entirely clear again through coarticulatory influences (though it is possible for it to be replaced by a clear /l/ due to some analogical change). I will not discuss in this thesis the question of why some positions within the syllable should be considered a locus for strengthening rather than weakening processes or vice versa. Many phonological theories have devoted themselves to doing that. It is clear that the transition between the consonant and the vowel in the CV sequence is one of the most prominent elements of the syllable, and that there are overall tendencies in the timing of tongue tip and tongue body gestures related to this sequence (see 1.1.2

---

6 This variety also has /ɫ/-vocalisation in intervocalic, preconsonantal, and word-final position.

above for a discussion of the temporal coördination of these gestures in the clear and dark laterals). Some people have accordingly voiced words of caution against conferring syllable position effects too much weight in the emergence of the 'extrinsic allophones', pace Sproat and Fujimura (1993) who deny the existence of 'extrinsic allophones' altogether and argue that they can be explained by syllable structure alone.[7] The fine phonetic details of the laterals according to syllable position differ from dialect to dialect and from language to language (Wrench and Scobbie 2003, 319) and laterals in languages such as European Portuguese can even have a higher F2 in final than in initial position (Recasens forthcoming). According to the literature, strong tendencies seem to emerge, for example, that tongue body gestures occur closer to the tongue body gesture of a vowel than do tongue tip gestures or that gestures are timed differently according to syllable position. We know much about the American English lateral and a bit about the lateral in a number of Indo-European languages, but next to nothing or at least very little about laterals in other languages of the world. For this reason more empirical research from a wider variety of languages is needed. I therefore concur with Gick et al. (2006, 67-69) when they say with respect to gestural timing in laterals that "there is no single pattern that characterizes syllable positions across languages. Thus, language-specific patterns, though apparently influenced by universal phonetic factors, must nonetheless be to a large extent specified language by language."

1.2   THE ACOUSTIC STRUCTURE OF THE LATERAL

In this section, I will present research findings related to the acoustic structure of the lateral. In 1.2.1, I will be concerned with the formant structure of the lateral approximant, and in 1.2.2 with the anti-formant (zero) arising through the formation of lateral side channels.

1.2.1   *The formant structure of the lateral*

The first formant. F1 in the lateral approximant is associated with tongue height and corresponds to the Helmholtz resonance between the constriction and the back cavity.[8] As this area becomes greater, F1 increases. Moreover, losses at the central alveolar or dental closure

---

7 Barry (2000, 78) observes that Sprout and Fujimura, by studying a language with overall dark /ɫ/s, namely Midwestern American English, rather than a variety with genuine 'extrinsic allophones' such as RP British English, have missed the opportunity to make any substantial claims about the clear /l/ – dark /ɫ/ distinction.

8 Reetz and Jongman (2009, 190) describe the Helmholtz resonator as "a resonant system formed when a relatively wide back cavity is completely closed at one end (the glottis) and has a narrow constriction at the other end. The resonant frequency of this Helmholtz resonator is determined by the relative volumes of air in the back cavity and constriction, and is typically very low (below 1kHz)."

contribute to a relatively large bandwidth which in turn can reduce the amplitude of the spectrum (Bladon 1979, 502-503, Recasens 1996, 70, Narayanan et al. 1997, 1074, Stevens 1998, 546). F1 tends to be higher in dark laterals as compared to clear laterals, suggesting a lower tongue position in the former than in the latter variety of lateral. Typical F1 frequency values are 281 Hz in an /i/-context and 413 Hz in an /a/-context for an intervocalic clear /l/, and 337 Hz in an /i/-context and 460 Hz in an /a/-context for an intervocalic dark /ɫ/ (data from Recasens forthcoming).

The second formant. F2 is associated with the half-wavelength-resonance of the mid and back cavities behind the central constriction; the larger this cavity the lower F2. The smallest cavities behind the constriction and hence the highest F2 are found in palatal laterals followed by alveolar clear laterals. Velarisation and pharyngealisation both contribute to lengthening of the vocal tract and to an increase in the volume of the back cavity, and this results in low frequency values for F2 (Bladon 1979, 502, Recasens 1996, 75, Narayanan et al. 1997, 1074, Stevens 1998, 546). Moreover, as Ladefoged and Maddieson (1996, 197) note, a velar /ʟ/, i.e., a lateral in which the constriction is situated at the soft palate, has a higher F2 frequency than dark /ɫ/. Typical F2 frequency values for intervocalic clear /l/ are 1715 Hz in an /i/-context and 1222 Hz in an /a/-context, and for intervocalic dark /ɫ/ 1104 Hz in an /i/-context and 972 Hz in an /a/-context (data from Recasens forthcoming).

The third formant. F3 is thought to be correlated to the cavity in front of the constriction, with its frequency values becoming greater as the cavity becomes smaller (Stevens 1998, 543, 546). Considering the variability in tongue tip closure location due to coarticulatory influences in the clear lateral, one would expect to find a corresponding variation in F3 frequency values in /l/ but not in the articulatorily more stable /ɫ/ (Chafcouloff 1972, 103-104). Moreover, since the tongue tip contact in dark /ɫ/ occurs at the upper incisors as opposed to the alveolar region in clear /l/, the anterior cavity is smaller in dark /ɫ/ than in clear /l/, and F3 is accordingly somewhat higher in the former kind of lateral than in the latter (Recasens and Espinosa 2005, 11). Typical frequency values of F3 in the intervocalic clear lateral are 2581 Hz in an /i/-context and 2522 Hz in an /a/-context, and in the intervocalic dark lateral 2551 Hz in an /i/-context and 2639 Hz in an /a/-context (data from Recasens forthcoming). Furthermore, Bladon 1979, 503-504 observes that F3 is stronger in the retroflex /ɭ/ and in the palatal /ʎ/ where the anterior cavity is larger than in alveolar clear /l/ and dental or dentoalveolar dark /ɫ/.

The fourth formant. F4 is also thought to be associated with the cavity in front of the constriction, at about 3500 Hz, and has a very large bandwidth of approximately 1000 Hz. If a zero (see below 1.2.2) occurs

close to F3 and effectively cancels it, F4 may appear as F3 (Bladon 1979, 503, Stevens 1998, 546).

The fifth formant. Stevens (1998, 546) estimates F5 in the lateral to be at approximately 3900 Hz.

The amplitudes of the higher formants are to a great extent influenced by the exact location of the zero in the lateral's transfer function (see 1.2.2 below). Moreover, the higher frequencies are subject to considerable variability due to speaker characteristics.

It has been usual to take as an indicator of the degree of darkness or clearness in a lateral the frequency values of F2, since it corresponds roughly to tongue position along the anterior-posterior axis. F2 divides the clearness-darkness continuum at approximately 1300-1400 Hz in the context of /i/ and at about 1000 Hz in the context of /a/ (Recasens forthcoming). Given however the fact that F1 also varies, albeit less dramatically, as a function of darkness or clearness of the lateral, a better indicator to measure darkness or clearness is the distance between the second and the first formant (Recasens and Farnetani 1990, 961, 963, Recasens, Fontdevila and Pallarès 1995, 41, Recasens and Espinosa 2010*a*, 72), and this measure is increasingly used in the literature, e.g., by Sproat and Fujimura (1993, 297), Müller and Martín Mota (2009), Simonet (2010*b*), Roussel and Oxley (2010), Honorof et al. (2011, 22), Van Hofwegen (2011, 382).

Transitions and intensity. The most prominent feature in the transition of the lateral into a following vowel is the rather rapid increase in frequency of F1 which results from a rapid increase in constriction area during the release of the tongue tip closure, while changes in F2 are slower due to the slower movements of the tongue body. Moreover, with the disappearance of the tongue tip constriction acoustic losses are reduced, and this results in a rapid narrowing of formant bandwidths during the transition from the lateral into the vowel. The zero in the transfer function (see 1.2.2 below), of course, also disappears with the release of the constriction. These changes cause an abrupt rise in amplitude at the release of the lateral into the following vowel; the decrease in amplitude during the transition from the vowel into the lateral, on the other hand, has a less abrupt character (Narayanan et al. 1997, 1074, Stevens 1998, 547-550, 553). According to Bothorel (1967, 100) the formant transitions in and out of the lateral are in the range of 50-70 ms, whereas when one calculates the average transition length measured by Quilis et al. (1979) for Spanish, one gets an average length of only 15.4 ms across syllable positions and phonetic context. It is not clear to me what causes such blatant divergences in these results, but methodological or definitional differences are good candidates.

The oral constrictions during the lateral, in the dento-alveolar region or elsewhere, lead to a higher air pressure inside the oral cavity, which in turn reduces the overall intensity of the waveform at the glottal source in comparison to vowel productions (Prahler 1998, 16). This,

however, seems not to be true for the lateral in all positions. Quilis et al. (1979, 327, 333, 335) found that the Spanish clear lateral has a greater intensity than the following vowel when it is in a complex onset cluster, and the same holds for the preconsonantal lateral when either a /t/ or a /n/ (but not /d, θ, s/) follows. To my knowledge, no other study has yet systematically looked at intensity levels in the lateral across syllable positions.

1.2.2 *The zero in the transfer function caused by lateral side channels*

It has been said at the beginning of this chapter that the presence of lateral side channels is the defining feature of lateral consonants (Ladefoged 1980, 492). The side channels can occur on one or both sides of the tongue. In a large-scale survey of 357 speakers, Hamlet (1987, 193) found that 49% of her subjects had side channels on both sides of the tongue, and that the other half divided roughly equally into lateral productions with a unilateral side channel on the right side of the tongue and into lateral productions with a unilateral side channel on the left side.[9]

The effect of the lateral side channel(s) is to add a zero to the transfer function as well as a further frequency peak. The zero occurs in the frequency range of roughly 2000 to 5000 Hz and is visible as a marked drop in amplitude in the spectrum of the sound in the region of the third formant, slightly below it in clearer laterals and slightly above it in darker laterals. This is illustrated in the spectral slices in Figure 3 on page 25 and Figure 4 on page 25, for clear /l/ and moderately dark /ɫ/, respectively (see also Bladon 1979, 506, fig. 1, 508, fig. 3 for more spectral slices of a variety of laterals). Moreover, the pole associated with the zero (see Stevens 1998, 130) can lead to an increase in the number of formants in the higher frequency regions with respect to vowels (Mártony and Fant 1961, Stevens 1998, 546-548, Zhang, Espy-Wilson and Tiede 2003, 2395, Zhang and Espy-Wilson 2004, 1274), and it is also possible that the lateral's F3 displays two spectral peaks, namely when "the acoustic path near the tongue blade splits into two channels, leading to a replacement of the pole in the vocal tract transfer function at about 2800 Hz by a pole-zero-pole cluster" (Stevens 1998, 550).

The presence of an additional pole-zero pair effectively decreases the amplitude of the formant peaks in its environment. Specifically, as Mártony and Fant (1961) and Chafcouloff (1985, 91) note, the amplitude levels of the second or third formant are affected, while the level of the fourth formant, on the other hand, may be raised.

Research into acoustic modelling of the lateral has shown that side channels of non-uniform area and length can produce a pole-zero pair in the region of 2000 to 3000 Hz even if they are only a few centimetres

---

9 These asymmetries were not a function of the subjects' handedness (Hamlet 1987).

Figure 3: Spectral slice of clear /l/ in the sequence /aˈla/ in the speech of a male speaker of Western Lengadocian Occitan. Spectral peaks are visible at 422 Hz, 1546 Hz, 2411 Hz, 3188 Hz, and 3870 Hz. A zero appears at 2153 Hz, just below F3.
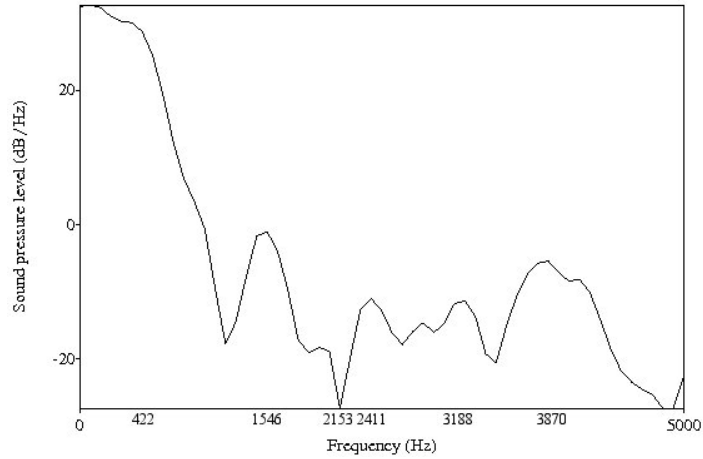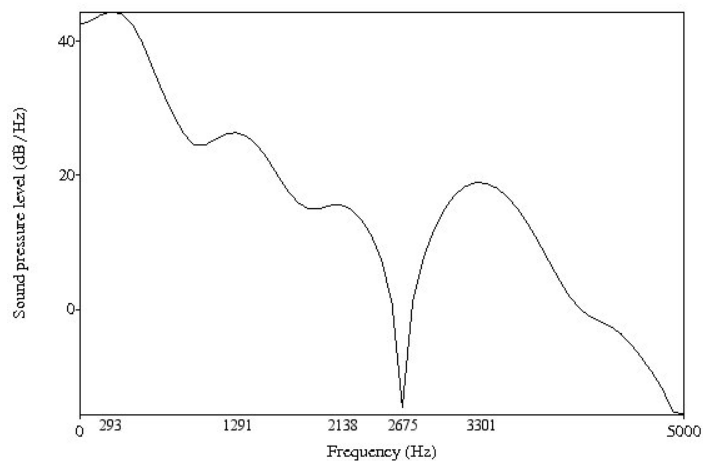

Figure 4: Spectral slice of moderately dark /ɫ/ in the sequence /ˈaɫa/ in the speech of a male speaker of Standard Greek (Thessaloniki accent). Spectral peaks are visible at 293 Hz, 1291 Hz, 2138 Hz, and 3301 Hz. A very prominent zero occurs at 2675 Hz, just above F3.

long (uniform side channels would produce pole-zero pairs which would cancel each other out, but it is highly unlikely for such uniform channels to occur in real speakers anyway). As the precise frequency of the pole-zero pair depends on the whole area functions of the lateral side channels, it is highly sensitive to small changes in either area or length, and therefore a large intra- and interspeaker variability in the location of the pole-zero pair is both expected and observed. Moreover, the smaller the area of the side channel(s), the greater the losses and the greater the reduction of the spectral prominence of the pole-zero pair (Chafcouloff 1985, 81, Zhang and Espy-Wilson 2004, 1274, 1279-1280, see also Prahler 1998 for an earlier model). Using articulatory synthesis, Narayanan and Kaun (1999, 2099-2100) tested different side channel lengths and their acoustic effects: While a side channel length smaller than approximately 1.7 cm produced pole-zero pairs in a frequency region above 6000 Hz, and side channels of 2.15 cm to 2.58 cm length pole-zero pairs between 4000-6000 Hz, it was side channels greater than 2.58 cm in length which were able to create pole-zero clusters in the frequency regions observed in laterals, namely between roughly 2000 and 4000 Hz. Furthermore, side channels are generally greater in dark laterals than in clear ones (Narayanan et al. 1997, 1072, see also Recasens 2004, 595).

According to Zhang et al. (2003, 2395), Zhang and Espy-Wilson (2004, 1274, 1279-1280), there is a second source for a pole-zero pair in the lateral: the supralingual cavity. This cavity has a non-uniform tapering area function which decreases its effective length and leads to corresponding increased zero frequencies, still within the range of 2000 to 5000 Hz. This pole-zero pair often occurs in the region of F3 and F4 (as opposed to F2 and F3 for the pole-zero pair resulting from the lateral side channel(s)) and weakens the prominence of these spectral peaks.

1.3   GESTURES OF THE LATERAL

In this section, I will introduce the two theoretical frameworks, Articulatory Phonology and the Degree of Articulatory Constraint Model, the concepts and ideas of which I use in this dissertation for the discussion of the lateral and the sound changes affecting it in Occitan dialects and elsewhere. For the sake of readability, I have tried to keep the descriptions of them as concise yet informative as possible.

For over two decades now, Articulatory Phonology (see Browman and Goldstein 1992 for a comprehensive overview of the basic tenets of the theory) has been developing a framework which considers articulatory gestures as being the component parts of sounds. Unlike individual muscles, these are thought to be coordinated movements of a bundle of muscles of different articulators aimed at effecting one particular gesture such as lip closure, tongue body retraction,

critical narrowing of the tongue tip at the alveolar ridge, and so on. For instance, in a recent attempt at articulatory synthesis of the clear lateral of Spanish using gestures from Articulatory Phonology (Proctor 2009, 105, fig. 5.3, 108, 186, also p.c., February 2010), the tongue tip gesture of /l/ has been determined by trial-and-error to be 'dental' or 'alveolar' and 'narrow' (for constriction location and degree, respectively) and the tongue body 'palatal' and 'wide'.[10] It is not my aim here, however, to discuss the degree of abstractness and hence 'phonologicity' of Articulatory Phonology nor the role of gestures in speech perception ('direct realism'[11]). I will rather loosely and heuristically make use of the term 'gesture' in order to designate coordinated movements of the tongue or other articulators such as retraction, lowering, and so on.

A refinement of the idea of gestures is provided by the Degree of Articulatory Constraint (DAC) model of Daniel Recasens. In a nutshell, this model assumes that articulators are subject to different degrees of control or constraint in their movements during the production of speech. The more an articulator such as the tongue tip or the tongue body is constrained in its movements, the more it is resistant to coarticulatory effects resulting from its phonetic context. Conversely, the more it is resistant to coarticulatory influences, the more it will exert these same influences onto its own phonetic context. Coarticulatory sensitivity is thus inversely related to the degree of constraint of a particular articulator (Recasens et al. 1997, 546, Recasens 2006, 612, Recasens 2007b, 26; for empirical findings of coarticulation involving the lateral and supporting the assumptions detailed above, see Bladon and Al-Bamerni 1976, 143 on RP British English, Lehman and Swartz 2000, 53 on American English, Widdison 1989, Recasens 2009, 465-466 on Catalan, and Recasens and Farnetani 1990, 963, Recasens and Farnetani 1994, 195, 198-199, Recasens et al. 1998, 65, Recasens and Espinosa 2005, 8 in a comparative outlook). It has not been investigated for lack of electromyographical studies (for the few that are on the market, see 1.1.3 above) whether the degree of articulatory constraint or control directly corresponds to the degree of muscle activation (cf. Perrier et al. 2003, 1584). For matters of simplicity, I will equate in this thesis 'articulator' to 'gesture' when both perform a targeted movement, such as forming a closure at the alveolar ridge, but it has to be kept in mind that these are not quite the same at the theoretical level.

As already intimated in 1.1.3 above, the tongue body in clear /l/ is thought to be less constrained than in dark /ɫ/, based on empirical findings from studies of coarticulatory resistance and influences. The

---

10 In this particular modelling, the synthesised lateral failed to exhibit the characteristic zero in its higher frequencies (see 1.2.2 above) and its acoustic quality was too close to that of a palatal approximant.

11 On the Direct Realist Perspective of Speech Perception, see Fowler (1986) as well as Honorof et al. (2011). Ohala and Shriberg (1990) and Ohala (1996) vociferously argue against it.

tongue tip, on the other hand, is considered to exhibit the same degree of constraint as other dento-alveolar consonants (e.g., Recasens and Farnetani 1990, 961, Recasens et al. 1995, 38, Recasens et al. 1996, 173, 175, Recasens forthcoming; see already Straka 1979, 371, 373 for a similar assumption). However, it seems that not all clear /l/s readily accept coarticulatory influences (see 1.1.3 above). Straka (1979, 373) proposes that the tongue tip actively maintains contact with the roof of the mouth, but is otherwise passive with respect to contact location[12], and thus allows for closure fronting due to simultaneous tongue body retraction in dark /ɫ/; a low degree of constraint in the tongue tip is likewise considered by Recasens 2007a, 389 to allow for closure fronting in dark /ɫ/. In the course of this thesis, I shall discuss issues of degrees of constraint at various places in relation to different kinds of lateral (for instance, the degree of constraint in the tongue tip and tongue body in the retroflex lateral is discussed in 5.3.2).

Having introduced the two theoretical bases which underlie my technical terminology and theoretical concepts in this thesis, I shall now devote some space to the question of the gestural make-up of clear and dark laterals. Due mainly to the prevalence of mid-sagittal thinking in the conception of which gestures occur in a lateral and how are they coordinated, no consensus has yet been reached, and the issue is still subject to scholarly debate. In the following, I will summarise the positions on the topic, on the basis of which I will then expound my own view of the gestural make-up of the laterals.

How many gestures in a lateral? The first question to ask is whether clear /l/ and dark /ɫ/ differ in the number of gestures they contain.[13] It has been argued in the literature that dark /ɫ/ consists of both a tongue tip gesture and a tongue body gesture, whereas clear /l/ only possesses the tongue tip gesture (Sproat and Fujimura 1993, 309-310 with respect to German /l/, Recasens et al. 1996, 166, Barry 2000, 84, Molinu 2009). A counter-example to this view are clear laterals whose tongue body gesture is evidently constrained, judging by their degree of resistance to coarticulatory effects, as discussed in 1.1.3 above and in Recasens et al. (1996, 166) with respect to the clear /l/ of Standard German. At least these should have a tongue body gesture present. On a conceptual level, it seems easier to say that a given lateral has a tongue body gesture present, on the assumption that an articulator which is not paralysed or otherwise missing suffices for the presence of such a gesture, but that it may be totally unconstrained. On a gestural score, which is the standard representation of sound sequences in Articulatory Phonology, completely unconstrained gestures may be graphically omitted. It is questionable, however, whether clear laterals

---

12 Straka (1979, 373, footnote 51) claims that an active control of contact location would result in tongue tip retroflexion when the tongue body is lowered and the tongue root retracted, since it could not give way to it by fronting its closure location.

13 Note that the absence of a gesture in Articulatory Phonology corresponds to a totally unconstrained articulator in the DAC model.

really have a totally unconstrained tongue body since comparisons with alveolar stops reveal that clear laterals undergo less coarticulatory influences from the vocalic context than stops do (Proctor 2009, 94, 188, ultrasound study). Moreover, even overall clear-/l/-languages such as French, Standard German or Greek show dark laterals either synchronically in dialectal variation or historically in sound change, or both.

In what follows I will discuss positions which assume that both clear and dark laterals consist both of a tongue tip and a tongue body gesture.[14] Such is the position taken by Sproat and Fujimura (1993, 291, 304-306) (but see Barry 2000, 78 in footnote 7 on page 21 above) and Browman and Goldstein (1995, 21), and, in their wake, by scholars such as Horvath and Horvath (1997, 166), Borowsky (2001, 70-71), and Proctor (2009, 189).

Is laterality a gesture? The question remains how to account for the fact that laterals are precisely that – lateral. Two positions can be discerned in the literature: those scholars who hold the view that laterality is an active gesture, and those who say that, on the contrary, it is a side-effect caused by the interplay of the tongue tip and tongue body gestures. I will discuss both and show that, although at first sight antagonistic, the two positions may in fact be complementary.

If the formation of lateral side channels is due to an active gesture, then tongue narrowing or inward lateral compression of the tongue body is a good candidate. In an early version of Articulatory Phonology, Browman and Goldstein (1989, 228-229) proposed an additional tract variable of constriction shape for the tongue body: laterality would need to be specified in the tongue body gesture. In a later publication, however, they consider laterality to be a consequence of the constellation of tongue tip and tongue body gestures making up the lateral (see below on the current page). Most of the proposals of active lateral tongue body compression consider that a small degree of tongue body backing is a consequence of the volume displacement of the tongue. Such is the view of Lindblad and Lundqvist (2003) and Gick et al. (2006, 69). Despite their apparent claims to the contrary, Sproat and Fujimura (1993, 304) can be read as sharing this opinion.

Other scholars have argued that laterality is to be seen rather as the consequence of another gesture or constellation of gestures. Specifically, tongue elongation through tongue tip displacement towards the upper incisors and tongue body retraction has been suggested as provoking lateral side channels without the need for active lateral inward compression of the tongue body, most prominently so by Browman and Goldstein (1995, 21) (following them Proctor 2009, 16). Articulatory synthesis of a dark /ɫ/ consisting solely of tongue tip and

---

14 Velar and palatal laterals, of course, do not have a tongue tip raising gesture, but rather a tongue tip lowering gesture, the degree of constraint of which is very low or zero.

tongue body gestures indeed produced the impression of laterality (Browman and Goldstein 1995, 22, fig. 2), but recall that the same strategy was less successful for clear /l/ (Proctor 2009, 105, fig. 5.3, 108, 186). It is not clear which acoustic features of the synthesised /ɫ/ gave rise to the perception of laterality; the transfer function depicted in Browman and Goldstein (1995, 22, fig. 2) shows two spectral peaks, one at approximately 400 Hz and the other at approximately 3300 Hz, with a huge drop of energy in between. The characteristic F2 of /ɫ/ is lacking altogether.

It seems obvious that in a dark lateral, tongue body retraction is too prominent to be an epiphenomenon of lateral inward compression. But what is its potential relationship to an active lateral gesture, if any? Together with Lindblad and Lundqvist (2003, 1901), I would like to argue that the gesture which retracts the tongue body has arisen as a side-effect of a slight tongue body displacement due to tongue narrowing, possibly by the action of transversus muscle (see 1.1.3 above). This retraction could be interpreted in some languages as having been intended, i.e., produced by an active gesture. Such reinterpretation would lead tongue body backing to become indeed an active gesture, potentially magnified by the speakers' interpreting it as intentional. A properly dark lateral would thus have emerged under this account. If, moreover, one accepts the hypothesis that tongue elongation can lead to lateral side channel formation, lateral inward compression may at some point cease to be an active gesture and laterality could then become in its turn an epiphenomenon of tongue body backing, if indeed the tongue will be elongated enough for this to happen.

Let me elaborate on the last point. If tongue elongation in a velarised or pharyngealised lateral would really be enough to create side channels, then one would think that preventing such side channel formation in a corresponding dentoalveolar stop, articulated with secondary velarisation or pharyngealisation, would be rather difficult, and that consequently few languages would contrast the two. To the best of my knowledge, only a few languages have this kind of contrast (/dˠ/ ~ /ɫ/ or /dˤ/ - /lˤ/), namely Berber (Applegate 1958, 2, 4), a number of Arabic dialects (those where ḍād is today a voiced alveodental emphatic stop) (Petráček 1952, Ferguson 1956, Corriente 1978, 50-51, Lipiński 2001, 138, Watson 2002, 16), Irish Gaelic (Ní Chasaide 1999), and Marshallese (Austronesian) (Willson 2003), but all of these generally oppose a series of velarised/pharyngealised consonants with either a series of plain or palatalised consonants. Note that in Arabic, the contrast is marginal, in the sense that the occurrence of emphatic lām is restricted to forms including or deriving from the name for God ("Allah", /ʔalˤːɑː/), to the immediate neighbourhood of other emphatic consonants, and in a very few other vocabulary items (Ferguson 1956, 446). It will be fair enough to say that these language

data don't imply that laterality in dark laterals is an epiphenomenon; whether or not any degree of tongue body retraction can achieve that remains a matter of actual empirical investigation, not guesswork, and will therefore not be answered here in a conclusive way.

Not only tongue body backing, however, can contribute to tongue elongation. Stretching the tongue tip to an interdental point of articulation can achieve the same effect. Olson et al. (2010) and Mielke et al. (2011) describe the clear interdental lateral approximant of Philippine and Western Australian languages[15] as a sound in which side channel formation is due to substantial tongue protrusion, carried out by contraction of the genioglossus muscle and, less so, transversus and verticalis muscles, to a point where the tongue touches the lower lip. This sound does not involve tongue body backing. The tongue body is rather completely unconstrained – in other words, its gesture is absent, – while the tongue tip seems to be overly active. It thus seems that in cases where tongue elongation is long enough to produce lateral side channels, as in interdental clear laterals and perhaps very dark laterals, laterality may potentially be considered a consequence of these gestural configurations. In the clear interdental lateral approximant of the Kagayanen (Manobo, Austronesian) speaker who was the subject of the ultrasound and video study by Mielke et al. (2011), only the right side of the tongue was lowered; this pattern held also for her alveolar clear /l/ (Mielke et al. 2011, 408).[16] Note, however, that in all other cases, i.e., clear alveolar /l/, palatal /ʎ/, and velar /ʟ/, this reasoning predicts that laterality is the result of an active tongue body narrowing gesture. The amount of tongue elongation needed to switch from an active lateral gesture to a passive epiphenomenal one is a matter of empirical investigation, and it is hoped that it will be answered in the future; moreover, we must still keep in mind the possibility that laterality will turn out to be due to an active gesture in all cases and the hypothesis of epiphenomenal laterality consequently will become moot.

I shall close this discussion of the gestural make-up of the lateral by a few words on default articulations. It has been noted above that Sproat and Fujimura (1993, 308) aimed at explaining the clear /l/ – dark /ɫ/ variants of many English dialects as a result of syllable position placement alone while maintaining that each lateral variant had fundamentally the same targets for both tongue tip and tongue body gestures (but see Recasens forthcoming and 1.1.4 above). This assumption seems to be based on the idea that the American English

---

15 In contrast to the darkish interdental lateral found in Romance dialects such as Upper Arièja Occitan and (Pre)Sila Calabrian Italian which involves substantial amounts of friction, the clear interdental lateral approximant of Philippine languages has no aperiodic noise, but displays strong formants instead (Olson et al. 2010, 205, Mielke et al. 2011, 404, fig. 1).

16 In Kagayanen, alveolar /l/ and the interdental lateral approximant stand in complementary distribution. See Mielke et al. (2011, 405, footnote 2) for details.

lateral somehow constitutes the fundamental variant of laterals, e.g. as in Blevins (1994, 307, footnote 5): "Given Sproat & Fujimura's (1993) discovery of tongue dorsum involvement in all English laterals, it may be the case that all laterals are most properly viewed as complex corono-dorsal segments." (for this critique see also Ladefoged (2003, 271-272) who explicitly doubts that blending and overlapping of gestures can explain 'extrinsic allophones', as in British English).

This said it is not a matter of merry armchair theorising to decide which of the points of view is correct. In the end, only careful empirical and experimental investigation will judge the hypotheses detailed above.

1.4   PHONOLOGICAL VIEWS OF THE LATERAL

Phonology, both in its traditional feature-based generative guise and in an Optimality Theory-oriented perspective, has been concerned with laterals as part of its treatment of the phonological structures of specific languages and its search for universalities. Most of its questions, however, are of a theory-internal nature, which is why I consider them here for historical interest only; they will be of limited use in the understanding of the sound changes analysed in the present dissertation.

The defining feature of the class of laterals in feature-based generative phonology is [lateral]. While or perhaps precisely because this seems straightforward, Spencer (1984) made an attempt to declare [lateral] redundant. To put it briefly, his argument consists in claiming that all laterals be henceforth [+distributed]: "In lateral sounds the air flows between the side of the tongue and the side of the cheeks. Now this passage is one of the longest constrictions in phonetic space along which air flows during speech. This implies that lateral sounds are [+distributed] par excellence." (Spencer 1984, 29, also p. 39) Under his account, all [+distributed] segments are automatically [+continuant] (the traditionally [+distributed] laminal segments being re-analysed in a different way, namely as [+coronal, –apical]) (Spencer 1984, 33-38; for a discussion of additional problems arising from this redefinition, see Blevins (1994, 309-311)).

Despite the dubious effectiveness of Spencer's attempt, Brown (1995) also tried to dispose of the feature [lateral]. She argues that there is no such thing as phonological laterality, and that laterality rather is the phonetic implementation of a combination of features in a feature geometric representation. For the approximant /l/, she posits a representation which combines SPONTANEOUS VOICE/approximant and bare PLACE, while for the fricative /ɬ/ she opts for a combination of AIR FLOW/continuant and bare PLACE (Brown 1995, 49). The awkward part of her theory is, of course, the question of how (phonetic) laterality arises out of these representations: "what is it

about the features [approximant] and [continuant] combined with a bare Place node that produces a laterally released sound? At this time, I can only speculate; additional research is required." (Brown 1995, 53, footnote 11). Moreover, she assumes, along with Blevins (1994) (see below) that all laterals are underlyingly coronal (Brown 1995, 43); for her, this is "an explanation for the propensity of lateral segments to have a coronal place of articulation – if a segment is specified for any place feature (other than coronal, perhaps), it is simply not realized as a lateral." (Brown 1995, 85). Unfortunately, nothing is said about how velar laterals could arise in phonetic implementation.

If one accepts that the feature [lateral] does exist somehow, the next question is how and where. This is why quarrels among phonologists, once feature matrices had grown into more tree-like structures, mainly concerned the location of the feature [lateral] inside the segment itself. One much-discussed proposal is the question of the relatedness of coronality and laterality, the so-called Coronal-Lateral Hypothesis (Blevins 1994). The idea is that, while not all coronal segments are lateral, all laterals would be coronal (Blevins 1994, 306); put differently, [lateral] would be dependent on [coronal] in the feature tree. This is achieved by enlarging the definition of [coronal], which certainly creates a valid argument, but not a particularly good one, since the scope of coronality is questionable from an articulatory point of view: "If [. . .] [+lateral] sounds involve the tongue margins and the tongue blade as active articulators, it follows from the definition of [coronal] that all lateral sounds are coronal." (Blevins 1994, 307). This hypothesis, of course, would be falsified not only by the mere existence of palatal and velar laterals with their lowered tongue tip, but by an analysis of those palatal and velar laterals which could not make use of [coronal] in one way or the other. Since basically all of these palatal and velar laterals alternate in some way synchronically with alveolar laterals or developed historically from or into alveolar laterals, Blevins (1994, 312-332 and 335-345) analyses them in ways involving the presence of [coronal] in the underlying representation, mainly by using language-specific redundancy rules that would supply the coronal laterals with the places of articulation at which they finally surface.

Finally, with the advent of Optimality Theory (OT), Yip (2004), Yip (2005) argues that Feature Geometry can now be dispensed with and that constraints (among them constraints on feature coöccurrence) and their rankings can handle everything. She discusses sound changes (taken as a selection of possible candidates) ("The core of an OT account is that if IDENTLAT is ranked above whatever causes neu-tralization, such as SHARE-F or *CODAF, laterality will survive. If these rankings are reversed, we derive languages in which laterality is lost. The other significant factor is markedness. High-ranked feature co-occurrence constraints like *LATDORSAL can block spreading from affecting laterals at all." (Yip 2004, 25)) and possible lateral sounds

("The preference for a coronal place of articulation means that *LATER-ALCORONAL is low-ranked in most languages, while the preference for lateral approximants means that *LATERALSONORANT is low-ranked in most languages. Conversely, the absence in a language of velar laterals and lateral affricates or clicks means that *LATERALDORSAL and *LATERALOBSTRUENT are high-ranked and thus surface-true. However, languages may vary as to how they rank these constraints. For example, if *LATERALDORSAL is low-ranked velar laterals may be found." (Yip 2005, 68)). The OT grammars she develops in these papers have nevertheless a few, as yet unresolved drawbacks: they predict the existence of unattested labial laterals (Yip 2004, 31, Yip 2005, 70), that neither /ɫ/ nor /ʎ/ have a specification for DORSAL, which is rather counterintuitive (Yip 2004, 46, endnote 4) and that assimilation to velar consonants should create velar, not velarised, laterals and assimilation to obstruents should give rise to lateral obstruents at a scale larger than what is observed cross-linguistically (Yip 2004, 46, endnote 6).

1.5   CONCLUSION AND OUTLOOK

The present chapter gives an overview of the state-of-the-art of our knowledge of the phonetics of lateral sounds. I have tried to pinpoint lacunae in this knowledge which will hopefully be filled with future studies. Based on what has been discussed in this chapter, I will look closely at sound changes involving the lateral in the chapters to follow. Chapter 2 will be concerned with vocalisation of dark /ɫ/ to a back, often rounded, semi-vowel in preconsonantal and word-final position (Section 2.1), as well as intervocalically (Section 2.2). The comparative wealth of research in this area has led to this chapter being the richest in information and thus the longest. In Chapter 3 then, I will study the case of palatalisation of /l/ in the complex onset cluster. We will see there that received wisdom does not always gradually lead to a deeper understanding of the phenomenon, and that in fact much needs still to be understood with respect to this sound change. The following Chapter 4 will discuss the ubiquitous cases of rhoticisation and its rarer mirror phenomenon, lambdacisation, and this will be followed in Chapter 5 by an attempt at explaining the retroflexion of the Latin geminate lateral in Gascon Occitan and other Romance languages and dialects. All these case studies will be concerned with Occitan dialects in detail, but I have also included a wealth of data for other languages, both Romance and non-Romance. I therefore hope that these case studies will appeal not only to Occitanists and Romanists, but also to linguists with interests in all kinds of languages, in laterals, or sound change in general.

VOCALISATION OF DARK /ɫ/

The first of the case studies discussed in this thesis deals with the vocalisation and associated further developments of dark /ɫ/. This evolution typically occurs in preconsonantal and word-final position and can be found in a large number of languages in the world. The first part of this chapter is devoted to it. In some Occitan dialects, however, we also find developments of /ɫ/-vocalisation in intervocalic position, and these will be the subject of the second, shorter, part of this chapter.

2.1 /ɫ/-VOCALISATION IN PRECONSONANTAL AND WORD-FINAL POSITION

2.1.1 *The geographic and historical expansion of /ɫ/-vocalisation in preconsonantal and word-final position*

2.1.1.1 *Vocalisation of /ɫ/ in the dialects of Occitan*

Vocalisation of /ɫ/, i.e. of a lateral whose dark acoustic quality arises through tongue dorsum backing towards either the soft palate or the upper pharynx, has been attested in the Romance-speaking area since Late Latin times (for the dark quality of the lateral in Latin see Chapter A). The first, but uncertain, testimony of the phenomenon on Occitan soil is a Roman inscription from the town of Narbona which contains the spelling "Aubia" for "Albia" (proper name) (CIL XII 5111) (Leumann 1977, 142, §148d,ε);[1] in addition, the epigraphic record contains a number of examples of /ɫ/-elision in /uɫC/-sequences, e.g. "ducissimo", "sufurarius", "cupae", "adutera", "fugere", "cutellus", "cumini" (de Kolovrat 1923*a*, 63-64, citing examples from Schuchardt 1867, 496-499), where one can raise the question whether vocalisation of dark /ɫ/ preceded its elision. There also exist inscriptions from both Italy and Spain where <l> is used for an etymological <u> in diphthongs (cf. de Kolovrat 1923*a*, 64).

---

1 The very first, albeit indirect, indication of /ɫ/-vocalisation in preconsonantal position seems to come from Gaius Suetonius Tranquillus (ca. 70 – ca. 130/140 CE), *De Vita Caesarum*, Book III: Tiberius 42: 1, who reports that the emperor Tiberius (42 BCE – 37 CE) had been given the nickname "Caldius" (in the sense of 'mulled wine') instead of his real first name "Claudius". Another example from Late Latin times occurs in an edict of the Roman Emperor Diocletian from 301 CE where we find "καυκουλατορι" with /ɫ/-vocalisation before /k/ (Leumann 1977, 142, §148d,ε, who interprets this form, however, as a dissimilation given the presence of a second dark /ɫ/ (Leumann 1977, 231, §232A2), see also de Kolovrat 1923*a*, 63).

The first examples of /ɫ/-vocalisation in the Gallo-Romance area occur in documents from the 7th century: we read "Baudomerus episcopus" in a charta from 653 (de Kolovrat 1923a, 135), a misspelled "Althisioderum" for "Autessiodurum" ('Auxerre') in another charta from 670 (de Kolovrat 1923a, 97), and "Saocitho" for "Sal(i)cetum" ('Saussoy') in a Merovingian document from 667 or 677 (de Kolovrat 1923a, 135, Straka 1979, 390, 400). Taking together both the Late Latin and early Gallo-Romance evidence, we can say with Grandgent (1907) that vocalisation of /ɫ/ occurred sporadically from the 4th century onwards, and then more regularly from the 8th and 9th century. Straka (1979, 412) places it into the 7th century.

In other places, however, the first attestations of the phenomenon don't go back as far as this, but this fact may be purely accidental, since we may lack documents for some geographical zones. For Occitan, Ronjat (1932, 207, §331ε) finds the first examples of vocalisation before alveolar consonants in the *Boecis* (ca. 1000) and further attestations in the other texts from the same era. For the village of Cela Froïn (16), Rousselot (1892, 299) locates the first forms attesting /ɫ/-vocalisation graphically in documents from the second half of the 11th century. Also the *Donatz Proensals* (c. 1240) shows examples of vocalisation before alveolars (Marshall 1969, 57-58), explicitly: "E totz los [sc. the words ending in –altz] podes virar in –autz for [. . .] cavaltz, valz, antrevalz, galz." (*Donatz Proensals* l. 1636-1638, Marshall 1969, 189).[2]

Before turning to the details of vocalisation of /ɫ/ in the dialects of Occitan, let me outline the main characteristics of the sound change in Romance. After high front vowels, /ɫ/-vocalisation is not very common. It does occur in this context in Occitan, as well as in the French (Oïl) dialects of Picard and the Southwest, and in the Gallo-Italic dialects of Sicily. Some Romance languages, such as Spanish and Portuguese, restrict vocalisation of /ɫ/ to sequences with preceding /a/ (cf. Recasens 1996, 67). After high vowels, we may find elision of the lateral instead, so e.g. in French (de Kolovrat 1923a, 294). In general, a following alveolar or dental stop seems to favour the evolution of /ɫ/-vocalisation (Recasens 1996, 66).

Two sources prove to be particularly useful for describing the geographical expansion of /ɫ/-vocalisation in Occitan: chapter five of Georges de Kolovrat's doctoral dissertation, published in 1923, and, of course, the relevant paragraphs of Jules Ronjat's encompassing description of the Occitan dialects (Ronjat 1932, 206, §331, 305-307, §394, 307-311, §395, 311-314, §396, 317-318, §399). The remainder of this subsection is heavily indebted to these two works.

In a very large number of Occitan dialects, a presumably dark lateral vocalised to /w/ in preconsonantal and word-final position, and this sound change affected either both Lat. /l/ and /lː/, or just

---

2 The author of the *Donatz Proensals* distinguishes sharply between the developments of Lat. /l/ and /lː/.

the singleton lateral. A smaller number of varieties – mainly Roergat and Gevaudan Lengadocian – vocalise /ɫ/ only selectively according to the following sound's place of articulation. In Auvernhat, Lemosin and Gascon dialects, a vocalised /ɫ/ may also elide after back rounded vowels (Ronjat 1932, 306-307, §394).

It is assumed here that the dark quality of the lateral in the syllable coda is a characteristic already present in Latin and which Occitan continued. This has been suggested early on, so for example by Meyer-Lübke (1934, 11) who points to Old Occitan texts where word-final /l/ is spelled <el>, as well as to the diphthongisation of front vowels before a syllable-final or even intervocalic lateral, which is first attested during the Middle Ages (Michelly 1936, 6). The phenomenon under investigation is, of course, by itself compelling evidence for a dark lateral in syllable-final position in Old Occitan. Some contemporary dialects still have dark(ish) laterals today, for instance some Auvernhat varieties where /eɫ/ developed to /aɫ/ and /iɫ/ was diphthongised to /jaɫ/ (Herzig 1959, 46, a thorough chronological discussion of this evolution in the varieties of Velai region is found in Michelly (1936, 3-23); see also 2.1.2.4 below).

A dark lateral in preconsonantal and word-final position, without vocalisation occurring, has been observed by Ronjat (1932, 206, §331α, γ2, 307, §395α) for Tolosa and its region, as well as for the village of Saint-Christophe-en-Oisans (38) and for the Lengadocian dialects on the linguistic border to Catalan. The Occitan varieties spoken in the Valadas Occitanas in the Italian Alps have a dark /ɫ/ not only in pre-consonantal and word-final position, but also intervocalically (Ronjat 1932, 307, §395α, see also Meyer-Lübke 1934, 10). Here, an epenthetic vowel occurs before the lateral: /əɫ/, which can take on different qualities according to the quality of the main vowel (Ronjat 1930, 388-389, §219γ). We also find a dark lateral in intervocalic and word-final position in the Eastern Lengadocian varieties of Aniana (34) (Zaun 1917, 113, §190, 114-116, §191) and of the Aude department (Sarah Dart, p.c., November 2010), as well as in the Western Lengadocian variety of Camarès (12) (Buckenmaier 1934, 36-37), and this may be (or may have been until a more pervasive influence of Standard French clear /l/ changed the situation)[3] a larger feature of Lengadocian.

Starting with the dialects spoken in the Northern half of Occitania, Lemosin has pervasive vocalisation of /ɫ/ in both preconsonantal[4] and word-final position, after all vowels, except for the Southern

---

3   See Simonet (2010a) for a comparable sociophonetically-conditioned attenuation and perhaps future loss of dark /ɫ/ in the younger generation of Majorcan Catalan speakers today and Van Hofwegen (2011) for a similar situation in an isolated African American community where an originally clear /l/ became gradually darker over the time span of a century until it reaches today in the speech of young African Americans the degree of darkness of the General American English lateral.

4   Before labial consonants and after /a/, the lateral may be elided. In loanwords from French, there is rhoticisation instead of vocalisation (de Kolovrat 1923a, 171-172).

Lower Lemosin variety where no vocalisation takes place (Ronjat 1932, 306, §394, 308, §395γ). The first spellings indicating vocalisation after /a/ can be found in 10th-century-texts,[5] and from the 12th century onwards, <au> is the usual spelling for a lateral followed by an alveolar consonant, and only later also in the case of following labial and velar consonants. Graphical evidence of vocalisation in word-final position in Lemosin texts is found from the 13th century onwards (de Kolovrat 1923a, 170-178, Ronjat 1932, 306, §394, 309, §395γ).

Moving eastwards, all varieties of Auvernhat have known /ɬ/-vocalisation in preconsonantal and word-final position (de Kolovrat 1923a, 179-182, Ronjat 1932, 206, §331β), to the exception of a handful of varieties such as those of Sant-Flor (15) and Murat (15) in the Cantal departament or of the Malasiu (48) canton where dark /ɬ/ developed into a uvular or pharyngeal fricative (/ʁ/~/χ/~/ʕ/) (Ronjat 1932, 206, §331α, Camproux 1962, 308-309, Straka 1979, 409), an evolution I will discuss together with similar developments in intervocalic position in Section 2.2.[6] In word-final position, /ɬ/ tends to be elided in Northern Auvernhat varieties (Ronjat 1932, 306, §394), whereas the Southern part of the dialectal zone rather maintains the vocalised outcome of the dark lateral (Ronjat 1932, 306, §394, 307, §395γ, Herzig 1959, 46). The vocalisation of /ɬ/ in Auvernhat is first attested in preconsonantal position by the consistent misspelling of etymological /aw/ as <al> in a text from 1273 (which also happens to be the oldest text known to us).

In the Southwest of Occitania, like the Northern dialects, Gascon also has pervasive /ɬ/-vocalisation in both preconsonantal[7] and word-final position (Fleischer 1912, 57-61, de Kolovrat 1923a, 183-187, Ronjat 1932, 306, §394, 308, §395γ, Bec 1968, 136-139). Studying a corpus of medieval texts from Gascony, Field (in press) observes a spreading movement of forms presenting /ɬ/-vocalisation from Western and Northern Gascony through urban centres such as Baiona and Lo Mont-de-Marsan during the 12th and 13th centuries and beyond onto the central and southern parts of the dialectal area. This evolution is thus much younger than the retroflexion of Lat. geminate /lː/ in this dialect (see Chapter 5).

The picture becomes more complicated in Lengadocian varieties. In the region around Montpelhièr and in the Gard departament, i.e.,

---

5   The *Boetius* also contains examples of palatalisation: <ai> for /alC/. Such spellings may also be found in later medieval Lemosin texts (de Kolovrat 1923a, 174-175).

6   In a small area in northwestern Gevaudan, the word-final palatal lateral evolved also into /ʁ/~/χ/~/ʕ/, most often after /a/ and less frequently after /i/, where the clear or palatalised character of former /ʎ/ was probably preserved to a greater extent (Camproux 1962, 313-314). This may be due to analogical influences; a similar case has been observed for Corsican, where both the outcomes of Lat. /lː/ and /lj/ developed retroflexion (see 5.1.3).

7   In varieties of the Tarn-e-Garona departament, the lateral may be maintained if the following consonant is /s/ or a labial; however, rhoticisation may also occur before a labial.

towards the dialectal border with Provençal, /ɫ/ vocalised in pre-consonantal position before all consonants (Ronjat 1932, 206, §331β). Most other varieties to the West and North of these regions have vocalisation of /ɫ/ before alveolars only (Ronjat 1932, 206, §331γ1).[8] A small dialectal zone covering Northern and Eastern Roergat, and most of Gevaudan vocalised /ɫ/ selectively before labials and velars only (Ronjat 1932, 207, §331δ, Camproux 1962, 315-316). Where /ɫ/ didn't vocalise, it often has a somewhat dark quality to it (de Kolovrat 1923a, 190, Ronjat 1932, 206, §331, γ2; see on page 37 above). The first spellings of /aɫ/ in preconsonantal position as <au> occur with the following consonant being an alveolar stop. In all other cases, it seems that vocalisation took place later than the 14th century. See also de Kolovrat (1923a, 187-192).

Generally speaking, Western Lengadocian has had no word-final vocalisation of /ɫ/ (Ronjat 1932, 306, §394, 307, §395α), but it did take place in Eastern Lengadocian (Montpelhièr and its surroundings) and in Southeastern Gevaudan and Orlhac varieties for those word-final laterals that go back to a singleton lateral in Latin, with the Lodeva (34) and Nant (12) varieties having vocalisation only after front high vowels. The word-final geminate lateral of Latin is maintained as /l/ in these varieties (Ronjat 1932, 306, §394, 308, §395γ, 312, §396γ). As with the non-vocalised preconsonantal laterals, the quality of the non-vocalised word-final lateral seems to be darkish for de Kolovrat (1923a), also for Ronjat (1932, 307, §395α) for Tolosa (31) and its region, as well as for the dialects close to Catalan.

Turning finally to Provençal, we find vocalisation preconsonantally in all varieties save Eastern Provençal, Eastern Alpin, Valdés (Ronjat 1932, 206, §331β, see Bouvier 1976, 237-244 for the varieties of the Droma departament, Dubois (1958, 189-190) for the varieties of Canha (06) and Vença (06)). More specifically, in the Valdés varieties, vocalisation of /ɫ/ seems to have taken place selectively before alveolar consonants only, while before labials and velars, we still have /ɫ/ or rhoticisation (Meyer-Lübke 1934, 75, see also Ronjat 1932, 206, §331γ1). In the medieval documents of Provença, dating from the 12th – 14th centuries, <u> for <l> appears first before alveolar consonants; in all other positions (before labials and velars, and word-finally) it continues to be spelled <l>. Both spellings coexist in the departament of Droma until the late 15th century (Bouvier 1976, 239). As in French and perhaps under its influence, the hyper-corrective spelling <ault> makes its appearance in the 16th century.

In word-final position, /ɫ/-vocalisation occurs in Southern Daufinés, in Southern and Central Alpin, in the varieties to the East of the river Ròse, as well as in Southern Vivarés and in the variety of Nimes (30) which vocalised only /l/ stemming from the Latin singleton lateral,

---

8 These varieties may have nasalisation of the lateral instead, cf. Ronjat (1932, 209, §333).

whereas the Latin geminate word-final is maintained as an alveolar lateral (Ronjat 1932, 306, §394, 307, §395γ, 312, §396γ, see Tausch (1954, 100-101) for the variety of the Trièvas (38) region, and Moutier (1882, 24), Bouvier (1976, 225-236) for the varieties of the Droma departament). In Fontan, in the Niçart hinterland, the word-final lateral, whether from Latin singleton /l/ or geminate /lː/, vocalised to /ɐ/ or /ə/ instead of a back vowel or glide (Ronjat 1932, 310, §395δ, 313, §396δ), see also de Kolovrat (1923a, 203-205, 207-208). In the Valadas Occitanas, there is no word-final /ɫ/-vocalisation, and this also holds on a more general level for the totality of the Eastern Alpine varieties (Ronjat 1932, 306, §394, 307, §395α). According to Ronjat (1932, 310, § 395γ), vocalisation of /ɫ/ after vowels other than /a/ seems to have been completed in Provençal only during the 16th century. Specifically for the varieties spoken in the Droma department, Bouvier (1976, 227-228, 230-231) still found much graphical variation in 16th-century texts for word-final vocalisation affecting Lat. singleton /ɫ/, while the earliest attestations for word-final vocalisation of the Lat. geminate lateral appear only during the course of the 16th century; this latter evolution thus takes place later than the vocalisation affecting the singleton lateral in this region, and this holds perhaps for the wider Provençal area as well.

Before turning to the phenomenon of preconsonantal and word-final /ɫ/-vocalisation in the remainder of the Romance languages and dialects, let me note that in the Occitan dialects, a glide corresponding to the dark vocalic component of /ɫ/ may frequently be found, even in the absence of vocalisation of /ɫ/. This anaptyctic glide typically occurs after front vowels and often induces stress displacement from the front vowel to the dark-coloured glide, so for instance, in the form /ˈfjal/ from Lat. FĪLUM 'thread'. This excrescent vowel-like element is attested as early as in Old Occitan where spellings such as "si l" > "siel" and "auzi l mesatge" > "auziel mesatge" testify to the phenomenon (Meyer-Lübke 1934, 11, see also Tausch 1954, 98-99). In the varieties of Droma departament, this evolution seems to have been completed by the 15th century (Bouvier 1976, 250).

2.1.1.2 *Vocalisation of /ɫ/ in the Romance languages*

The sound changes described in 2.1.1.1 for Occitan are far from uncommon in the Romance languages in general. In this section, I will have a look at each Romance language, and in some cases, individual dialects, in turn, in order to paint the larger picture of a sound change that was already well on its way in Late Latin. But before I turn to these, I will describe another related sound change that took place in this language.

Even though /ɫ/-vocalisation as such didn't occur in Early and Classical Latin, the darkness of the lateral (see Chapter A) had a noticeable influence on its preceding vowel in that it provoked a sound change,

Table 3: Examples illustrating preconsonantal /ɫ/-vocalisation before labial
and velar consonants in different Occitan dialects. Departament
numbers are given in parentheses, e.g., (06) = Alps-Maritims; the
reference point in the linguistic atlases is also given, e.g., ALP 111
= point n° 111 in the *Atlas Linguistique de la Provence* (Bouvier and
Martel, 1975-1986); finally, the dialect is given to which the particular
village belongs. The example words are given both in IPA transcrip-
tion and in orthographic transcription. The second-to-last column
provides the etymon of the example word, while the last column
provides an English gloss. Note that Western Lengadocian and East-
ern Provençal Alpin represent the absence of /ɫ/-vocalisation before
labial and velar consonants.

Location	reference point	dialect	example word	orthographic form	etymon	gloss
Brenhac (19)	ALAL 58	Lemosin	[sɔʷˈfa]	"calfar"	CALEFACERE	'to heat'
Cosés (87)	ALAL 56	Lemosin	[kɑoˈky]	"qual-qu'un"	QUĀLEM QUEM ŪNUM	'some-body'
Espinassa (63)	ALAL 14	Auvernhat	[tsoˈfɑ]	"calfar"	CALEFACERE	'to heat'
Cròs (63)	ALAL 17	Auvernhat	[kɑʷkœˈtẽ]	"qualque temps"	QUALE QUID TEMPUS	'in former times'
Armons-e-lo-Cau (32)	ALG 678NO	Gascon	[kawˈha]	"calfar"	CALEFACERE	'to heat'
Moissac (82)	ALG 649	Western Lenga-docian	[kalˈfa]	"calfar"	CALEFACERE	'to heat'
Meljac (12)	ALLOc 12.24	Western Lenga-docian	[falˈku]	"falcon"	FALCŌNEM	'buzzard'
Agde (34)	ALLOr 34.34	Eastern Lenga-docian	[kaʷˈfa]	"calfar"	CALEFACERE	'to heat'
Lo Puget-de-Rostanh (06)	ALP 94	Provençal	[tʃɔwˈfa]	"calfar"	CALEFACERE	'to heat'
Clumanc (04)	ALP 88	Provençal	[fɔwˈkũŋ]	"falcon"	FALCŌNEM	'buzzard'
Abriès (05)	ALP 20	Provençal, Eastern Alpin	[ˈbalma]	"balma"	*BALMA	'rock shelter'

Table 4: Examples illustrating preconsonantal /ɫ/-vocalisation before alveo-
lar consonants in different Occitan dialects. See Table 3 on page 41
for details.

Language	reference point	dialect	example word	orthographic form	etymon	gloss
Sant-Laurenç (23)	ALAL 33	Lemosin	[tʃoʷˈdjeɾɔ]	"caudièra"	CALDARIAM	'boiler'
Celles-sur-Durolle (63)	ALAL 3	Auvernhat	[ʃɔʷˈdjɛjʁɔ]	"caudièra"	CALDARIAM	'boiler'
Arrens-Marsós (65)	ALG 695O	Gascon	[kawˈtɛɾɐ]	"caudièra"	CALDARIAM	'boiler'
Sent-Micolau-de-la-Grava (82)	ALG 649SO	Western Lengado-cian	[kawˈðjɛɾo]	"caudièra"	CALDARIAM	'boiler'
Aniana (34)	ALLOr 34.13	Eastern Lengado-cian	[ˈkawda]	"cauda"	CALDAM	'hot' (adj. fem. sg.)
Aiguina (83)	ALP 118	Provençal	[ˈkaw]	"caud"	CALDUM	'hot' (adj. masc. sg.)
Abriès (05)	ALP 20	Provençal, Eastern Alpin	[ˈt͡ʃawt]	"caud"	CALDUM	'hot' (adj. masc. sg.)

Table 5: Examples illustrating /ɫ/-vocalisation in word-final position in different Occitan dialects. See Table 3 on page 41 for details. Note that Western Lengadocian and Eastern Provençal Alpin have not undergone /ɫ/-vocalisation in word-final position. Similarly, in Eastern Lengadocian, word-final /ɫ/-vocalisation affected only the Lat. singleton lateral, with the exception of the geminate one.

Language	reference point	dialect	example word	orthographic form	etymon	gloss
Juòus (23)	ALAL 25	Lemosin	[ˈfjaʷ]	"fil"	FĪLUM	'thread'
			[ˈʃjaʷ]	"cèl"	CAELUM	'sky'
			[t͡ʃaˈvɑʷ]	"caval"	CABALLUM	'horse'
Cròs (63)	ALAL 17	Auvernhat	[ˈfjɑʷ]	"fil"	FĪLUM	'thread'
			[ˈʃjɑʷ]	"cèl"	CAELUM	'sky'
Auzelles (63)	ALAL 7	Auvernhat	[t͡saˈvo]	"caval"	CABALLUM	'horse'
Aas (64)	ALG 693	Gascon	[ˈhiw]	"fil"	CABALLUM	'thread'
			[ˈsɛw]	"cèl"	CAELUM	'sky'
			[ʃiˈβaw]	"caval"	CABALLUM	'horse'
Sent-Micolau-de-la-Grava (82)	ALG 649SO	Western Lengadocian	[ˈfil]	"fil"	FĪLUM	'thread'
			[ˈsɛl]	"cèl"	CAELUM	'sky'
			[ˈpjɛl]	"pel"	PILUM	'hair'
			[ˈpɛl]	"pèl"	PELLEM	'skin'
Massals (81)	ALLOc 81.13	Western Lengadocian	[ˈgal]	"gal"	GALLUM	'rooster'
Bosiga (34)	ALLOr 34.33	Eastern Lengadocian	[ˈfiw]	"fil"	FĪLUM	'thread'
			[ˈpɛw]	"pel"	PILUM	'hair'
			[ˈpɛl]	"pèl"	PELLEM	'skin'
			[ˈgal]	"gal"	GALLUM	'rooster'
			[pejˈdɔʷ]	"pairòl"	*PARIOLUM	'kettle'
Entraigas/ Sòrgas (84)	ALP 98	Provençal	[kuˈtew]	"cotèl"	CULTELLUM	'knife'
			[ˈgaw]	"gal"	GALLUM	'rooster'
Abriès (05)	ALP 20	Provençal, Eastern Alpin	[ˈd͡ʒal]	"gal"	GALLUM	'rooster'

dated by Belardi (1984*a*, 77) to the 6ᵗʰ-5ᵗʰ centuries BCE, whereby the mid front vowel /e/ was backed to /o/ (or /u/) and merged with original /o/ (or /u/) if an intervocalic singleton lateral was followed itself by a back or low vowel[9] (Osthoff 1893, see also among others Juret 1921, 337-338, de Kolovrat 1923*a*, 64-66, 75, Blaylock 1968, 394-395, Allen 1970, 34, Leumann 1977, 47, § 43c, 141-142, § 148b,dγ, Meillet 2004, 138-139). Not unexpectedly, vowel darkening also took place when the lateral was in preconsonantal position. The most interesting example of this sound change is probably the conjugation paradigm of the verb VELLE where forms with and without vowel backing alternate, e.g. VOLŌ 'I want', but VELIM 'I should want'. Osthoff (1893, 51-62) gives more examples and apparent counterexamples and provides extensive etymological discussions of these. A case for the extension of the sound change to the word-final position is more difficult to make for lack of examples. Osthoff (1893, 62-64) discusses the counterexamples VEL, MASCEL, SEMEL, but points to examples such as FACUL (cf. FACILE) and DIFFICUL (cf. DIFFICILE)[10]. By the times of Late Latin, the quality of the lateral, at least in intervocalic position, seems to have changed such that loanwords which entered the language during this period were no longer affected by the sound change (Belardi, 1984*a*, 81).

Vocalisation of /ɫ/ in French, both in the standard language and in its various dialects, has yielded much interest from scholarship, and research on it has gone into considerable detail, from a historical point of view as well as from a geolinguistic standpoint. To summarise briefly here the developments in Standard French and in the French or Oïl dialects, in preconsonantal position only the Picard dialect vocalised /ɫ/ regardless of the quality of the preceding vowel, whereas Standard French, Norman, and to a great extent, Eastern French dialects and Franco-Provençal, may have vocalised after all vowels save after the high vowels /i/ and /u > y/ (but simple elision of the lateral is also common), and Western French dialects only vocalise after /a/. A diphthongisation of the /ɛɫs/-sequence, from Latin –ELLOS, to /eaws/ or /aws/ occurred in Standard French, as well as in all of the French dialects, leading to the monophthongised modern forms in /ɔ~o/ or /jɔ~jo/. There is less vocalisation in word-final position: Standard French vocalised only after mid vowels, Western and Eastern French dialects only after /a/, whilst in Norman, /ɫ/ disappeared altogether without leaving traces of vocalisation. Only in Picard do we have vocalisation in word-final position after all vowels. Diphthongisation of the final /ɛɫ/-sequence seems to occur only in a few instances in Norman. No dialect seems to have vocalised selectively in preconsonantal position according to the following consonant's

---

9 The words VOLĒBAT, VOLĒS, ADULĒSCĒNS, and HERCULĒS in which the lateral is followed by a long /eː/ also show the phenomenon (Leumann 1977, 141, §148b).

10 Meillet (2004, 138-139) explains the counterexamples SCELUS, SCELERIS, GELŪ, GELĀRE, and *CELLO, CELSUS by making the hypothesis that the velar stops had already evolved to palatal(ised) stops which prevented then vowel backing.

place of articulation. For an amazing amount of detail, see de Kolovrat (1923*a*, ch. 3) on Standard French, de Kolovrat (1923*a*, 138-146), also Haas (1889, 35-60), Schönig (1913, 19-46, 97-100) on the Western French dialects (Bretagne romaine, Anjou, Maine, Touraine, Saintonge, Poitou, Orléanais, Berry, Perche), de Kolovrat (1923*a*, 146-150), also Haas (1889, 6-34), Schönig (1913, 1-18) on Norman French, de Kolovrat (1923*a*, 150-157), also Haas (1889, 60-74), Schönig (1913, 57-75) on Picard French, de Kolovrat (1923*a*, 157-169), also Haas (1889, 74-112), Schönig (1913, 76-96, 101-145) on the Eastern French dialects, which, at the time of writing these works, included the North-Eastern French dialects as well as Franco-Provençal.

It is generally thought that /ɫ/-vocalisation had taken place between the 7th and the 12th century, from which date <u> spellings seem to be more firmly established and less vacillation is found in the texts. More precisely, de Kolovrat (1923*a*, 137) claims /ɫ/-vocalisation to be posterior to the 6th century based on a discussion of some related sound changes. While it was shown above that the earliest examples for /ɫ/-vocalisation in Gallo-Romance date back to the 7th century[11] (see the introduction to 2.2.1), orthography preserves the grapheme <l> well into the 12th century, so that there seems to have been substantial variation between a dark /ɫ/ and /w/ up to that point (de Kolovrat 1923*a*, 134-137, Meyer-Lübke 1934, 73-74, see also Lausberg 1967, 45, §413). In some cases, so for instance, in the vocalisation of word-final /ɛɫ/ and /eɫ/ (from Latin /ale/) sequences in Standard French, variability in spelling could persist into the 16th century, leading to doublets in Modern French (de Kolovrat 1923*a*, 129-133). The first grammatical treatise to speak of /ɫ/-vocalisation in French is the 12th/13th century *Orthographia Gallica* (which is actually a modern collection of four different treatises each of which contains a similar passage related to the phenomenon at hand) (Stürzinger 1884, 10-11).[12] According to de Kolovrat (1923*b*, 37), vocalisation after low vowels had taken place earlier than after back rounded vowels.[13]

---

11 The first documentation of /ɫ/-vocalisation in Western French dialects comes from 10th-century manuscripts (de Kolovrat 1923*a*, 138-144); in Norman French, it is the *Domesday Book* of William the Conqueror (1086) which gives us first testimonies of the sound change (de Kolovrat 1923*a*, 146-149); as for Picard, there are first examples of the phenomenon in 12th-century texts (de Kolovrat 1923*a*, 155).

12 Note that, since these treatises were actually pronunciation guides aimed at contemporary Anglophone learners of French, the English /l/ in the same position does not seem to have achieved its dark quality at this time; otherwise one could suppose that the author(s) of the treatises would have been less explicit about the correct pronunciation in French.

13 Some argue that in French, the very first step in /ɫ/-vocalisation after the vowel /a/ was a sound sequence /awlC/, as would be indicated by the spelling <aulC>, which was in widespread use up to the 17th century. Moreover, there are Rhaeto-Romance dialects which show exactly this pronunciation (but see below on these varieties). Also, several German dialects have an evolution /aɫC/ > /awɫC/ (see below). But since the French <aulC> spelling only appears during the 14th century, i.e., later than the spelling <auC>, it is better considered an etymological hypercorrection,

From Middle French onwards, the lateral in syllable coda position became clear, sometimes with a following excrescent schwa-like element, such as in the words "palefroi" or "caleçon", which is a loanword from Italian "calzone"[14]. These 'new' clear /l/s in preconsonantal position were likely to undergo rhoticisation in some Oïl varieties, just as in Occitan (Meyer-Lübke 1934, 74).

In Occitan's closest sister language, Catalan, there is no regular historical /ɫ/-vocalisation in preconsonantal or word-final position, but vocalisation can occur as synchronic variation, most notably so in Balearic Catalan and in Rossellonès (de Kolovrat 1923*a*, 209-213, 216, de Kolovrat 1923*b*, 44). Some Eastern Catalan, Valencian and Majorcan dialects may vocalise /ɫ/ before labials and /s/ (de Kolovrat 1923*b*, 43, Recasens 2009, 456). In a few words ("malalt" < *MALEHABITUM, "delme" < DECIMAM) an etymologically correct /w/ has been reinterpreted as /ɫ/ (de Kolovrat 1923*a*, 213-215).

In Spanish, /ɫ/-vocalisation occurred only in very restricted environments: it took place following the vowel /a/, and especially preceding voiceless stops, in some words such as Latin ALTERUM to Spanish "otro", with the oldest examples dating back to the 10th century according to Meyer-Lübke or even back to the year 747 according to de Kolovrat (Ford 1911, XXXIX, de Kolovrat 1923*a*, 218-222, Meyer-Lübke 1934, 75). The lateral that came to be in preconsonantal position later in the history of the language, however, through vowel syncope or in loanwords from Arabic, has been maintained as clear /l/, just as in Portuguese (see below) (Meyer-Lübke 1934, 78). In Old Leonese, we can find some hypercorrective spellings of etymological /w/ as <l> (de Kolovrat 1923*a*, 224, de Kolovrat 1923*b*, 49).

Moving over to the Atlantic coast and European Portuguese, we find /ɫ/-vocalisation in Old Portuguese (first example in a Latin text from Portugal from 775, first example in a Portuguese-language text from 1192; the spelling <u> is pervasive by the 12th and 13th centuries). Piel (1932, 97) argues for vocalisation to have been completed by the 5th century on the grounds that neither Germanic place and proper names nor loanwords from Arabic were affected and that it didn't take place in words where the /VlC/ sequence arose through short

---

as is supported by the contemporary grammarians Robert Etienne (1550), *Traité de la Grammaire française* and Théodore de Bèze (1584), *De Francicae linguae recta pronuntiatione* (cited in de Kolovrat 1923*a*, 89-92). It seems that several scholars believed the French spelling <lx> to actually represent the sound sequence /lks/. Among them is Voelkel (1888, 39-40) who argues that in the Engadin Rhaeto-Romance (Bergün and Oberhalbstein dialects) /us/ evolved into /uks/. In this sense, he argues, the same evolution would have taken place in /ɫs/ > /ɫks/, where /k/ would be an epenthetic stop which owes its velar place of articulation to the preceding velarised lateral. This is by itself not an unlikely explanation, but one wonders why then no French dialect would have retained that particular pronunciation, given the widespread use of the spelling <lx>.

14 The Occitan forms of the Italian "calzone" show /l/-nasalisation instead of vocalisation of a dark /ɫ/.

vowel syncope in Proto-Romance, with vocalisation being ubiquitous (though not pervasive, cf. Piel 1932, 99) after /a/, but not necessarily so after /ɔ/ and /o/, and, in Standard Portuguese, never after /ɛ, e, i, u/[15] (de Kolovrat 1923a, 225-232, Piel 1932, Meyer-Lübke 1934, 12; see also Lausberg 1967, 45, §412-413). In the Alemtejo dialects, /aɫ/ was backed to /ɒɫ/ (de Kolovrat 1923a, 230), and in the Madeira dialect of Portuguese, the high front vowel in /iɫ/ was retracted to /ɨɫ/ (de Kolovrat 1923a, 37, 231). In word-final position, however, no vocalisation took place in Portuguese (de Kolovrat 1923a, 232-233). An interesting evolution has been observed in the varieties of the Minho dialects: here, forms which display both /ɫ/-vocalisation and rhoticisation can be found, such as "kaurdo", "aurdeia" ("auldeia"), "sourdado", "feurga", "siurba" [selva] (de Kolovrat 1923a, 231, Meyer-Lübke 1934, 78-79). Still in contemporary European Portuguese, stress-dependent vowel raising of /ɛ/ is found to be blocked by a following preconsonantal dark /ɫ/ (Andrade 1999, 545-546).

Even if Galician today seems to be an overall clear /l/-language, it had undergone the same /ɫ/-vocalisation process as Portuguese.

The case of Brazilian Portuguese constitutes a well-known example of /ɫ/-vocalisation as an ongoing sound change. Here, a preconsonantal or word-final /ɫ/ can vary from complete vocalisation in Fortaleza, Rio de Janeiro and João Pessoa (Estado de Paraíba) varieties (da Hora 2006)[16] to a dark /ɫ/ with its tongue tip gesture still present (but not necessarily forming an occlusion) in the speech of São Paulo (Feldman 1972).[17] Much variation seems to occur in the Bahia varieties, where, in addition to vocalisation, instances of uvular trills or fricatives and retroflex rhotics can be found (see do Socorro Demasi 1995, 123; see also Pitombo Teixeira 1995 for a Northeast Bahia dialect); this is actually a not unexpected situation: developments to uvular or pharyngeal fricatives also occur in some Occitan localities (see on page 38 above). In the Campos Neutrais border region to Uruguay and Uruguayan Spanish, /l/ in the syllable coda is still pretty much preserved, but only by the older generation (Espiga 2002). Espiga (2002) also observes labialised dark /ɫ/s in these dialects, although it isn't entirely clear to me whether this is due to the fact that he posits them as an element in the developmental chain of /ɫ/-vocalisation. He shows (Espiga 2002, 63), however, that vocalisation in Campos Neutrais varieties takes places rather after /a/ than after high vowels, with the mid vowels taking on an intermediate position. This is in line with the facts we

---

15 After /u/, /l/ palatalised (Piel 1932, 98).

16 Alongside the more current vocalisation of /ɫ/, its elision may also occur to a minor extent (see the data in da Hora 2006, 35). This is likely due to stress factors: /ɫ/-elision occurs more frequently in post-stress syllables than in pre-stress or stressed ones (da Hora 2006, 41).

17 Feldman (1972) presents an experiment which shows that listeners of Brazilian Portuguese are overall unable to distinguish between /w/ and /ɫ/ in the syllable coda (this held more for word-final position than for preconsonantal position (Feldman 1972, 130)).

have observed in the other Romance languages above. Like in the Gevaudan and Northern/Eastern Roergat Lengadocian varieties of Occitan, in the Campos Neutrais variety of Brazilian Portuguese, a following alveolar consonant contributes to the preservation of /l/ in preconsonantal position (Espiga 2002, 64); we will see below that English has the same phenomenon. It is interesting to note that /ɫ/-vocalisation in Brazilian Portuguese today already interacts with the morphology of the language: words ending in etymological /w/ (as part of a diphthong) come increasingly to share the plural allomorph of the /ɫ/-final words, /-Vjʃ/ "-is" (Huback da Silva 2007).[18] This morphological shifting is reminiscent of the many other /ɫ/ - /w/ confusions found in the Romance languages and elsewhere during the unfolding of the sound change.

To the east of the Occitan area, among the Rhaeto-Romance dialects, the Graubünden and the Dolomites varieties (Sursilvan and Western Ladin), as well as the Engadin varieties, have /ɫ/-vocalisation in stressed syllables in preconsonantal position before an alveolar consonant, but nevertheless retain the lateral yielding sound sequences such as /awɫC/ and /ɔwɫC/ (de Kolovrat 1923a, 268-272). The Obwald dialect still has /aɫ/ > /awɫ/[19] (but /uɫ/ > /u/) (Meyer-Lübke 1934, 66-67, cf. de Kolovrat 1923a, 269), while the Val Monastero variety has elision of the lateral in low vowel contexts (with concomitant vowel lengthening) (de Kolovrat 1923a, 271). In the Gröden variety, /ɫ/-vocalisation also occurs before velar consonants (Meyer-Lübke 1934, 67). In the Sutsilvan and Western Ladin dialects, /ɫ/-vocalisation in preconsonantal position seems to have taken place only after /o/, but where there is no vocalisation, /ɫ/ in preconsonantal position in the Sursilvan and Sutsilvan varieties has a markedly dark quality (de Kolovrat 1923a, 270, 273, see also Lausberg 1967, 45, §413). The Eastern Ladin varieties, on the other hand, while not having vocalisation of the lateral in preconsonantal position, except for the variety of Val d'Ampezzo, show a systematic change from /awC/ to /alC/ where the lateral has an alveolar place of articulation; a phonetic environment that argues for a (former?) dark /ɫ/ in this position, given

18 Factors influencing this confusion are, on the sociolinguistic side, a low educational level, male sex, and on the linguistic side, polysyllabic words, preceding vowels other than /e/, and a low frequency of occurrence in the lexicon. This seems to be conditioned by frequency effects: most words ending in /–w/ are monosyllables, so the /–wʃ/ plural form is preserved in monosyllabic words, but rather not in polysyllabic words; moreover, the most common /Vw/ diphthong (making up for 50 % of the total number of this type of diphthong in Brazilian Portuguese) is /ew/, which contributes to preservation of the /–wʃ/ plural in words containing this diphthong. Low frequency words are less rooted in lexical memory and thus more amenable to word inflection by analogy with more frequent words (Huback da Silva n.d.).

19 But these dialects also display an evolution from /an/ to /awn/, which means that the presence of /w/ is not necessarily due to vocalisation of /ɫ/. A further indication that we are not in the face of /ɫ/-vocalisation proper here is the fact that there is no diphthongisation in unstressed syllables (de Kolovrat 1923a, 268-269).

also the larger Romance observations (de Kolovrat 1923*a*, 274-276). The phenomenon has been attested in Rhaeto-Romance as early as the 9th century in a document from Grabs (Vorarlberg) (Meyer-Lübke 1934, 67); for the Lower Engadin varieties, the first attestation dates back to 1560 (de Kolovrat 1923*a*, 271). No Rhaeto-Romance dialect has /ł/-vocalisation in word-final position (de Kolovrat 1923*a*, 276-277).

When turning now to the phenomenon of /ł/-vocalisation in Italian, let me note that, while Standard Italian shows few signs of it, it does or did exist in the dialects; in the following paragraphs, I will try to synthesise the results of dialectal diversity. Since the Tuscan dialect is the main source for Standard Italian, I will begin by describing the phenomenon in the varieties of this region. In medieval times, /ł/-vocalisation before alveolars seems to have been a not uncommon feature of Tuscan, as attested by toponyms such as "Montauto" < montem altum, the evolution of the Latin suffix -bilis to Italian "-vole", the ubiquitous presence of "topo" ('mouse') < talpa[20], or misspellings such as <l> for etymological /w/ (Voelkel 1888, 30, de Kolovrat 1923*a*, 237-239, 253, Schürr 1927, 496-500, Sletsjøe 1959, 149, Folena 1959, 6, Rohlfs 1966, 342, §243, Tuttle 1991, 576). According to de Kolovrat, the first attestation comes from a document written in 899 and the last ones date from the 14th century. /ł/-vocalisation before alveolars can still be found today in the Lunigiana region; the modern dialect of Livorno has somewhat dark laterals in preconsonantal position (Marotta and Nocchi 2001, 302, table 6, Nocchi 2002, 81, table 3).

Despite the absence of /ł/-vocalisation in Venetian (which rather has palatalisation), a lateral could lead to vowel backing in older stages of the dialect: the sound sequence /al/ developed into /ol~ɔl/ (de Kolovrat 1923*a*, 247, Meyer-Lübke 1934, 79-80), and this evolution also took hold in Lombard varieties (de Kolovrat 1923*a*, 245-246). Moreover, Old Venetian and Old Lombard, as well as Old Piedmontese, Old Veronese, the medieval Emilian dialect of Cremona, Bologna, and Modena, the medieval Tuscan dialect of Firenze and Siena, Old Neapolitan, and Old Sicilian, according to 13th-15th century texts, had undergone /ł/-vocalisation before alveolar consonants, as also attested by inverse spellings (de Kolovrat 1923*a*, 244, 246-250, 252-254, 256-259, 262, Tuttle 1991, 576). Some of these inverse developments persist in modern Lombard dialects (de Kolovrat 1923*b*, 53).

In the dialect of Naples, before velar and labial consonants, the lateral developed an excrescent schwa (/lə/) or rhoticised without forming an anaptyctic vowel (this happened also in the varieties of the Abruzze region and in Subiaco (Lazio region) (de Kolovrat 1923*a*, 254-255, Meyer-Lübke 1934, 70, see also Schürr 1927, 498-499), while

---

20 For a discussion of "topo", see de Kolovrat (1923*a*, 237) who takes the word to be a loanword from Occitan or Spanish; a more thorough discussion, including its semantic evolution, can be found in Schürr (1927).

before alveolar consonants, the lateral became /vɔ ~ ve/[21], thus developing an excrescent vowel as well, but it may also simply vocalise after back vowels (de Kolovrat 1923*a*, 256-257, also Schürr 1927, 498-499). A similar situation occurs in Lucania[22], Calabria (Tarento) and Sicily, where before alveolars, an excrescent vowel may or may not be found (de Kolovrat 1923*a*, 258). As in Gallo-Romance, in more recent times, rhoticisation has practically supplanted /ɫ/-vocalisation in preconsonantal position, as can be seen in loanwords from Standard Italian (Rohlfs 1966, 342-344, §243, see also Meyer-Lübke 1934, 68-70).

Modern Western Ligurian and Piedmontese dialects have vocalisation of the lateral before alveolar consonants selectively according to vowel context in /al, ol, ɔl/ (but not in /el, ɛl, il, ul/), as do Sicilian and the Gallo-Italic dialects of Sicily (de Kolovrat 1923*a*, 240-241, 243-245, 258-260, 262-263), while rhoticisation affects /l/ in preconsonantal position when followed by a labial or velar consonant, as is the case in Ligurian and in Piedmontese, as well as in Central and Southern Italian dialects such as Lucanian or the Abruzze varieties (de Kolovrat 1923*a*, 254-255).

While the dialects described above show /ɫ/-vocalisation selectively before alveolar consonants only, a handful of other Italian varieties have vocalised /ɫ/ before both alveolar and velar consonants, with the exception of labial consonants. This situation holds for some Lombard dialects (e.g., the Lago Maggiore variety or else Bergamascan), the Venetian variety of Padova, and the Southern Italian Puglia dialect of Lecce. Bergamascan also has some forms where etymological /awC/ has been reinterpreted as /alC/. In older stages of the Romagnolo dialect, we find /ɫ/-vocalisation selectively before alveolars and velars, while before labial consonants, the lateral palatalised.

In word-final position, /ɫ/-vocalisation, whether from Latin singleton /l/ or geminate /lː/, is very rare in Italian dialects. de Kolovrat (1923*a*, 263), de Kolovrat (1923*b*, 54) and Rohlfs (1966, 426-427, §304) observe it in the Piedmontese colonies of Sicily[23] and for the Val Maggia/Alta Mesolcina varieties of Canton Ticino. In the Calabrian and Basilicata varieties of Noepoli and Terranova, it seems that the final unstressed vowel could drop, leading to the lateral being in final position and to develop into /ɔ/ and /a/, respectively (Rensch 1968, 596).

Although in the now extinct Romance language of Dalmatia, no /ɫ/-vocalisation occurs, except perhaps in prestress position, the lateral

---

21 /Vw/-diphthongs also developed in a similar fashion, which argues for the lateral being dark and then vocalising preceding this stage in /VlC/-sequences (cf. de Kolovrat 1923*a*, 256, Schürr 1927, 499).

22 With the exception of Eastern Lucania and Central Puglia, where no vocalisation took place at all. In Southern Calabrian dialects, rhoticisation may replace vocalisation in preconsonantal position.

23 Except for the Gallo-Italic dialects of Piazza Armerina and Nicosia where word-final /lː/ undergoes retroflexion (de Kolovrat 1923*a*, 264), see Chapter 5.

has had an opening influence on the preceding (mid-)high vowel in Lat. sᴛᴇ̄ʟʟᴀ ('star') > Dal. "stala", Lat. ɪʟʟᴇ ('he') > Dal. "jal" (Bartoli 2000, 426, §409, 427, §414).

The only variety of Romanian in which /ɫ/-vocalisation in preconsonantal position took place seems to be the variety of Oaş (Meyer-Lübke 1934, 64, see also de Kolovrat 1923a, 278-279).[24] Aromanian seems to have a dark /ɫ/ in word-final position, e.g. /jeɫ/ < Lat. ɪʟʟᴇ ('he'), /nineɫ/ < Lat. ᴀ̄ɴᴇʟʟᴜᴍ ('ring'). Presumably under the influence of Bulgarian, there are some speakers who have a dark lateral before low and back vowels. In the Farsheriot variety of Aromanian, /ɫ/ developed into what seems to be a pharyngeal fricative, described as 'deep guttural' by Weigand (1891, 5-6).

2.1.1.3 *Vocalisation of /ɫ/ outside of the Romance languages*

The phenomenon of vocalisation of dark /ɫ/ also occurs widely in other languages, mostly of Indo-European origin. In this section, I will first turn to Germanic languages, with English receiving the lion's share because of the vast number of detailed studies available on this language; I will then describe the process in Slavic and other Indo-European languages, and finish by pointing to the few instances of /ɫ/-vocalisation in preconsonantal and/or word-final position I have been able to localise outside of the Indo-European domain.

Let me begin then with English. In the Old English period, so-called consonantal breaking, whereby a front vowel breaks into a diphthong under the influence of a following preconsonantal dark consonant, took place between the 3rd and the 5th centuries, and this also happened under the influence of the lateral, among other consonants such as /r/ or /h/ (Flom 1937, 126).

In Early Modern English, it seems that vocalisation of a dark lateral took place in words such as "half", "folk", "should", "would", or "could" (Viëtor 1915, 264, Caffee 1940, 259, von Essen 1964, 53-54, see also Voelkel 1888, 19-20). Borowsky (2001, 75) reminds readers that this evolution did not always happen in the case of the following consonant being alveolar, as in "halt", "bolt", "fold". The sound change occurred

---

24 For cases where a Latin geminate /l:/ apparently developed into /aw/ (Recasens 1996, 67), see Meyer-Lübke (1934, 32), Graur and Rosetti (1936), also Lausberg (1967, 69, §498), who argue that in this case, the Latin geminate /l:/ was first simplified, and subsequently velarised only if followed by /ɐ/. A third position is entertained by de Kolovrat (1923a, 280-282), who holds that the evolution was rather /l:/ > /l/ > zero > /w/ (to avoid hiatus). The sound change has led to a morphological alternation of the type "stea" (sing. def.) – "steaua" (sing. indef.) – "stele" (gen. sing., nom. pl. indef.), and this alternation has induced other feminine nouns and adjectives ending in "-a" to likewise adopt a plural form in "-le". So, Lat. ᴅɪᴇ̄s is Rom. "zi (ziuǎ)" – "ziua" – "zile", "trei" ('three') has a feminine form "trele", and loanwords such as "cafea" – "cafeaua" – "cafele" ('coffee') or "sardea" – "sardeaua" – "sardele" (< Gr. «σαρδέλλα» ('anchovy')) also adopted the pattern (Graur and Rosetti 1936, 50-52). See Huback da Silva (n.d.) for a similar morphological generalisation in Brazilian Portuguese in footnote 18 above.

in almost all dialects of British English, after back and low vowels, and before labial and velar consonants (Johnson and Britain 2007, 298).

In a large number of contemporary accents of English, /ɬ/-vocalisation is a sound change still in progress, as speakers fluctuate between vocalised and non-vocalised uses of dark /ɬ/ (Hardcastle and Barry 1989, 3 on British English, see also similar findings by Scobbie and Pouplier 2010, 250-251). On the other hand, Hardcastle and Barry (1989, 12) also found that their "[s]ubjects were relatively consistent in their realisation of any one word", which seems to argue for diffusion through the lexicon still being in progress.

American English varieties and some dialects of British English vocalise preconsonantal and word-final /ɬ/ completely (Caffee 1940 for Southern US American English, Hardcastle and Barry 1989, 3 for New York English, the dialects of the American South, and British English, Meyerhoff 2006, 168 for Hawai'ian English, Stuart-Smith, Timmins and Tweedie 2006 for Scottish English, Johnson and Britain 2007 for Southern British English), with post-stress intervocalic /l/ being but very rarely vocalised (Scobbie and Wrench 2003, 1872);[25] phonetic data on the sound change in progress may be found, e.g., in Giles and Moll (1975), Hardcastle and Barry (1989), Wright (1989), Recasens and Farnetani (1990), Sproat and Fujimura (1993), Narayanan, Alwan and Haker (1997), Huffman (1997), Lehman and Swartz (2000), Scobbie and Wrench (2003), Wrench and Scobbie (2003) – these will be discussed below in 2.1.2.

In the American English varieties from the South of the United States, a dark-coloured schwa precedes the dark /ɬ/ in tokens of words that are not completely vocalised. Vocalisation occurs here, as elsewhere, before velar and labial consonants, but not alveolars. The lateral in these varieties may be velarised as well as pharyngealised (Caffee 1940, 259-260).

Also in varieties of Southeastern British English, /ɬ/-vocalisation is a sound change in progress, for instance in the Fenland area (northern Cambridgeshire, western Norfolk, southern Lincolnshire) as studied by Johnson and Britain (2007), or in London (Wells 1982, 313-317). It occurs with younger speakers in Cambridge English, especially in colloquial speech, and seems to be rather independent of speech rate (Wright 1989, acoustic and EPG study). A 1996 M.A. dissertation (Spero 1996) on Southeastern British English reveals that it is the preconsonantal /ɬ/ which is most likely to vocalise, followed by word-final /ɬ/ and syllabic /ɬ/ (reported in Horvath and Horvath 1997, 117). Findings by Scobbie and Wrench (2003, 1871) also indicate that the "vocalisation of /l/ is more likely if the /l/ is syllabic [. . .]", but they also caution that "a hypothesis along the lines 'syllabic implies vocalic' is oversimplistic" (Scobbie and Wrench 2003, 1874).

---

25 Vocalisation of intervocalic /ɬ/ occurs in the American English variety of Philadelphia (Ash 1986).

From a historical point of view, apart from the vocalisation of the "half"-type in Early Modern English, the contemporary sound change seems to have been initiated first in northern England (Yorkshire, South Durham) in the 17th-19th centuries. Other accents of English, such as Irish English and Northern East Anglia still retain clear /l/ in all syllable positions. Johnson and Britain (2007, 300 (see also their fig. 3, p. 301)) note that "[b]y the 1960s [. . .] dark /l/ had spread across the southern half of England, but all of the north, the west Midlands and Norfolk, retained [l] in syllable rhyme position. Small pockets of vocalisation were found at this time in Surrey, Sussex, Essex and Oxfordshire".

In the Urban Scots of Glasgow, studied by Stuart-Smith, Timmins and Tweedie (2006) from a sociolinguistic point of view, we find two processes of vocalisation of /ɫ/: one is a recent import from Southern British English, with a rather great intra- and inter-speaker variation (Stuart-Smith, Timmins and Tweedie 2006, 83), although the general hierarchy of likelihood of occurrence decreases from preconsonantal position to 'syllabic' /ɫ/ to word-final /ɫ#C/ to word-final /ɫ#V/ (Stuart-Smith, Timmins and Tweedie 2006, 79, 83); the other, peculiar to Scots, "was completed by the mid-fifteenth century and is no longer productive in the language: Scots l-vocalization affected /l/ in Older Scots after the short vowels /a, o, u/ so that the outcomes of the sequences /al, ol, ul/ in West-Central Scots were respectively /ɔ, u, ʌu/ ([. . .]). [. . .] The process was blocked before /d/, hence aul(d) ('old')." (Stuart-Smith, Timmins and Tweedie 2006, 73-74). Additionally, Stuart-Smith, Timmins and Tweedie (2006, 73, footnote 1) note an excrescent schwa in the words "film" and "milk" in some of their speakers.

The ongoing vocalisation of /ɫ/ in South Australian and New Zealand English has been subject to detailed investigation: A comparison of several South and Southeastern Australian and New Zealand English dialects with respect to vocalisation of syllabic /ɫ/ was carried out by Horvath and Horvath (2001) (impressionistic auditory analysis; Horvath and Horvath (1997) is a preliminary study focusing on the Australian data only; see also Hardcastle and Barry (1989, 14), Borowsky and Horvath (1997), Borowsky (2001)) and for preconsonantal and final /ɫ/ by Horvath and Horvath (2002). While there is no /ɫ/-vocalisation in the syllable onset or in intervocalic position, these dialects display /ɫ/-vocalisation, accompanied or not by lip-rounding, in the syllable coda to varying degrees (Horvath and Horvath 2001, 40). In all of them, the phenomenon occurs more frequently in younger than in older speakers, suggesting a sound change in progress (Horvath and Horvath 1997, 117, Horvath and Horvath 2001, 40-41), but the vigorousness of the change, measured as the difference of percentage of vocalisation between younger and older speakers, suggests that the sound change in New Zealand takes place at a rate twice as fast than

that in Australia (Horvath and Horvath 2002, 339). As regards the geographical distribution in this part of the English-speaking world, Horvath and Horvath (2001, 41) (similarly Horvath and Horvath (1997) for the Australian cities only, Horvath and Horvath (2002, 327) for final /ɫ/ and pp. 335-336 for preconsonantal /ɫ/) found "all New Zealand cities leading all Australian cities, with Christchurch ahead of Wellington and both of them ahead of Auckland. In Australia, Adelaide and Mount Gambier are close and still on the side of promoting vocalization, while speakers from the other Australian cities are less likely to vocalize /l/, gradually decreasing to only 7% in Brisbane." Overall, New Zealand English showed a rate of 58% vocalisation of syllabic /ɫ/, but Australian English only 15% (Horvath and Horvath 2001, 42, see also the maps in Horvath and Horvath 2001, 50, fig. 9 and Horvath and Horvath 2002, 342, fig. 6).

The phonetic context favouring vocalisation of syllabic /ɫ/ in these Australian and New Zealand dialects is, for the context following the lateral, in descending order of favour, a pause >(/) consonant-initial word > vowel-initial word (Horvath and Horvath 2001, 44). As for the phonetic context preceding the syllabic lateral, velar consonants favour /ɫ/-vocalisation more than alveolars do, with labials constituting a favourable factor only in New Zealand English, but not in Australian English, where they range behind alveolars for this purpose (Horvath and Horvath 2001, 45). Similarly, in preconsonantal laterals, a following velar consonant favours vocalisation, an alveolar inhibits it, whereas labials go together at times with the velars, and at times with the alveolars (Horvath and Horvath 2002, 329, 331); the preceding vowel most likely to be found in relation to /ɫ/-vocalisation is mid central or high front in Horvath and Horvath (2002, 337), but central and back rather than front according to the results of Borowsky (2001, 83). For word-final /ɫ/, vocalisation is inhibited by a following vowel-initial word, which effectively puts the lateral into an intervocalic position (Horvath and Horvath 1997, 117, Borowsky 2001, 81, Horvath and Horvath 2002, 329). It should be noted, however, that all the studies on Australian and New Zealand English conducted by Borowsky, Horvath and Horvath discussed in this and the above paragraph draw on impressionistic transcription of recorded speech, which poses a methodological problem. These data may be in need of reëvaluation through an articulatory study of tongue tip movement during /ɫ/. It is also interesting to note that New Zealand English dark /ɫ/ exerts a backing influence on the vowels preceding it (Wells 1982, 609-610).

From a historical point of view, Horvath and Horvath (2001, 52) point out that New Zealand English is related to the London dialect, and, generally, to the Southeast of England, and Australian English to Cockney. Johnson and Britain (2007), who discuss the genesis of /ɫ/-vocalisation in the English spoken in New Zealand, find no evidence

for the presence of an early (imported) dark lateral, since a study
"of the first generation of native-born Anglophone New Zealanders
(born 1850-1890)" showed that they all had clear /l/s, whilst "in
New Zealand English today /l/, even in prevocalic contexts, is quite
'dark'" (Johnson and Britain 2007, 300). Data presented in Horvath and
Horvath (2002, 338, table 7) suggest that the second generation of New
Zealanders (born ca. 1940) has a vocalisation rate of 40-50%. This has
implications for other postcolonial dialects, such as American English,
for which Johnson and Britain (2007, 300) propose that the evolution
of /ɫ/ and its vocalisation should be considered to be an independent
evolution as well.

In a few varieties of English, the vocalisation of /ɫ/ at the end
of words has led to an interesting phenomenon termed intrusive
or epithetic /ɫ/[26]: Analogously to the more common intrusive /ɹ/,
which arises at the end of words ending in a non-high vowel when
the following word is vowel-initial, the intrusive lateral only occurs in
those dialects that have /ɫ/-vocalisation in preconsonantal and word-
final position (for which, see above). It is extensively studied by Gick
(1999),Gick (2002), who proposes the following stages in the evolution:
1. /ɫ/-vocalisation in syllable coda position, and 2. no vocalisation
in intervocalic position, 3. merger of /Vw/ with some low and/or
back vowel monophthong (most often /ɔː/) (also Gick 1999, 37, 44),
4. reanalysis of all /ɔː/ as /ɔɫ/, as well as /ɑw/ as /aɫ/. Evidence
for this reanalysis comes from spelling mistakes such as <sal>, <sall>,
<sol> for "saw" or <braln> for "brown" (just as medieval manuscripts
in Romance contain inverse spellings, see above on page 35 and on
page 40) (Gick 2002, 169-173). On the sociolinguistic side, intrusive
/ɫ/ is "extremely socially marked", and a phenomenon in progress
(Gick 2002, 175). There are, in English, three different dialects or
dialectal areas where intrusive /ɫ/ developed: 1. Southern Oklahoma
– Northern Texas American English, where it occurs after schwa,
2. Southeastern Pennsylvania – Northeastern Maryland – Northern
Delaware American English, where it occurs after /ɔ/, and 3. Bristol
British English, where /ə/ was reanalysed as /əɫ/ (Wells 1982, 344-
345[27], Wakelin 1986, 31, Gick 2002, 176-180, see also Gick 1999, 36).

Similar developments as in English can be found in other Germanic
languages as well. Although the lateral of Standard German is clear,
dark /ɫ/ and the vocalisation of it can be found in various German
dialects, where different stages of the evolution are visible: presence of
a dark lateral, evolution of an anaptyctic vowel in /ɫ/ preceding labial
or velar consonants, vocalisation to low and back (semi-)vowels, with
/u/ or /w/ being the most frequent outcome in intervocalic, precon-
sonantal and word-final position alike; as in Romance, vocalisation in

---

26 A comparable phenomenon occurs in the two California Algic languages Yurok and
Wiyot (Blevins and Garrett 2007).

27 Who notes that "Bristol itself was once Bristow".

preconsonantal position is most likely to occur before a following alveolar consonant (Selmer 1933, 221-222). Because the dialectal diversity of the phenomenon under investigation is rather instructive, I will now turn to each German dialectal group which presents /ɫ/-vocalisation in turn.

Among the Swiss German dialects, the lateral is dark in the Western part of the Appenzell region, the Aargau, in the Rhine Valley near St. Gallen, and Fribourg; it confers a darker quality to its preceding vowel in Western Appenzell and vocalises in Inner Rhoden (Appenzell), Bernese Seeland[28], in the upper part of the Valais, and in Lucerne (vocalisation in intervocalic, preconsonantal and word-final position), in Fribourg and in the Hittisau region of Vorarlberg (vocalisation in preconsonantal and word-final position); /ɫ/ may be elided in preconsonantal position in the Rhine Valley near St. Gallen; finally, in the Innere Bregenzerwald variety of Vorarlberg, vocalisation after /a/ and before alveolars leads to forms of the type /awɫt/ with maintenance of the lateral. The remaining Alemannic dialects have clear laterals (Selmer 1933, 225-229, see also Voelkel 1888, 13-15).

Most Bavarian-Austrian dialects have very clear and/or palatalised laterals. Only the Tyrolese dialects show some degree of velarisation and an influence of /ɫ/ on the preceding vowel: /əɫ/ > /aɫ/ (Isel-, Drau-, and Lesach Valleys and the surroundings of Lienz). In Lower Austria, the syllabic lateral in word-final /gl̩/ developed into /ɫ/. In the variety of Gottschee (Slov. Kočevje), which is of Franconian origin, vowel backing and /ɫ/-vocalisation was apparent in the evolution of /eɫ/ to /awɫ/ and /aɫ/ to /oɫ/. In the Heanzische variety, the syllabic lateral was dark (Selmer 1933, 230-231).

In Thuringian, /ɫ/-vocalisation may only be found in the Hocheichsfeldische variety, to the south of Eichsfeld, and in the Hennebergische variety, where the evolution is probably due to contact with the neighbouring Franconian dialects (Hentrich 1919, Selmer 1933, 231-232, see also Voelkel 1888, 13-15). In the Lusatian dialect, /ɫ/-vocalisation in intervocalic, preconsonantal, and word-final position, as well as in syllabic /ɫ̩/, occurs in the Southern part of the Upper Lusatian territory (Selmer 1933, 232-233). Dark laterals after back and low vowels occurred in the Silesian dialect of Waldenburg (Pol. Wałbrzych), and /ɫ/-vocalisation (and sometimes its elision) could be found in Glogau (Pol. Głogów) (Selmer 1933, 233-234).

Dark /ɫ/ also occurred in the East Low German dialects spoken in the Baltic region. In the Danziger Nehrung (Vistula Spit), we find a similar evolution as in the Alemannic dialect of the Innere Bregenzerwald (see above on this page), namely the vocalisation of the lateral in the sequence /aɫC/ together with its simultaneous maintenance as /awɫC/. In the Koschneiderei (Pol. Chojnice), the sound sequences

---

28 In the beginning of the 20th century, dark /ɫ/ was a feature of younger speakers of this dialect, with older speakers having clear /l/s (Selmer 1933, 227).

/aɫt, uɫt/ developed into /oɫ/. In the Posen (Pol. Poznań) variety, /ɫ/–vocalisation yielded /ɐ/. It is not clear to what degree the occurrence of dark laterals and their vocalisation in these varieties of German was due to language contact phenomena, given that the same process was also happening in Polish; mutual influence is a likely candidate for an answer to this question (Selmer 1933, 234-236).

Already in Old Saxon and Old Frisian, a following lateral or rhotic in preconsonantal position prevented fronting of a preceding /a/ to /e/ (Leidner 1973, 199, also Leidner 1976, 334, see also Meillet 1905-1906, 242, Selmer 1933, 229). In the modern dialects of Low Saxon, we note that, although the sequence /ald/ has been preserved in the part of Westphalia which lies southeast of Lipperode and Mettinghausen, there is /ɫ/-vocalisation and vowel-darkening (/aɫd/ > /oɫd/) in most other parts of the territory. This is attested in medieval documents as early as the 14th century. The region between Osnabrück, Minden, Herford, Lippe, and Bielefeld, as well as the variety of Bonsdorf in the Bergische Land and the Schleswig dialects, have a vocalisation of the type /aɫ/ > /awɫ/, first attested in 1500. "This phenomenon seems to be predominant throughout a territory extending from Frisia through Westphalia and from the northern part of Rhenish Prussia to the south of Bonn" (Selmer 1933, 236-237). von Essen (1964, 53-54) describes the vocalised outcome of /ɫ/ in the variety of Vierlanden (near Hamburg) as a velar approximant, e.g., "hell" /heɰ/, "School" /ʃeɰʊ/, "Kalf" /kaɰf/.

Franconian is the German dialect where /ɫ/-vocalisation occurs most pervasively. In East and Rhenish Franconian, in Elberfeld, in Low Franconian, in the northern part of the Bergische Land and along the Lower Rhine up to the Dutch border, vocalisation preserves the lateral as in Low Saxon, with the evolution of the lateral to /awɫ/ following a low or back vowel. In Middle Franconian, we find vocalisation in a region situated between Eupen, Aachen, and Gelsenkirchen; variation between velarisation, anaptyxis of schwa after /ɫ/ in preconsonantal position (also in Cologne), elision of the lateral with concomitant vowel lengthening, and vocalisation in the region between Aachen and Düsseldorf; Moselle-Franconian and Luxemburgish have both dark laterals and/or their vocalised developments; an excrescent schwa after preconsonantal /ɫ/ and vocalisation of the lateral in preconsonantal and intervocalic position was also a feature of Transylvanian Saxon, where the dark quality of the lateral extended to the word-initial position and the onset clusters (Selmer 1933, 238-240, see also Voelkel 1888, 13-15).

/ɫ/-vocalisation in Dutch (Flemish included) happened in preconsonantal position after low and back vowels and before alveolar consonants (evolution to /ow/) during the Middle Dutch period (first attested in the 13th century, i.e., in the earliest documents available to

us).[29] Elsewhere, /ɫ/ persisted (Voelkel 1888, 18, Selmer 1933, 240-244). In contemporary Dutch, /ɫ/ in the syllable coda leads to darkening of a preceding mid vowel (Botma, Sebregts and Smakman 2010).

Before concluding the overview of /ɫ/-vocalisation and other effects of dark /ɫ/ in the Germanic languages, let me briefly note that Old Norse breaking corresponds to the type of front vowel diphthongisation we already saw in Gallo-Romance. As in Old English, breaking of /e/ occurred when a preconsonantal lateral or rhotic followed the vowel. The resulting diphthong seems to have been maintained as /ea̯/ or /eo̯/ up until the 12th century, when stress was shifted to yield /ja/ or /jɔ/ (Flom 1937, 125, footnote 7). "[I]n dialect forms of Old Norwegian, and in Faroese, and in the Shetlandic 'Norn' dialect, the vbs. fela and stela become fjala and stjala (fjal in Shetland). Again, Old Swedish and Old Danish show such broken vowel forms in the vbs. of the 4th and 5th rows very frequently, and both standard Swedish and standard Danish have them today." This also holds for the Old Gutnic (Old Gothlandic) forms (Flom 1937, 125). See also briefly Selmer (1933, 224, 229) and Leidner (1973, 199).

Turning now in a somewhat more succinct fashion to the Slavic languages, we may note with Straka (1979, 382) that the Slavic lateral acquired its dark quality historically before the vowels /a, o, u, ɨ, õ, yer/ (/yer + l/ > /oɫ/ (Straka 1979, 382, footnote 69)), a process which he views as regressive tongue body assimilation. Let us look briefly at some individual Slavic languages.

In the 14th century, Czech had a distinctly dark /ɫ/, according to Jean Hus, 1406, *Orthographia bohemica*. This dark /ɫ/ evolved, however, not towards vocalisation, but to a clear /l/[30], apparently under diglossic influence by neighbouring clear-/l/ German dialects (Straka 1942, 33-34 and Straka 1979, 395, also de Kolovrat 1923*a*, 67). Czech dialects, on the other hand, preserved dark /ɫ/ to varying degrees into the 20th century. In word-final position, an /u/-coloured schwa could develop following a dark /ɫ/, which in turn subsequently became clear. In some dialects, syllabic /ɫ/ vocalised (Voelkel 1888, 8).

In Polish, /ɫ/-vocalisation was a sound change in progress in the 19th and first half of the 20th centuries (Voelkel 1888, 11, Straka 1942, 22-24, Petráček 1952, 522; see also below 2.1.2). While during the 1960s, Bothorel (1967, 189) reports that tongue tip contact was already regularly lost in vocalising /ɫ/, but movement towards the alveolar ridge continued to be preserved in many instances, the sound change has been completed since (Gussmann 2007, 28). As in many other languages, dark /ɫ/ has an opening, diphthongising influence upon the vowel /e/, as in, e.g., "beły" > "biały" ('white') (Voelkel 1888, 10,

---

29 But these documents also contain spellings such as <leC> rather than <uC>, suggesting the evolution of an excrescent schwa (Selmer 1933, 242).

30 On the basis of an acoustic investigation, Recasens (forthcoming) characterises the Czech lateral as moderately dark.

de Kolovrat 1923*a*, 112). Similarly, /ɬ/-vocalisation was in progress in Upper Sorbian, at least by the time of writing of Voelkel (1888, 11).

Among the South Slavic languages, the Slovenian syllabic /ɬ/ developed an excrescent vowel (/oɬ/) and vocalised (/ow/ > /u/) (Voelkel 1888, 5). Non-syllabic dark laterals were attested up to the 16th century for the Carniola Inferior dialects; in Carniola Superior and Carinthia dialects, /ɬ/-vocalisation may also be encountered (Voelkel 1888, 6). A similar evolution occurred in Serbo-Croatian, where vocalisation of dark /ɬ/ took place in preconsonantal and word-final position (Voelkel 1888, 7, Meillet 1905-1906, 240, Meillet 1965, 36, §38).

In East Slavic, Ukrainian is known for having /ɬ/-vocalisation in intervocalic, preconsonantal and word-final position (Voelkel 1888, 8-9, Meillet 1965, 36, §38). Straka (1979, 370-373) was able to observe instances of /ɬ/-vocalisation in some Russophone speakers native from the Ukraine. The sound change occurred preconsonantally and word-finally in Belarusian as well (Ščerba 1910-1911, 282). While a similar evolution is not found in Russian, the Old Slavonic syllabic */ḷ/ has evolved into Russian /oɬ/, and the Old Slavonic sequence */el/ into Russian /oɬo/ (Meillet 1905-1906, 240-241).

Finally, let me survey a couple of other Indo-European as well as non-Indo-European languages. Whereas Standard Greek is said to have overall clear laterals, a handful of Greek dialects such as the Asia Minor dialect of Vourla Ionias have strongly dark laterals before back and low vowels (Kontossopoulos 2006*a*, 119). Interestingly enough, the Italian (Venitian) word "volta", which in Standard Greek has been adapted as "βόλτα", is pronounced "βόλιτα", with an epenthetic high front vowel, in the Greek dialect of Crete (Kontossopoulos 2006*b*, 15, table 2); this particular evolution may be due to the Venitian dialect of Italian having very clear /l/s, even tending to palatalisation, in this phonetic environment.

In fact, Ancient Cretan Greek had either /ɬ/-vocalisation or at least a heavily velarised /ɬ/ in preconsonantal position (also Voelkel 1888, 27) which Meillet (1914-1915, 169) (also Meillet 1905-1906, 241-242) describes as tongue tip weakening; the spelling <υ> for <λ> testifies to this: e.g., "αὐκάν · ἀλκήν. Κρῆτες" (Latte 1953, 279), "αὐκυόνα · ἀλκυόνα. Κρῆτες" (Latte 1953, 280), "αὖμα · ἄλμη, ὑπό Κρητῶν" (Latte 1953, 281), "αὖσος · ἄλσος. Κρῆτες" (Latte 1953, 282), "αὐγεῖν · ἀλγεῖν" (Latte 1953, 278), "εὐθεῖν · ἐλθεῖν" (Latte 1966, 225), "θεύγεσθαι · θέλγεσθαι. Κρῆτες" (Latte 1966, 318); "ἄδευφιαί" (Collitz and Bechtel (1905, 256 = 4991.5.18).

In Albanian, a dark /ɬ/ in the syllable coda has a backing influence on its preceding vowel (de Kolovrat 1923*b*, 20). In some Breton dialects, the lateral is velarised (Hewitt 1978), and also seems to vocalise in preconsonantal position (de Kolovrat 1923*a*, 288). The southeastern varieties of Lithuanian pronounce /aɬ/ in an almost vocalised fashion (Voelkel 1888, 2-3). Armenian has known preconsonantal /ɬ/-pharyngealisation in its historical evolution from Old Armenian /ɬC/

to Modern Armenian /ʁC/~/ɣC/ (Meillet 1905-1906, 237, footnote 1, Troubetzkoy 1922, 203[31]). Among the Indo-Iranian languages, East Kurdish dark /ɫ/, like other velar(ised) consonants in this language, is known to back a preceding /ɨ/ to /ɯ/ (McCarus 1958, 18).

Among Semitic languages, Western Mehri has undergone regular vocalisation to /w/ of its preconsonantal lateral (Johnstone 1977, 68, see also Steiner 1977, 16-18). Finally, equally outside of Indo-European, it is interesting to observe that in Kuma (Southern Mid-Waghi, Waghi language, Chimbu group, spoken in the Papua New Guinea Western Highlands), a formerly alveolar (and probably dark) lateral developed into a velar (not velarised) lateral, except in preconsonantal position before alveolar consonants, where it still retains the tongue tip contact (cf. Blevins (1994, 327), who uses this example in a Feature Geometry framework, but provides an articulatory explanation on p. 328, footnote 34). Unexpectedly enough, however, in this language, vowel rounding and lowering does not occur with the velar laterals, but only in the vicinity of velar stops (Blevins 1994, 328, footnote 36).

2.1.2 *Articulation and perception of /ɫ/-vocalisation as a sound change in progress*

In this section, I will review phonetic studies pertaining to /ɫ/-vocalisation as an ongoing sound change or as synchronic variation in a small variety of languages, mainly English, before moving on in 2.1.3 to explanations of /ɫ/-vocalisation from articulatory, acoustic, and usage-based perspectives. The main points of interest in the studies presented in this section will be the behaviour of the tongue tip, especially the question of tongue tip reduction or undershoot, the advent of lip rounding in more advanced stages of the sound change, the reasons behind vowel breaking or diphthongisation due to dark /ɫ/, and finally, what perception studies can tell us about the phenomenon.

Whereas in 2.1.3, I shall discuss old and new attempts at explaining the initiation of /ɫ/-vocalisation with regard to Romance, the present section will be concerned primarily with the fairly recent amount of work done on /ɫ/-vocalisation both as a sound change in progress and as synchronic variation. For surveys of earlier work, the reader is referred to Voelkel (1888, 40-48) who provides an account of the research on the phonetics of dark /ɫ/ up to the publication of his

---

31 Troubetzkoy (1922, 203-204) thinks that this is not a case of velarisation, i.e., /ɫ/ > /w/ > /ɣw/ > /ɣ/, but rather of fricativisation, i.e., /ɫ/ > /ɮ/ > /ɣ/, since the /ɮ/ > /ɣ/ stage is attested in Northeastern Caucasian languages. If this turns out to be right, the sound change would be due to contact between Armenian and the Northeastern Caucasian languages. His argument relies on the fact that the proposed intermediate stages /w/ and /ɣw/ have left no graphical traces in the medieval Armenian documents, but apparently neither does /ɮ/. Of course, pharyngealisation is a possible sound change in preconsonantal position; it is attested, as described above on page 35, in Auvernhat Occitan varieties Troubetzkoy may have been unaware of.

article. Straka (1979, 367-369), then, gives a fairly complete overview of the work done on /ɫ/ up to 1968, some of which, given the lack of instrumental techniques compensated for by each author's vivid imagination, is sometimes quite entertaining.

2.1.2.1   *Tongue tip reduction in the vocalisation of /ɫ/*

Perhaps the most decisive step in the vocalisation of dark /ɫ/ is the moment where the tongue tip ceases to make contact with the alveolar ridge or the dental area, for this is when /ɫ/ becomes de facto the velar approximant /ɯ̯/ (i.e., the stage prior to its eventual recategorisation as /w/), the loss of tongue tip contact leading to loss of the side channels (except in the case of Kuma described above (2.1.1.3), where laterality is maintained). It is also clear that this reduction does not occur once and for all for any given speaker, but that we expect to find a large amount of intra- and inter-speaker variability and different degrees of reduction in the tongue tip gesture. It is therefore not surprising that the main effort of articulatory studies investigating data from ongoing vocalisation of /ɫ/ concentrated on tongue tip movements.

Despite /ɫ/-vocalisation in Occitan being a sound change that had been completed many centuries ago, a handful of Lengadocian varieties in Upper Arièja, on the linguistic border with both Catalan and Gascon Occitan, shows /ɫ/-vocalisation in synchronic variation. The articulation of this vocalising /ɫ/ has been studied by Companys (1953, 194) in the variety of Lo Pòrt (09) as best could be done in a fieldwork setting in these times:

> Nous avons pu voir à l'aide de miroirs que la langue est placée très en arrière, se bombant, la pointe, très basse, ne touchant pas les gencives inférieures. L'apex se relève légèrement au cours de l'articulation, qui se fait très en arrière, vraisemblablement au même point que le o fermé dont ce phonème se rapproche beaucoup.

He also notes that this variant of /ɫ/ occurs preferentially in the vicinity of low and back vowels. Acoustically, it resembles /w/ (Dauzat in Companys 1953, 194, footnote 2). What is of interest here is the fact that the tongue tip gesture in this sound was still present, although it didn't produce a central closure. We will see in this section that this finding has been replicated again and again in articulatory studies with state-of-the-art techniques.

But before we move on to articulatory investigations of the phenomenon carried out within the past few decades, let me note that similar findings as for Lo Pòrt Occitan have sparked the interest of phonetic researchers as early as the beginnings of the 20th century. For instance, already Ščerba (1910-1911, 282) reports a case of idiosyncratic /ɫ/-vocalisation in a Russian speaker whose tongue tip just

failed to make contact. While, to the best of my knowledge, Russian today does not have an ongoing sound change of /ɫ/-vocalisation (unlike Ukrainian) and therefore, the idiosyncratic variation in the single speaker studied by Ščerba may not have been representative of the language as a whole, another Slavic language, Polish, as described above, did have a process of /ɫ/-vocalisation completed in modern times, which has been studied by Georges Straka in 1942.

Using an artificial palate and visual inspection to investigate tongue tip configuration in vocalising /ɫ/, Straka (1942, 22-24) found great inter-speaker differences in his group of about 30 Polish-speaking subjects of diverse dialectal background. In some of his subjects, tongue tip contact was well-preserved[32], in some others, the tongue tip had advanced its point of articulation to the upper incisors without making firm contact, another group of subjects showed a reduced tongue tip movement which didn't attain the alveolar ridge (as in the Lo Pòrt Occitan and the single Russian speaker above), finally, the last group of speakers had completely vocalised the lateral to /ɯɥ/.

As adumbrated above, the bulk of phonetic research on /ɫ/-vocalisation has been carried out on different varieties of English. The first to have thrown light on its developmental path in this language via instrumental techniques have been Giles and Moll in 1975. In their cinefluorographic study of American English, they found that lack of tongue tip contact in /ɫ/ could occur in preconsonantal position, except when the following consonant was alveolar[33] (Giles and Moll 1975, 216-217). In word-final /ɫ/, loss of tongue tip contact was due to increased speech rate (Giles and Moll 1975, 212-213).

An article published a year later by Leidner (1976), based on his doctoral dissertation, corroborated many of Giles and Moll's findings with the use of electromyography. In this study, the American English speakers showed greater activity in the tongue tip in intervocalic /ɫ/ than in either preconsonantal (here: prelabial) or word-final /ɫ/ (Leidner 1976, 333). This generalisation, however, did not hold in the context of the vowel /u/ where the greatest tongue tip activity was found for the lateral in the syllable coda and the least activity in intervocalic position (/uɫu/), although the overall level of activity was still less than in the other vowel contexts (Leidner 1976, 331-332).

Similar findings were obtained, still for American English, by Gick (2003) who found greatest tongue tip displacement in the word-initial lateral, the smallest tongue tip gesture in word-final /ɫ/ followed by a consonant-initial word, and an intermediate degree of magnitude in word-final laterals followed by a vowel-initial word, i.e., practically

---

32 Straka advances a sociophonetic explanation for this finding, namely that the non-vocalised /ɫ/ is a highly prestigious sound. Gussmann (2007, 28), half a century later, reports that it conveys affectation in contemporary Polish.

33 This finding actually holds for alveolar stops; before /s, z/, tongue tip contact of /ɫ/ may well be partial (see Hardcastle and Barry 1989, 15 for British English (EPG study)).

in intervocalic position. Interestingly enough, this intervocalic lateral had a much smaller standard deviation than the lateral in either of the other positions, suggesting a more stable tongue tip target position.

The results of an EMA study undertaken by Scobbie and Wrench (2003) on a variety of British and American English near-standard accents offer more insights still: They found most vocalisation in preconsonantal (here: prelabial) context, as well as a certain amount of vocalisation in word-final context, although a few instances of vocalised intervocalic /ɫ/ following a stressed vowel also occurred in their data. One speaker of American English had vocalisation in word-final position even when the following word began with a vowel, while another speaker of this variety, as well as two speakers of London and West Central Scottish accents, respectively, restricted their word-final vocalisation to prepausal and prelabial positions. For two speakers of Northern British English, /ɫ/-vocalisation occurred only in the prelabial context. Finally, two speakers of Southeastern British English had vocalisation in this position only when the syllable where it occurred was unstressed. For most of the subjects, the alternation between vocalised and non-vocalised /ɫ/ was categorical. Nevertheless, some of the subjects that vocalised most had a tongue tip position that was similar in the consonantal and the vocalised variants of dark /ɫ/, i.e., where a seemingly targetless movement of the tongue tip still occurred in the vocalising lateral, whereas for one of the Southeastern British English speakers, tongue tip position differed for each sound in a more categorical fashion (Scobbie and Wrench 2003, 1872-1873; a reduced tongue tip movement in American English vocalising /ɫ/ was also found by Browman and Goldstein (1995, 26)). In an accompanying study, Wrench and Scobbie (2003) complemented their findings of the variations in tongue tip movement in the same speakers as above. They found that "[a] high rate of vocalisation need not be due to extreme tongue lowering." (Wrench and Scobbie 2003, 317) The subject with the acoustically most vocalised variant of dark /ɫ/, the London English speaker, had a systematically lowered tongue tip in his vocalised /ɫ/s. He also had labialisation. A second subject (the second author) also had a lowered tongue tip, accompanied by slight labialisation (raising of the lower lip rather than lip protrusion), in his vocalised /ɫ/, but unlike his /w/, the vocalised variant of the dark lateral was pharyngealised in this speaker (Wrench and Scobbie 2003, 317-318).

The findings described above have recently been replicated in an EPG study by Scobbie and Pouplier (2010) (see also Scobbie, Pouplier and Wrench 2007) with speakers of Scottish Standard English and Southern Standard British English.[34] Unlike the Scottish English

---

34 The task of Scobbie and Pouplier's paper was to challenge the resyllabification view of ambisyllabicity, replacing it by the Articulatory Phonology approach to coda variability via loose intergestural coordination of word-final consonants and

speakers who vocalised /ɫ/ word-finally (regularly before a following consonant-initial word, where the consonant was always a labial, and often before a following vowel-initial word), the Southern Standard English speakers had vocalisation practically only before the labial consonants (Scobbie and Pouplier 2010, 247). Moreover, as pertains to the strength of alveolar contact, "for all speakers, consonantal codas are substantially weaker than their onsets, and it appears that Scottish speakers have weaker consonantal contact than the English ones." (Scobbie and Pouplier 2010, 248, see also p. 251: "Gradient gestural reduction of the alveolar constriction is likely to be responsible for vocalisation in many cases, because partial reduction of the degree of contact in the different conditions patterns well with a speaker's tendency to lose alveolar contact completely ([. . .]).") Furthermore, the degree of tongue dorsum retraction, causing darkness, did not seem to determine whether tongue tip contact in /ɫ/ was present or absent in word-final position (Scobbie and Pouplier 2010, 249). "The two gestures of /l/ behave somewhat independently. The tongue tip gesture may or may not be onset-like while the tongue dorsum invariably displays the spatial characteristics of a coda consonant" (Scobbie and Pouplier 2010, 251).

Similar variability in the tongue tip gesture was also found by Feldman (1972) for Brazilian Portuguese varieties. In his study, speakers from the interior of São Paulo state had fully-articulated dark /ɫ/s with alveolar tongue tip contact and without any labialisation. In the region of the city of São Paulo, the vocalisation of /ɫ/ was more advanced, with the tongue tip gesture present but not reaching its alveolar target, and with a slight labialisation. Finally, in the varieties of Fortaleza and Rio de Janeiro, the tongue tip gesture was often completely absent in the articulation of the dark lateral, and, given concomitant labialisation, it had practically become /w/ (Feldman 1972, 133-134, 136-137, 139). Tongue tip reduction may also occur in the dark lateral of European Portuguese, as shown by an EMA study of syllable-initial and syllable-final laterals in this language (Oliveira, Teixeira and Martins 2010), where one out of the two speakers studied had this feature.

An articulatory (EPG) study of Catalan spontaneous speech by Recasens (2009) yielded similar results as the studies presented above: Speakers of the Valencian variety of Catalan, which has overall clear laterals, showed relatively few instances of lack of tongue tip contact in preconsonantal position (Recasens 2009, 472). With the moderately dark laterals of Eastern Catalan, partial, but not complete, loss of tongue tip contact in /ɫ/ occurred in preconsonantal position before labial and velar consonants, but not alveolar (dental, alveopalatal)

---

intergestural phasing to the following word on the grounds of the great variability found in the 'ambisyllabic' environment, i.e., in word-final position before a vowel-initial word.

ones (Recasens 2009, 474-476). Finally, the strongly dark laterals of Majorcan Catalan had absence of tongue tip closure in preconsonantal /ɬ/ half of the time, with the greatest percentage of lack of closure in the context of a following labial consonant, whereas a following alveolar helped to maintain tongue tip contact (a finding replicated by Recasens and Espinosa (2010*a*, 77)). Even in intervocalic position, the strongly dark /ɬ/ of Majorcan Catalan could have partial or complete lack of tongue tip contact, especially so after a low or back vowel (Recasens 2009, 474). Within the dialect, however, the degree of tongue tip contact was independent of the degree of darkness of the lateral (Recasens and Espinosa 2010*a*, 77), as with the English speakers of Scobbie and Pouplier (2010).

Interestingly enough, the contemporary pattern of degree of loss of tongue tip contact found in the two Romance languages Portuguese and Catalan does not coincide with the path the sound change took during the period of Proto-Romance. I will discuss these facts in 2.1.3, where explanations for the Romance sound change will be reviewed and critically examined.

Furthermore, as discussed in Chapter 1, in dark /ɬ/, the tongue tip closure shows a lag with respect to voicing offset. Studying the word-final, prepausal dark lateral of Catalan and American English and the clear lateral of Italian via EPG and acoustic analysis, Recasens and Farnetani (1994, 200) found that the offset of voicing occurred before onset of the alveolar closure in American English, leading to a perception of /ɬ/ as vocalised, whereas in Catalan, the offset of voicing took place before the offset of alveolar closure, which made the closure period appear shorter than it was from an articulatory point of view. Italian prepausal clear /l/, on the other hand, had synchronised voicing offset with the offset of the tongue tip closure. See also Recasens and Espinosa (2005, 16) for similar results for word-final dark /ɬ/ in Majorcan Catalan and clear /l/ in Valencian Catalan.

Before moving on to the question of labialisation in vocalising dark /ɬ/, I shall summarise the findings concerning tongue tip contact and its reduction.

- Loss of tongue tip contact is not abrupt. Rather, speakers display a great amount of variability, including partial contact and tongue tip movements toward the alveolar ridge without reaching them (undershooting), before attaining a stage in the sound change where they distinguish categorically between consonantal /ɬ/ and its vocalised evolution /ɯ~w/ which has the tongue tip lowered behind the lower incisors.

- The degree of darkness of dark /ɬ/ is independent from the rate of alveolar contact loss. Presumably, once the lateral is dark enough to meet the perceptual conditions for vocalisation (to be discussed below), the tongue tip gesture begins to become unstable in its own right.

- The most favourable environment for the evolution of vocalised /ɫ/ is the preconsonantal position, except for the position before alveolar (dental, palatoalveolar) consonants, where tongue tip contact is generally maintained. In word-final position, the evolution seems to expand from prepausal environments and those with a following consonant-initial word to the word-final position before a vowel-initial word. Loss of alveolar contact in intervocalic position is rare.

- Desynchronisation of voicing with alveolar tongue tip closure in word-final /ɫ/ may lead to the perception of a shortened closure period or to no closure period at all.

2.1.2.2   *Labialisation in vocalising /ɫ/*

It had been mentioned above that some variants of vocalising or vocalised /ɫ/ are accompanied by some degree of lip-rounding. No phonetic study has been dedicated specifically to this aspect of /ɫ/-vocalisation, and the observations reported below are therefore scarce.

In the Brazilian Portuguese dialects studied by Feldman (1972), a small degree of labialisation occurs in the dark lateral of the São Paulo region, whose alveolar tongue tip contact was loosening, while the fully vocalised variant of the Rio de Janeiro variety was accompanied by lip-rounding (see above on page 47).

Likewise, the London English speaker of Scobbie and Wrench's (2003) study presented both a lowered tongue tip and labialisation in his vocalised /ɫ/, but Wrench and Scobbie (2003)'s subject JS, who also had a lowered tongue tip in /ɫ/, showed raising of the upper lip only, thereby distinguishing vocalised /ɫ/ from /w/, which had full lip-rounding.

Given that labialisation seems to coöccur exclusively with variants of vocalised /ɫ/ in which the tongue tip is categorically lowered, it can be suggested that it is a reinterpretation of /ɯ/ (= vocalised /ɫ/) where this newly emerged sound is categorised with a similar sound already existing in the language, such as /w/ or one of the back rounded vowels. I will discuss the implications of this assumption for the explanation of the sound change in 2.1.3 below.

2.1.2.3   *The role of perception in the vocalisation of /ɫ/*

What has been said above indicates that a point seems to exist where the vocalisation process moves to a stage in which the vocalised /ɫ/ loses its tongue tip gesture, but acquires lip-rounding. In all likelihood, this step in the evolution of /ɫ/ is due to perceptual recategorisation, and this recategorisation as /w/ can be called vocalisation from the vantage point of perception, as opposed to the articulatorily-defined loss of tongue tip contact (see Recasens and Espinosa 2010*b*, 1). The first to suggest this on the basis of acoustic evidence seems to be von

Essen in his 1964 article on /ɬ/-vocalisation, and he is closely followed in doing so by Jonasson (1971, 32, 47) and Ohala (1974, 256-258). As Recasens (1996, 70) points out, this acoustic similarity of /ɬ/ and /w/ is greater in syllable-final position than it is in syllable-initial position. Apart from the timing relations of the tongue body and tongue tip gestures for dark /ɬ/ in syllable-initial position discussed in Chapter 1, lip-rounding for /w/ in syllable-final position is less extreme and also the tongue body may be less retracted, leading to higher frequencies of the first and second formant which approach the values for syllable-final /ɬ/, although the third formant continues to distinguish the two sounds (/w/ has a lower F3 due to lip-rounding, Recasens (1996, 70, footnote 6)). Although formant transitions may be very similar for both sounds, changes in the formant bandwidths and the glottal source for /ɬ/ result in a more abrupt transition from vowel to lateral than from vowel to glide (Prahler 1998, 45). Moreover, /ɬ/ but not /w/ has a zero in its transfer function (Recasens and Espinosa 2010a, 74), at least as long as the lateral side channels in vocalising /ɬ/ are maintained. This acoustic similarity was in fact put to verification by authors such as Faure (1972, 120-121), who found that the spectral characteristics of the dark /ɬ/ of his South African English speaker were extremely close to those of his /w/.

Three studies have investigated the effects of these acoustic similarities between /ɬ/ and /w/ in relation to factors such as syllable position and phonetic contexts. All of them take their material from Catalan. Martín Mota (2005) tested the influence of vowel quality and consonant place of articulation in the perception of /ɬ/-vocalisation in preconsonantal position (i.e., word-finally before a consonant-initial word) position. In his real-word stimuli, the vowel preceding the lateral was either /a/ or /ɛ/, the consonant following the lateral one of /p, t, k/, and the vowel following this cluster either /i/ or /u/. The stimuli were uttered by an Eastern Catalan speaker who produced non-vocalised dark /ɬ/s. The listeners, who were fluent in both Aranese Gascon Occitan and Catalan, were asked in a forced-choice test to decide whether the stimulus belonged to Aranese (where /ɬ/-vocalisation has occurred historically, see above on page 38) or to Catalan. The only cue that could be used to distinguish these two closely-related languages was the perceived presence or absence of vocalised /ɬ/. Martín Mota's results show that a following velar stop "yielded the highest number of vocalized-l percepts [. . .], followed by /l#t/ [. . .] and /l#p/ [. . .]" (Martín Mota 2005, 48). Also, /a/ as the preceding vowel led to greater rates of perception of vocalisation (78%) than when the lateral followed /ɛ/ (22%) (Martín Mota 2005, 51, table 3). As for the vowel following the lateral + stop cluster, /u/ favoured perception of vocalisation much more than /i/ did (64% vs. 36% of vocalised /ɬ/-percepts) (Martín Mota 2005, 52, table 5). Moreover, a following /u/ had the effect of levelling perception across

consonants, presumably due to anticipatory lip-rounding, by increasing the number of percepts of vocalised /ɫ/ in the context of /p/ and /t/.

Recasens and Espinosa (2010a) conducted a perceptual experiment using stimuli from Majorcan Catalan in order to find out which factors may be responsible for perceiving a preconsonantal dark /ɫ/ as vocalised. They presented listeners with stimuli containing either preconsonantal /ɫ/ or /w/, where the consonant was either one of /b, d, g/ and vowel context either /ɔ/ or /ə/, and asked them to categorise the stimuli in a forced-choice test (Recasens and Espinosa 2010a, 74-77). The /ɫ/ stimuli, all from natural speech tokens, were classified according to tongue tip contact degree (low or high) and to height of F2 (low or high). Laterals before /d/ always had a full tongue tip closure, as in the EPG study by Recasens (2009) reported above (2.1.2.1). Their results point to some degree of perceptual confusion of /w/ and /ɫ/, in that the percentage of correct identification of /w/ did not exceed 70%, but they caution that this may be due to methodology. Overall, when looking at incorrect identification of /ɫ/, "the percentage of /w/ identification responses decreases with the cluster taken into consideration in the progression /lb/ (24%) > /ls, lk/ (13-16%) > /ld/ (about 3%)"[35] (Recasens and Espinosa 2010a, 77). Only with the /lb/-cluster was incorrect identification significantly higher for stimuli having both a low degree of alveolar contact and a low F2, whereas for the other clusters, this tendency was only numerical (Recasens and Espinosa 2010a, 78).

The results obtained by the two experiments on Catalan, despite their similar methodology, are quite different. While the very low numbers of miscategorisation of /ɫ/ as /w/ in the alveolar context found by Recasens and Espinosa (2010a) corresponds to the predictions arising from interpretation of the articulatory data obtained from the studies reported above,[36] this was not confirmed in the experiment carried out by Martín Mota (2005). It is likely that more data and more detailed studies are needed to throw further light on the respective roles of perception and place of articulation of the following consonant in the evolution of /ɫ/-vocalisation.[37]

---

35 The laterals in the stimuli were lengthened (Recasens and Espinosa 2010a, 77), so there may be some reason to believe that lower percentages of correct identification would have occurred with naturally shorter sounds.

36 In fact, this is also to be expected on the grounds that the lateral is clearer preceding an alveolar stop than either a velar or labial stop, e.g., in Spanish, where the difference between the lateral in the one condition and in the other can amount to 1 Bark in the F2-F1 distance (see Quilis et al. 1979, 329, 331-334, 337).

37 A recent study (Honorof et al. 2011) tested to what extent speakers would imitate intervocalic /l/ and (vocalised) /ɫ/ in rapid shadowing. Of the five subjects tested, one didn't imitate at all, one over-imitated by adding lip-rounding to his dark lateral, and three imitated fairly well, although none of the imitating subjects reproduced the absence of tongue tip movement in the model /ɫ/. It would be interesting to know how fast the subjects would converge on the model speaker's acoustic distinction of /l/ and /ɫ/ if the exercise was repeated over several sessions.

A further perceptual experiment conducted by Recasens and Espinosa (2010*b*) on Catalan looked closer at the question of whether formant frequency values or temporal variation in formant frequency transitions would contribute more to the vocalisation of /ɫ/. A lower F2 in the lateral would render it acoustically more akin to /w/, since the range of the frequency drop from the vowel into the lateral would increase, whereas longer formant transitions resulting from a greater lag between tongue body and tongue tip gestures in syllable-final /ɫ/ would lead to a better perception of the earlier occurring tongue body component in the dark lateral (Recasens and Espinosa 2010*b*, 5). In order to sort out the relative contribution of height of F2 and of the duration of the transitions from the preceding vowel into the preconsonantal lateral, they presented listeners with synthetic speech stimuli of a dark lateral in prelabial position after /a/ where the F2 of the lateral in its steady-state portion as well as the timing of the formant transitions from the preceding vowel to the lateral were systematically varied. Their findings indicate that, while both acoustic cues, low F2 and transition length, contribute, possibly in conjunction, to the perception of /ɫ/-vocalisation, a low second formant in the lateral plays a greater role in this process than the duration of the formant transitions (Recasens and Espinosa 2010*b*, 16). This would also indicate that there exist two different pathways leading to /ɫ/-vocalisation: 1. direct recategorisation of /ɫ/ as /w/, based on F2 height, 2. recategorisation as an excrescent /w/ of the acoustic effects of the tongue body gesture alone as a consequence of greater prominence attributed to the formant transitions, and later negligence of the tongue tip gesture in the /wɫ/ cluster. Both mechanisms may apply in conjunction with each other; however, based on their results, the former one seems to be more readily used than the latter (Recasens and Espinosa 2010*b*, 21). It will be interesting to see in future studies whether the relative weight of the two possible evolutionary pathways differ according to the quality of the preceding vowel or to the place of articulation of the following consonant.

Finally, while not primarily concerned with sound change, Roussel and Oxley (2010) presented in a perceptual experiment a small number of American English listeners with American English stimuli of the type /ɚˈɫi/ and /ɚˈɫow/, where dark /ɫ/ was in word-initial position (preceded by the indefinite article "a") and which were truncated to different degrees, and asked them to transcribe what they heard in a free-choice test. They found that identification of /ɫ/ hinged mainly on the perceptibility of the tongue tip release. In particular, identification rates were close to chance level when the stimuli were truncated at the steady-state midpoint of the lateral and those stimuli which presented reduced acoustic energy in the higher frequency

regions were especially prone to misperception of /ɫ/ as /w/[38], even when they were presented to listeners in their entirety (Roussel and Oxley 2010, 462-463, 468-469).

2.1.2.4   *Vowel breaking and backing due to dark /ɫ/*

As could be gleaned from the data presented in 2.2.1 above, a vowel preceding a dark lateral in syllable-final position can be affected by the lateral's tongue body component to varying degrees which can go from simple backing effects to diphthongisation. This seems to affect front vowels in most spectacular ways, as in Lat. BELLUM > Lemosin Occitan [ˈbjaʷ] "bèl" ('nice') (here Juòus (23) (ALAL 25)). In this section, I will review studies that investigate the interaction of the vowel's and the lateral's tongue body gestures as well as their acoustic consequences.

Already at the beginning of the 20th century, phoneticians such as Colton (1909, 112) found that a lateral may darken its preceding vowel,[39] and this influence has been shown to exist in other languages as well (see, e.g., Lehiste (1964, 10, also p. 26) for Midwestern American English). This backing and lowering influence exerted from the dark lateral onto the vowel is stronger when the lateral is in preconsonantal position than when it is in intervocalic position, as could be observed from a comparison of the European Portuguese words /ˈsɛɫtɐ/ "celta" ('celtic') and /ˈsɛɫɐ/ "sela" ('saddle') (Andrade 1999, 545-546), which is an argument in favour of the gestural overlap being greater in the former condition than in the latter. The same situation holds for the syllable-final dark /ɫ/ of Dutch. Here, the lateral provokes a lowering of the second formant of a preceding mid vowel (this is retraction rather than centralisation). Moreover, it seems to lengthen any preceding vowel, thereby blurring the distinction between phonological long and short vowels in this language (Botma, Sebregts and Smakman (2010), acoustic analysis).[40]

In fact, the acoustic effects of laterals (and rhotics) extend much farther than to the preceding vowel only, as shown by Heid and Hawkins (2000) for Southern British English clear /l/ and /ɹ/. They found that "anticipatory liquid resonance effects can be observed up to 5 syllables, and 0.5-1 s before the conditioning /r/ or /l/. The long-range resonance effect is not necessarily blocked by stressed syllables" (Heid and Hawkins 2000, 80).

---

38 Misperception of /ɫ/ could also yield /n/ or /nɫ/-responses (Roussel and Oxley 2010, 463, 468).

39 Although this observation has been made with respect to Spanish clear /l/, see Proctor (2009) for the presence of a tongue body gesture in this sound.

40 In Dutch, there is a tense-lax vowel contrast. Botma et al. (2010) observed that some speakers blurred the length contrast, but not the quality contrast, whereas the opposite (blurring of qualitative contrast with maintenance of the durational contrast) did not occur. They conclude that length is an enhancing feature of tenseness, with tense vowels having farther-away gestural targets.

That the lowering of F2 of the preceding vowel, most noticeable in front vowels, is brought about by tongue dorsum lowering and/or retraction has been confirmed by Recasens and Farnetani (1994, 201-202) in an examination of word-final /iɫ/ and /il/-sequences in Catalan, American English, and Italian via acoustic analysis and electropalatography. Early in the vowel, dorsopalatal contact began to decrease in all three languages, which means that F2 decreased concomitantly, conferring to the vowel a diphthongal character. With the Italian clear lateral, this was less marked as with the two dark /ɫ/-languages. This mechanism has been studied in more detail by Recasens, Pallarès and Fontdevila (1997) for intervocalic /ɫ/ for which the vowel context was either /i/ or /a/. The slope of F2 of the high front vowel /i/ down to /ɫ/ amounted to a difference of 811 Hz, whereas from /a/ to /ɫ/, F2 fell only 243 Hz (Recasens, Pallarès and Fontdevila 1997, 548). Moreover, as results from their figure 2 (p. 548), the downward trajectory of F2 begins earlier in the case of /i/ than in /a/; and the same can be said for the temporal effects and the magnitude of carryover from the lateral onto the following vowel. Similar findings had been obtained for Catalan as well a decade earlier in a small study by Widdison (1989), although in his study, the greatest differences in F2 of a vowel before /ɫ/ vs. before /k/ (his control condition) occurred with the mid front vowels /e/ and /ɛ/. This is in line with these vowels but not /i/ undergoing diphthongisation before /ɫ/ e.g. in French, and may be attributed to /i/ being more constrained on the articulatory level than are the mid front vowels. Additionally, Widdison (1989) found that vowel length also increased as an effect of a following dark /ɫ/, as it did in Dutch (see above on the facing page). Presumably, lengthening is conducive to the perception of diphthongisation.

On the other hand, the emergence of a schwa in high vowel + lateral sequences in American English has been shown not to increase the syllable rhyme's duration by itself. Its acoustic and articulatory manifestation is simply a by-product of the tongue body movement from a high front position in the vowel to the retracted position in the dark lateral (Gick and Wilson 2001, acoustic and ultrasound study).

Support for articulatory backing also comes from an electromyographic study undertaken by Leidner (1976) on American English. He found greater activity in the genioglossus muscle during the low vowel /a/ when the following /ɫ/ was in preconsonantal or word-final position rather than in intervocalic position, which he attributed to an anticipation of the backing gesture of the lateral (Leidner 1976, 332, 334).[41] Moreover, in his study, it turned out that muscle activity of the styloglossus, also responsible for tongue retraction, was greater after the high front vowel /i/ than after /a/, and least after /u/. He

---

41 The fact that this backing of a low vowel leads less commonly to sound change than when it affects front vowels might be due to /a/'s having a greater acoustic-perceptual space than the front vowel series and thus tolerating variants more easily.

suggests that less activity is needed when the articulatory trajectory is shorter, i.e., that after low and back vowels, the tongue is already in a position close to that for the dark lateral, and less muscular effort will be required for the vowel-lateral transition movement (Leidner 1976, 334).

The findings presented above lead to the conclusion that diphthongisation of high and mid front vowels in Occitan and other languages is most probably due to recategorisation of the falling F2 (which is accompanied in most cases by a rising F1, thereby a decreasing Δ F2-F1), due to tongue body repositioning in the vowel-lateral transition, as an excrescent vocalic element whose acoustic quality will range somewhere in the back or low vowel spectrum, according to the individual trajectory of the retracting tongue body. In fact, it is possible that the mere falling movement is enough for the listener to perceive the vowel as diphthongised, even if the F2 doesn't attain values as low as for low and back vowels (cf. the dynamic approach by Carré, Pellegrino and Divenyi (2007)). Once this vocalic element gained its firm place in the mental representation of a word, chances are that it would be assimilated to one of the vowels already present in the language. In the case of the evolution of the Latin word FĪLUM to /ˈfjal/ or /ˈfjaʷ/, for instance, we would suppose that one stage of the evolution included a pronunciation /ˈfiɐ̯ɫ/. Shifting of the stress, which, in the case of Occitan occurred in other /ia/-sequences as well, can be ascribed to the fact that stress is much more reliably perceived on /a/ than it is on /i/ (Ortega-Llebaria, Prieto and Vanrell 2007). Note that vowel diphthongisation is independent of tongue tip reduction in the lateral.

2.1.3 *Explaining /ɫ/-vocalisation*

The whys and wherefores of /ɫ/-vocalisation have occupied the minds of linguists, especially Romance scholars, for a very long time. This isn't the place to review all of the proposals and hypotheses entertained by every single researcher, for often advances in explaining the sound change have only been meaningful since the advent of more precise instrumental studies. Voelkel (1888, 30-40) provides an extensive review of the literature and explanations of the phenomenon up to the date of his publication, showing that much was not understood at the time. For a survey of explanations of /ɫ/-vocalisation up to 1968, see Straka (1979, 385-387) (up to 1942: Straka 1942, 8-10). Nevertheless, selected proposals from earlier scholars will be discussed in this section.

But before turning to explanations based on phonetic evidence, let me briefly review some approaches from phonologists of diverse theoretical backgrounds. In a spirit of structuralism, De Martino (2000, 220-221, footnote 10) sees the vocalisation of the preconsonantal lateral in the /alC/-sequence in French as a reaction to the assumed prior

monophthongisation of Lat. /aw/ in order to close the gap left by this sound change. He insists that, given these structural requirements, there is no need for any dark lateral to be involved in the vocalisation of /alC/; indeed, any dark /ɫ/ found today in Romance should be an innovation with respect to Latin.[42] It almost goes without saying that De Martino (2000) overlooked at least two important counter-arguments: 1. His logic implies that a further sound change should close the gap left by original /alC/ yet this hasn't occurred; 2. South-ern Occitan dialects and Gascon do have /ɫ/-vocalisation, but not monophthongisation of /aw/.

In a Feature Geometry framework applied to /ɫ/-vocalisation, then, Molinu (2009) starts from a clear lateral to arrive first at /ɫ/ and then at /w/. In her approach, it is the preceding vowel that is responsible for darkening the lateral, by simple virtue of its being vocalic and the lateral being in syllable coda position: the vowel spreads its dorsal component onto the lateral, rather than the lateral having a dorsal gesture by itself. Unfortunately, the use of a spreading mechanism allows only for very simplified modelling of the process at hand. Further vocalisation into /w/ would take place, then, by applying a repair strategy to the marked segment /ɫ/ (which is thought to be default-marked by Universal Grammar because of the complexity induced by the secondary articulation).

An Optimality Theoretic account of /ɫ/-vocalisation is offered by Johnson and Britain (2007, 304-312). Unfortunately, the account works mainly by restating observations of language data in terms of con-straints, which are then called for to explain the observed language data. According to their study, /ɫ/-vocalisation comes about through the existence in the relevant grammar of the following ~~commandment~~ constraint: "*COR[LAT]/rhyme: Do not perform the coronal gesture of the lateral in the rhyme of the syllable" (Johnson and Britain 2007, 305). This negative constraint outranks FAITH[COR] in the case of /ɫ/-vocalisation. Another example of /ɫ/-vocalisation from an OT perspective may be found in Borowsky (2001) whose constraints are also rather formalisations of observed phenomena, without much explanatory value.[43]

---

42 A similar view, but outside of any phonological current, is entertained by both Nandris (1965, 941) and Valle (1977, 13, 15); the latter author's point, as well as De Martino's, is that plain /l/, just like /ɫ/, would vocalise equally easily to /w/ when tongue tip contact is lost, but unfortunately she doesn't back this claim up by any phonetic data worth their name.

43 "The best nucleus is that which contains the most vocalic element; and clearly in the circumstances in which a dark l occurs in a syllable nucleus the dorsal gesture will be favoured since it is the more vocalic gesture. The coronal gesture is marked; it is too consonantal for a nuclear position. [. . .] What these constraints say is that it is better to be a coronal in an onset or a dorsal in a coda or nucleus than it would be to be a dorsal in an onset or a coronal in a nucleus or coda." (Borowsky 2001, 72) Similarly Valle (1977, 12).

Having rather rapidly surveyed strictly phonological approaches to /ɫ/-vocalisation, I shall now turn to explanations based on the phonetic data discussed in 2.1.2.

The traditional articulatory account assumes that alveolar contact loss causes a reduced variant of the lateral to sound more /w/-like, because of the similar tongue body configuration in the two sounds. Tongue tip contact loss would follow a universal tendency for articulatory weakening in syllable-final position (Recasens 1996, 68, Recasens and Espinosa 2010*a*, 72, see also already Haas 1889, 4-5). For instance, de Kolovrat (1923*a*, 300-301) explains the greater frequency of /ɫ/-vocalisation in preconsonantal than in word-final position by cluster simplification called for by the principle of least articulatory effort – an explanation which still today will sound perfectly reasonable to some. He adds, still under the heading of the least effort principle, as a further argument the assimilation of /ɫ/ to the preceding vowel, which could be understood as gestural blending. Straka (1942, 10) objects to this view by pointing out that articulatory weakening is not teleological – rather, he considers it to have independent causes, but may, as a side-effect, lead to easier articulatory patterns (Straka 1942, 24).

It is then Straka who follows the articulatory explanation through to the very end (Straka 1942, 18-27 and Straka 1979, 388-393).[44] According to him, the preconsonantal position is characterised by its propensity to weaken the articulation of the consonant which happens to find itself there.[45] For the lateral, this would result, he argues, in muscular relaxation, tongue lowering and progressive detachment of the tongue from the roof of the mouth (Straka 1942, 18). The resulting sound, however, would not be a true dark /ɫ/, but simply a weakened /l/, for a true dark lateral would keep its tongue tip contact, in the view of Straka (1942, 21),Straka (1979, 390).[46] Tongue body raising and backing, which he thinks to have some kind of compensatory function, is for him necessarily subsequent to tongue tip contact loss. This order of events, he says, needs to be assumed for otherwise, elision of the lateral in the syllable coda could not be adequately explained

---

44 Before him, Grammont (1933, 207-208) attempted to give an articulatory account for the Romance phenomenon of /ɫ/ vocalising before alveolars but not labials and velars. In short, he proposed that vocalisation of /ɫ/ in lateral + alveolar sequences is due to articulatory dissimilation of the tongue tip movement, in that forming a tongue tip closure twice in a row (once for the lateral and once for the alveolar stop) would consume too much articulatory energy, whereas a rapid transition of tongue tip movement would be feasible in the case of the lateral followed by a stop whose articulation involves lowering of the tongue tip. An additional reason for the dissimilation would be the desire to prevent assimilation in the name of segmental integrity.

45 On the other hand, in strong positions, such as in word-initial position, there is more tongue tip (and blade) contact on the palate; in other words, /l/ in this position would be more likely to palatalise as a result of fortition effects (Straka 1942, 20).

46 One could ask, of course, whether the Latin grammarians would have noted the difference between the two kinds of lateral if it was simply weakened.

(Straka 1942, 23, footnote 1, Straka 1979, 391, footnote 89). Subsequent labialisation had previously been explained as a means to enhance the grave quality of the vocalised /ɫ/ by Ščerba (1910-1911, 284) by way of a "substitution inconsciente par la voie acoustique", but Straka points out that weak labialisation of back vowels in languages such as Polish may explain why vocalised /ɫ/ does not show a strong labialisation there (Straka 1979, 392). In the final stage of the evolution, vocalised /ɫ/ would be recategorised as a back vowel (Straka 1979, 392).

Predictions derived from the phonetic studies described in 2.1.2 above state that /ɫ/-vocalisation should take place first before labial and velar consonants, and then word-finally before consonant-initial words (presumably also beginning with labials and velars) and in prepausal position before extending to all word-final positions. The preconsonantal position before alveolars is expected to maintain non-vocalised /ɫ/ longest. As we have seen in 2.2.1 and 2.1.2 above, the historical evolution of /ɫ/-vocalisation in Romance does not conform to this predicted path, since here the first attestations of the sound change occur precisely before alveolar consonants. The fact that a handful of Occitan varieties (Northern and Eastern Roergat and Gevaudan Lengadocian), by vocalising /ɫ/ only in preconsonantal position before labial and velar consonants, developed along the predicted lines raises rather more questions than it answers. Recasens (1996, 68-69) concludes from this paradoxical situation that the Romance sound change originated in misperception rather than in articulatory reduction processes alone.

Again, Straka seems to be the first to try and make sense of the Romance developmental path from an articulatory point of view. While the fact that /ɫ/-vocalisation occurred preferentially after the vowel /a/ can be attributed, he argues, to the opening influence of this vowel onto the tongue body position of the lateral, it is precisely the alveolarity of the following stop which leaves the lateral no choice but to vocalise in order to resolve a situation resembling an articulatory double-bind. The syllable coda position asks for weakening, while assimilation to the following consonant would constitute a strengthening process – the lateral ends up giving in altogether and loses tongue tip contact (Straka 1942, 26, Straka 1979, 393).[47]

As mentioned above, Straka doesn't think that weakening processes are universal in the sense that they occur in languages everywhere and at all times. Rather, he looks for specific circumstances that would explain the sound change, which, it has become clear, is a case of weakening for him, and notes that other preconsonantal consonants, too, underwent weakening and elision during the same period which saw the evolution of /ɫ/-vocalisation, namely the 7th century for

---

47 Nevertheless, he also stresses the importance of the acoustic consequences of articulatory release of the lateral (Straka 1979, 410), which is, of course, masked by the following consonant.

Gallo-Romance (Straka 1979, 412). He attributes it to the particular circumstances of a period of nutritional deficiencies caused by episodes of war and famine that would have led to a generalised loss of muscle tonus (Straka 1979, 284-286).[48]

Finally, since he distinguishes a true dark /ɫ/, which for him requires a certain amount of articulatory energy, from the dark lateral which proceeds from articulatory weakening processes, he needs to find an explanation for /ɫ/-vocalisation in those languages such as the Slavic languages which possess, according to him, a true dark /ɫ/. As inherent weakness of the sound is not a viable explanation for him, he posits a generalised articulatory weakening as the only possibility to affect /ɫ/ in these languages to an extent which could eventually result in vocalisation (Straka 1942, 30-32).

A more contemporary articulatory explanation of /ɫ/-vocalisation can be couched within the framework of Articulatory Phonology (Browman and Goldstein, e.g. 1992) (cf. Section 1.3). Given the fact that the tongue body gesture occurs earlier in time than the tongue tip gesture in the case of a preconsonantal dark lateral, the tongue tip gesture would merge with that of a following alveolar stop. Reinterpretation of the tongue body gesture as an autonomous gesture of phonological status (yielding the percept of /w ~ ɰ/) could then ensue (Recasens 1996, 63, 81-82). Recasens further points out (1996, 82) that an Articulatory Phonology account would assume /ɫ/ to merge or to be overlapped prior to /w/ receiving its phonemic status, which would be contradicted by dialectological data containing the sequence /awɫt/ such as occurs in Germanic dialects. If merger were a prerequisite for reinterpretion of the tongue body gesture of /ɫ/, which, in the absence of an identifiable tongue tip gesture, had lost its identity as a lateral, then, vocalisation should occur only in those circumstances where the tongue tip gesture was given the prior opportunity to merge with a homorganic stop. As this is only possible in the case of adjacent homorganic consonants, vocalisation before labials and velars would remain a puzzle (before labials, of course, masking of the tongue tip gesture by the lip gesture is possible).

One as yet unresolved difficulty with an account of /ɫ/-vocalisation in the spirit of Articulatory Phonology is the fact that the status of laterality as a gesture or as a side-effect of the interplay of the tongue body and the tongue tip gestures has not reached consensus (see the discussion of this question above in Section 1.3). If, as discussed there, a dark /ɫ/ can indeed lack an active lateral gesture and its laterality were due to the simultaneous presence of the tongue tip at its alveodental target and of a backed tongue body leading to tongue elongation which, in turn, would facilitate the formation of

_____

48 Before arriving at this hypothesis, Straka (1942, 27) subscribed to a widespread version of substrate hypothesis, which claimed that Gaulish had imported lenition into the Latin language spoken in Gaul. Thus, an already weakened dark /ɫ/ of Latin could have been encouraged in its vocalisation process by the Gaulish substrate.

side channels, this gestural configuration would still be in place even if the tongue tip merges with that of the following alveolar stop. In order for the lateral to disappear, listeners would need to discount the perceived laterality as a side-effect of gestural coordination. It is true that, in order to do so, the tongue body gesture would need to 'make phonological sense' to the listeners, i.e., be assigned a status of its own, /w/ or /ɥ/. Nevertheless, as for the Rhaeto-Romance and Germanic data presenting sequences of /awɫt/, it should not be forgotten that these transcriptions come to us from dialectological field studies and do not tell us directly about the presence or absence of a lateral element in the intended gestural configuration of the speakers. On the other hand, it may well be that only the appearance of a lip-rounding gesture on the vocalising /ɫ/ may be truly indicative of the tongue body gesture having achieved an interpretation independent of the lateral, and that the transcription /awɫt/ is an imprecise way to mean /aɥɫt/. In this sense, vocalisation of /ɫ/ before alveolars would be a perceptual dissimilation, i.e., a discounting of acoustic cues as attributable to the phonetic environment, leading to hypercorrection and a to reconfiguration of the gestural representation of the sequence in the mind of the language users.

As we have seen above in 2.2.1 and 2.1.2.4, an excrescent vocalic element can emerge from the dark lateral without tongue tip contact loss occurring. In some cases, such as in Occitan (/ˈfjal/ < Lat. FĪLUM), the lateral can even become clear again after its backed tongue body gesture had been recategorised as a vocalic element. It is thus likely that also in the case of preconsonantal /ɫ/, diphthongisation of the preceding vowel, i.e., an evolution along the lines /VɫC/ > /VɥɫC ~ VwɫC/ > /VwC/ is part of the sound change, as is also assumed by Recasens (1996, 77-78) and Recasens and Espinosa (2010a, 73) and Recasens and Espinosa (2010b, 4).[49]

Acoustic aspects offer further parts of the puzzle: they predict that in preconsonantal position, the lateral should be darker before labial and velar consonants, through anticipatory lip narrowing in the case of the labial and anticipatory tongue dorsum backing in the case of the velar consonant. Alveolar (and more so, palatal) consonants, on the other hand, should contribute to less dark laterals preceding them as they come with a repositioning of the tongue body in terms of predorsum raising (Recasens 1996, 71). In extreme cases, this could lead to a hypothetical situation in which a language would have clear laterals before alveolar (and palatal) consonants, and dark laterals before labials and velars. I have not been able to find a language or dialect in which there is a clear allophonic split in this sense, but there seems indeed to be a tendency toward somewhat clearer sounds immediately preceding alveolar (and, of course, palatal) consonants. But in the case of a language or dialect having particularly dark /ɫ/s

---

49 This is also the point of view of Grammont (1933, 207) and Tuttle (1991, 580).

in all preconsonantal positions such as the languages where the sound change is ongoing or where /ɫ/-vocalisation occurs in synchronic variation (for Catalan, see the data in Recasens (1996, 72)), even those laterals before alveolar consonants can be dark enough to allow for a reinterpretation in terms of /w ~ ɥ/ (see also Recasens and Espinosa (2010a, 74), and recall that, in dark laterals, the exact degree of darkness is independent from rate of tongue tip contact, 2.1.2.1). In this case, "active tongue dorsum lowering and backing for this consonant blocks to a large extent tongue dorsum fronting and raising effects exerted by following /t/; [...]" (Recasens 1996, 72-73).[50]

While merger of the tongue tip gesture with that of a following alveolar consonant or masking of it by the lip-narrowing gesture of a following labial consonant can explain the perceptual negligence of its acoustic cues, tongue tip contact loss in prevelar and prepausal position would need to be accounted for differently. Tongue tip contact loss in prepausal position is most likely attributed to the timing of voicing offset with respect to the tongue tip closure movement (see 2.1.2.1 above), namely that the tongue tip loses its perceptibility when it falls into the unvoiced portion of the consonant and occurs only after voicing has ceased. Moreover, in addition to the vowel lengthening provoked by the dark lateral itself, word-final lengthening may also contribute to a more prominent downward movement of the second formant during the transition from vowel to lateral (Recasens 1996, 83). As for the prevelar position, the explanation seems to be less straightforward at the moment. One element of explanation could be the fact that dark laterals have more dental places of articulation, often advancing the tongue tip to touch the upper incisors or even moving to interdental position, as in the Occitan Lengadocian varieties of Upper Arièja. Since dental consonants, which are non-strident, are known to be less salient than alveolar ones, it could be supposed that a dental or even interdental tongue tip location will be less perceptible than when the closure takes place at the alveolar ridge.

It is, of course, not enough in the case of the Romance paradoxical evolution to explain why /ɫ/ vocalised first before alveolars, but we also need to gain an understanding of why vocalisation of /ɫ/ before labials and velars, phonetically the most favourable environments for the sound change, lagged behind in Romance. Recasens (1996, 80-81) thinks that listeners discounted the lateral's darkness in these environments since it can be predicted from its context. In this sense, the sound change would be as much a dissimilatory, or hypercorrective, process as before alveolar consonants. If this is the case, the developmental path predicted from the phonetic studies should be reversed, as far as the preconsonantal position is concerned.

---

50 In contrast, a following palatal consonant will cause anticipatory predorsum raising and fronting, and thus, F2 raising in the lateral (Recasens 1996, 75).

There is a further riddle in the evolution of /ɫ/-vocalisation, specifically in Romance: that it took place first, and sometimes only, after the vowel /a/. If salience of F2 transitions are essential for recategorising the falling movement of the second formant (or, more precisely, the narrowing of the distance between the first and the second formant), then front, and especially, high front vowels should be more favourable to allow for the emergence of a vocalic element than the low vowel /a/, since the longer time it takes after these vowels for the tongue body to retract leads to longer and more substantial VC transitions (Recasens 1996, 78, also Hardcastle and Barry 1989, 16).[51] This is in fact what we find when we look at the data of influence of dark /ɫ/ onto its preceding vowel (see 2.1.2.4 above), and also seems to be true for contemporary English /ɫ/-vocalisation (Hardcastle and Barry 1989). Recasens (1996, 78) concludes that "the F2 vowel transition for /al/ is probably salient enough in order for listeners to categorize it as an independent segment ([...])". A further, but less discussed, element for understanding the Romance case, already pointed out early in the literature on the subject (de Kolovrat 1923a, 284-285), is the high frequency of the diphthong /aw/ in the Latin language, which would have served as a model for recategorising a vocalising /aɫC/-sequence. The contribution of frequency effects in the understanding of the Romance sound change has in fact been considered very little so far.

Recall that phonetic studies predict /ɫ/-vocalisation to occur before labial and velar consonants before extending to the word-final position and then to the preconsonantal position before alveolars. What role does the respective frequency of occurrence of diphthongs ending in /w/ in Latin as the source language for Romance and the frequency of /Vɫ/ in this language play? To answer this question, I have retrieved token frequencies of /VɫC/ and /VwC/-sequences (where V = /a, e, i, o, u/ and C = /p, b, t, d, k, g/) from the 3.2 million word corpus of the *Perseus under PhiloLogic* corpus of Latin texts, and obtained type frequencies of these same sequences from the electronic version of the Lewis and Short (1879) Latin-English dictionary. While it is true that Classical Latin, the variety represented the most in this corpus, is not the direct language stage before /ɫ/-vocalisation developed, we do not have enough written evidence for the critical time span of the Proto-Romance period, let alone information about actual pronunciation. It is also true that some features of Proto-Romance will necessarily be neglected by using Classical Latin, such as all those words that underwent vowel syncope and constituted new environments for /ɫ/-vocalisation to develop, such as Lat. ʙᴇʟʟɪᴛāᴛᴇᴍ > Occ. "beutat".

---

51 Borowsky (2001, 86, endnote 11) proposes that, since the formant transitions from a high front vowel to a dark lateral are so salient, listeners would be more likely to factor them out in perception and not mistake them for a vocalic element. It would be interesting to test this prediction experimentally.

Table 6: Token frequencies (per million words) and type frequencies (in the Lewis & Short Latin dictionary) for /VɫC$_{labial}$/ and /VwC$_{labial}$/-sequences.

	Token frequency (per million words)	Type frequency (number of words in Lewis & Short)
/VɫC$_{labial}$/	1018.632	247
/VwC$_{labial}$/	465.183	55

Assuming that a phonetically-conditioned sound change such as that of /ɫ/-vocalisation before labial and velar consonants proceeds faster through frequent repetition, it can be predicted that if the token frequency of this sound sequence is high, it will accelerate the evolution. This is so because frequent repetition will lead to greater automation and temporal compression of the articulatory gestures present in the sequence (Bybee 2001, 11-12), and will also provide more opportunities for hearers to misperceive and hypocorrect a sequence. On the other hand, phonotactics is thought to operate over schemata which emerge from sound patterns existing in the language – the more frequent a sound pattern, the stronger its associated schema (Bybee 2001, 64, 93-95). One such schema formed over Latin sound patterns is /VwC/ ("a diphthong ending in /w/ followed by a consonant"), and another, more specific schema is /awt/ ("the diphthong /aw/ followed by a voiceless alveolar stop"). It is important to note that schemata exist at different levels of abstraction, and that language users seem to have access to these schemata at all these various levels (Bybee 2001, 93).

In the case of Latin laterals in preconsonantal position before labials and velars, we note that /Vw/-diphthongs before these consonants are present only as /aw/ and /ew/[52], with the latter belonging almost exclusively to words borrowed from Greek, whereas laterals can occur in preconsonantal position after any vowel. The type frequency of /VɫC$_{labial}$/ amounts to 247 different lexicon entries, and its token frequency to 1018.632 per million words. In comparison, the sequence /VwC$_{labial}$/ has a type frequency of 55, and a token frequency of 465.183 per million words (see Table 6 on page 80). The schema which states that a lateral occurs before labials is thus stronger than the one that states that a diphthong ending in /w/ can be found before these consonants, since the former encompasses more types than the latter (for the notion of strength of schemata emerging from type frequency, see Bybee (2001, 13)). This state of affairs in Latin seems to counteract the phonetic tendency for dark laterals to vocalise before

---

52 The sequence /iw/, spelled <iu>, was not taken into consideration, as it is graphically indistinguishable from the sequence /ju/.

Table 7: Token frequencies (per million words) and type frequencies (in the Lewis & Short Latin dictionary) for /VɫC$_{velar}$/ and /VwC$_{velar}$/-sequences.

	Token frequency (per million words)	Type frequency (number of words in Lewis & Short)
/VɫC$_{velar}$/	1739.634	441
/VwC$_{velar}$/	2043.768	542

Table 8: Token frequencies (per million words) and type frequencies (in the Lewis & Short Latin dictionary) for /VɫC$_{alveolar}$/ and /VwC$_{alveolar}$/-sequences.

	Token frequency (per million words)	Type frequency (number of words in Lewis & Short)
/VɫC$_{alveolar}$/	7184.314	510
/VwC$_{alveolar}$/	20742.434	345

labial consonants, discussed above. If we have a look at the situation before velar consonants, we find that /VɫC$_{velar}$/ with a type frequency of 441 and a token frequency of 1739,634 per million words is less strong (but not by much) than the corresponding /VwC$_{velar}$/ sequence with a type frequency of 542 and a token frequency of 2043.768 per million words (see Table 7 on page 81). In this case, both frequency effects and phonetic tendencies would contribute together to /ɫ/-vocalisation. In fact, vocalisation before velars but not labials occurs in some Italian dialects (some Lombard varieties, Bergamascan, the Venetian variety of Padova, as well as in the variety of Lecce) and the Gröden variety of Rhaeto-Romance (see above 2.1.1.2). On the other hand, we do not find selective vocalisation before labials but not velars in Romance.

When we move now to the position before alveolar consonants, an interesting situation emerges. Here, laterals before alveolar consonants have a greater type frequency (510) than diphthongs containing /w/ (345), but the token frequency of the /VwC$_{alveolar}$/ sequences is far greater than that of the /VɫC$_{alveolar}$/ sequences (20742.434 per million words and 7184.314 per million words, respectively) (see Table 8 on page 81). We can make greater sense of the situation when we break down these numbers: Recall that the first cases of /ɫ/-vocalisation are attested after the vowel /a/. When we compare /aɫC$_{alveolar}$/ (type frequency of 141 lexicon entries, token frequency of 2117.479 per million words) and /awC$_{alveolar}$/ (type frequency of 330 lexicon entries, token frequency of 10260.341 per million words) (see Table 9 on page

Table 9: Token frequencies (per million words) and type frequencies (in the Lewis & Short Latin dictionary) for /aɫC$_{alveolar}$/ and /awC$_{alveolar}$/-sequences.

	Token frequency (per million words)	Type frequency (number of words in Lewis & Short)
/aɫC$_{alveolar}$/	2117.479	141
/awC$_{alveolar}$/	10260.341	330

Table 10: Token frequencies (per million words) and type frequencies (in the Lewis & Short Latin dictionary) for /uɫC$_{alveolar}$/ and /uwC$_{alveolar}$/-sequences.

	Token frequency (per million words)	Type frequency (number of words in Lewis & Short)
/uɫC$_{alveolar}$/	4889.372	330
/uwC$_{alveolar}$/	0	0

82), we see the very clear result that the schema stating that before alveolar consonants, we should find that /aw/ is stronger than the corresponding schema about the /aɫC$_{alveolar}$/-sequence. Moreover, if there is sound change in this sound sequence, the greater token frequency of this sequence than of /VɫC$_{velar}$/ (1739.634 per million words) or /VɫC$_{labial}$/ (1018.632 per million words) would suggest that /ɫ/-vocalisation, once initiated, should progress faster before alveolars than elsewhere.

Conversely and interestingly enough, the situation is very different when the lateral follows the vowel /u/. As noted above, there is no diphthong /uw/ in Latin; consequently, the schema /uwC/ is inexistent. /uɫC$_{alveolar}$/, however, is quite frequent (type frequency: 330, token frequency: 4889.372 per million words), more frequent indeed than /aɫC$_{alveolar}$/ (see Table 10 on page 82). This would predict that the sequence /uɫC$_{alveolar}$/ could constitute an exception to /ɫ/-vocalisation, and this is precisely what we find in Spanish (Voelkel 1888, 30, de Kolovrat 1923a, 222-223, Lausberg 1967, 45, §413, Straka 1979, 394; Lathrop 2003, 129) and Portuguese (Voelkel 1888, 30, de Kolovrat 1923a, 229, Piel 1932, 98-99, Meyer-Lübke 1934, 75-76). Here, the lateral eventually became clear and palatalised (e.g. Lat. multum > Sp. "mucho", Port. "muito"), an evolution which is first attested, according to de Kolovrat (1923a, 229), in medieval Portuguese manuscripts from the 11th century. Traditionally, this palatalisation has been considered to be a case of dissimilation (de Kolovrat 1923a, 229, Meyer-Lübke 1934, 75-76, Lathrop 2003, 129), but given the fre-

quency considerations discussed in this paragraph, the evolution may primarily have been a case of phonotactic conservatism before giving rise to the palatalisation processes.

2.1.4 *Conclusion*

It was mentioned at the beginning of this chapter that the vocalisation of dark /ɫ/ in preconsonantal and word-final position is probably the one sound change affecting the lateral which has attracted the most scholarly attention. Yet, even after so much ink has flowed and so many experiments have been conducted on this matter, we only begin to understand the mechanisms behind its evolution. We have a fairly good understanding of the fact that the tongue tip gesture persists some time after it has lost the habit of making contact with the alveolar ridge or the region behind the upper incisors; we know that labialisation only begins to appear when the tongue tip movement is no longer part of the gestural configuration of the lateral, namely when it loses its identity as a lateral and becomes recategorised as a labio-velar approximant; we have an idea of how vowel breaking, especially front vowel diphthongisation, can come about through the interaction of the vowel's and the lateral's tongue body gestures and the shape of the formant transitions that result from this; but we have still too few perception studies on the phenomenon to draw reliable conclusions (2.1.2.3) – this is a domain in which we will probably gain much more understanding in the years to come.

The explanations offered in 2.1.3, albeit relying on the studies reported in 2.1.2, are in many details still working hypotheses. We only begin to understand how place of articulation affects the process of /ɫ/-vocalisation, and this mainly for stops. We cannot directly infer from the phonetic research carried out so far whether the articulatory and perceptual conditions for /ɫ/-vocalisation are transferable to environments composed of fricative consonants, for instance. Especially, Romance /ɫ/-vocalisation, with its unexpected evolution, will continue to spur more detailed studies – not only with respect to the dialectal distribution of the phenomenon (this is indeed already a venerable tradition), but by asking the question what the conditions of its mother tongue, Latin, particularly Late Latin, were that would make /ɫ/-vocalisation take the path it did.

2.2 VOCALISATION OF DARK /ɫ/ IN INTERVOCALIC POSITION

Although intervocalic vocalisation of /ɫ/ is expected to be a rare evolution, it did occur in some Occitan and other Romance varieties. This section will describe the phenomenon and discuss the possible mechanisms that could have led to its emergence.

2.2.1   *The geographic and historical expansion of /ɫ/-vocalisation in intervocalic position*

2.2.1.1   *Developments of intervocalic /ɫ/ in Auvernhat Occitan and other Occitan varieties*

It was mentioned at the beginning of this chapter that some Occitan varieties have a dark lateral even in intervocalic position. These include the varieties close to the linguistic border with Catalan, for instance in the Lengadocian variety of Lo Pòrt (Upper Arièja) (Companys 1953, 194, see above 2.1.1.1), and in the far east of the Occitan area the varieties spoken in the Valadas Occitanas. In these varieties, the preconsonantal and word-final laterals are dark as well (see above 2.1.1.1) (Ronjat 1932, 143, §300, 206, § 331γ2, 307, § 395α).

While vocalisation of dark /ɫ/ is much rarer in intervocalic than in preconsonantal or word-final position, one area studied in great detail by Dauzat (1938) and Camproux (1962) in its entirety and by Straka and Nauton (1947) for those varieties situated in the Naut-Léger departament in Auvernhat Occitan exhibits an amazing richness of developments of such an intervocalic dark lateral (see also Meyer-Lübke 1890, 408-409, §457). The geographical extension of this area is described by Dauzat (1938, 54) thus (an approximate rendering of these geographical indications can be seen on figure 5; see also Straka and Nauton (1947, 198) and their map on p. 237 for the fine geographical distribution in Naut-Léger departament):

> La zone actuelle d'altération correspond à la superficie de trois départements environ, soit: dans le Puy-de-Dôme, la majeure partie de l'arrondissement d'Issoire (sauf le nord-est) et quelques communes en bordure sud de l'arrondissement de Clermont ; les trois quarts environ du Cantal (excepté le coin S.-O. de l'arrondissement de Mauriac, l'O. et le S. de l'arrondissement d'Aurillac) ; dans l'Aveyron, la pointe N. de l'arrondissement d'Espalion ; les deux tiers de la Haute-Loire : arrondissement de Brioude, sauf la Chaise-Dieu, et du Puy, sauf un coin N.-E. (Craponne-Vorey) et la lisière S.-E. (Fay-le-Froid – Les Estables – Pradelles) ; les deux tiers de la Lozère, est, sud et sud-ouest exceptés.

Below I present in some detail the developments in Auvernhat Occitan; I shall then introduce similar developments in other, mostly Romance, languages. The final part of this section will be devoted to explanations for these developments and their connection to developments of /ɫ/ in preconsonantal and word-final position.

When intervocalic /ɫ/ is subject to sound change,[53] it may, as in syllable coda position, develop into the labiovelar approximant

---

[53] That is, with the exception of loanwords and learnèd words (Camproux 1962, 288).

Figure 5: Geographical area in which developments of intervocalic /ɫ/ occurred in Auvernhat Occitan (shaded area) after Dauzat (1938, 54). Shown here is the administrative region of Auvernha with adjacent departaments. Map background from http://www.d-maps.com/carte.php?lib=auvergne_Lankarte-&num_car=3359&lang=de (accessed 08/03/2011), used by permission.
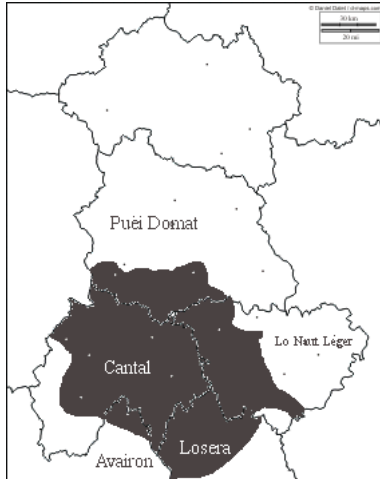
/w/. Following the vowel /u/, it assimilates to it so as to disappear altogether (Dauzat 1938, 55-56, also de Kolovrat 1923*a*, 195). In the eastern part of the canton of Santa-Jurvèva (12) and around the villages of Paulhenc (15) and Sent-Rocise (15), vocalised /ɫ/ elides in all intervocalic contexts (Dauzat 1938, 58). The area where /w/ is the outcome of vocalised /ɫ/ is described as follows by Dauzat (1938, 55) (also de Kolovrat 1923*a*, 195-198, Ronjat 1932, 144, §300):

> Au sud il règne sur un ensemble de parlers assez vaste (le Carladais, la moyenne vallée de la Cère et la vallée de l'Authre), dans le canton de Saint-Amans-des-Cots et l'ouest de celui de Sainte-Geneviève (Aveyron); [. . .]: la limite entre l et w passe au nord de Laguiole ([. . .]) et d'Entraygues, et remonte vers le nord-ouest en coupant la commune de Saint-Hippolyte (Cros, au nord de la commune, a le w; Labrousse (Cantal) appartient à l'aire w).

In a small part of the aforementioned area, the labiovelar approximant is prestopped: /ᵍw/. In other parts of the area, the velar stop is more pronounced. Where the stage /gw/ < /ɫ/ is still the regular pronunciation in the first half of the 20th century, /gw/ lends itself to metathesis: /ˈpawgɔ/ ~ /ˈpagwɔ/ "pala" ('spade') < Lat. PĀLAM (Dauzat 1938, 61-62). Dauzat (1938, 64, 67-69) provides a detailed list of villages situated in the departaments of Puèi-Domat, Cantal, Losera and Naut-Léger in which intervocalic /ɫ/ developed into /gw/ and further into /g/ (see also de Kolovrat 1923*a*, 196, Ronjat 1932, 144, §300). Another group of villages in the same region (listed in

Table 11: Examples illustrating developments of intervocalic /ɫ/ in Auvern-hat Occitan. Departament numbers are given in parentheses, e.g., (15) = Cantal; the reference point in the linguistic atlases is also given, e.g., ALMC 26 = point n° 26 in the *Atlas Linguistique du Massif Central* (Nauton, 1957-1963). The example words are given both in IPA transcription and in orthographic transcription. The second-to-last column provides the etymon of the example word, while the last column provides an English gloss.

Location	reference point	example word	orthographic form	etymon	gloss
Landeyrat (15)	ALMC 13	[aˈʁawza]	"alausa"	ALAUDAM	'lark'
		[esˈcaʁa]	"estelas"	STĒLAS < STĒLLAS	'stars'
Saug (43)	ALMC 24	[musˈcaʁa]	"mostela"	MŪSTĒLAM	'weasel'
Pierrefort-Paulhenc (15)	ALMC 43	[aˈɣawzɔ]	"alausa"	ALAUDAM	'lark'
Tèrmes (48)	ALMC 28	[musˈtjaɣɔ]	"mostela"	MŪSTĒLAM	'stars'
Polignac (43)	ALMC 21	[aˈvawza]	"alausa"	ALAUDAM	'lark'
		[esˈcava]	"estelas"	STĒLAS < STĒLLAS	'stars'
		[musˈcava]	"mostela"	MŪSTĒLAM	'weasel'
Chambon-le-Château (48)	ALMC 26	[aˈgawzɔ]	"alausa"	ALAUDAM	'lark'
		[esˈtjagɔj]	"estelas"	STĒLAS < STĒLLAS	'stars'
		[musˈtjagɔ]	"mostela"	MŪSTĒLAM	'weasel'

Dauzat 1938, 64-67, 70) has a further evolution to /ɣ/. Instead of emphasising the velar component of /w/, some varieties have evolved /w/ into the labial fricative /v/ or have a sound that is reported to be somehow intermediate between the two (Ronjat 1932, 144, §300, Michelly 1936, 81, Dauzat 1938, 57, Herzig 1959, 45-46; a list of these villages is given by Dauzat 1906, 34-35 and Dauzat 1938, 58-59, 64, 67).[54] See also Camproux (1962, 287-304) for a detailed description of the geographic extent of these different developments in the Gevaudan region. For many of the variants described above synchronic inter- and intraspeaker variation was found (Camproux 1962, e.g. 287, 292, 297).

An interesting snapshot of the sociophonetics of the evolution is reported by Dauzat and Fouché (1953, 6) for Dauzat (63), a small village of less than a hundred inhabitants situated in an isolated rural region. There, the evolution affecting intervocalic /ɫ/ had led to /g/, while the varieties spoken in the regional town centre had undergone the evolution to /v/. Judged as being a more prestigious sound, the younger generation of Dauzat and neighbouring villages chose /v/ at the expense of the traditional /g/, and this situation eventually led to the progressive disappearance of the /g/-zone in the first half of the 20th century.

More generally, however, all of the outcomes of /ɫ/-vocalisation in intervocalic position, at least in the Gevaudan region, seem to have become replaced by /l/ by speakers born during the first half of the 20th century, under the influence of more prestigious varieties of Occitan (see Camproux 1962, 291, 293, 295, 298) and, with the advent of mass media, of Standard French.

The distinction between the phonetic developments of dark /ɫ/ due to tongue body retraction and raising (velarisation) and tongue body lowering and retraction of the tongue root toward the upper pharyn- geal wall (pharyngealisation) is far from clear-cut, for the tongue body can move to a position anywhere between these two extremes and too little is known yet about the frequency of incidence of one or the other articulation across languages, dialects, or even individual speakers (see 1.1.3). While the outcome /ʁ/ could be considered as resulting from pharyngealisation (perhaps more properly uvularisation), this fricative can also result from a backing of /ɣ/, outcome of a velarised /ɫ/, as described by Dauzat (1938, 66-67) (see also Herzig 1959, 45-46).

Such a /ʁ/ occurs not only in Auvernhat varieties, but has been noted, as a variant of /ɫ/, also for the Lengadocian variety of Ca- marès (12) (Buckenmaier 1934, 36-37). More interesting, however, is the evolution of /ɫ/ to /ʁl/, an apparent dissociation of tongue body and tongue tip gestures in intervocalic position, which can be found in a small area covering approximately 750 km² in the southern part

---

54 In some of the villages where Ronjat (1932) heard the intermediate sound, Dauzat (1906, 34-35) claims to have still heard /w/ a few decades earlier.

of Puèi-Domat departament and described as generally rural and archaising by Dauzat and Fouché (1953, 4) (see also Herzig 1959, 45-46). While its western and southern borders are well-defined, its northern and eastern borders are rather vague, a fact that can be explained by the geographical peculiarities of the region, namely abrupt mountain slopes in the west and south and more gentle transitions towards the plains in the north and east (Potte 1973, 132-133). The emergence of /ʁl/ seems to have come about rather rapidly: In a study conducted during the first half of the 20th century, Dauzat and Fouché (1953) found an intervocalic dark /ɫ/ which they describe as 'reduced' in the villages of Chanat-la-Mouteyre (63), Orcines (63), Argnat (63), and Egaules (63) in the speech of the generation born before 1900.[55] A few decades later, Potte, in his 1971 field research, couldn't find this velarised /ɫ/ any longer (Potte 1973, 132-133). The generation born after the turn of the century pronounced /ʁl/, although this is not noted by the *Atlas Linguistique de la France* (Gilliéron 1902-1920) for the village of Pontgibaud (63), which falls within the area, so that Potte (1973, 134) thinks that the sound change was not yet noticeable when the fieldwork for the ALF was carried out. Dauzat and Fouché (1953, 5) describe the two sounds in question as follows:

> Tandis que la partie postérieure du dos de la langue se soulève contre le voile du palais, comme pour un l vélaire ordinaire, la pointe de la langue prend la position d'un r alvéolaire ou supra-alvéolaire, sans qu'il y ait pour cela le moindre battement lingual, ni contact avec le palais. On a donc en même temps un l vélaire et un r apical constrictif. L'impression acoustique correspond bien d'ailleurs aux résultats de l'analyse : on ne saurait dire si on a affaire à une sorte de l ou à une sorte de r. [. . .] Seules les personnes âgées le possèdent. [. . .] Les adultes et à plus forte raison les jeunes gens ont décomposé le phonème en ses éléments et prononcent successivement un r dorsal (semblable à leurs autres r) et un l dental, analogue à leur l courant : [. . .].

It is not entirely clear from this description how exactly this dark /ɫ/ is supposed to have been articulated; one could imagine a dark lateral whose tongue tip gesture is still present, but without effecting the central closure at the alveolar ridge. Moreover, it seems that even this lateral tended to pharyngealisation rather than to velarisation proper (these terms being sometimes used interchangeably in works from the earlier half of the last century). Support for this interpretation comes from testimonials given by Dauzat: "Le sujet [...] a conscience d'émettre un l, mais avec la langue étalée [...]" (undated letter, cited

---

55 Loanwords from French and Southern Occitan dialects (Lengadocian and Provençal) have clear /l/ in intervocalic position (Dauzat 1953).

in Potte 1973, 135-136). He also describes the sound as "hard" and "raucous", tending towards the Parisian French "r" (Dauzat 1938, 66).

Previous accounts of this sound change, put forth by Georges Straka and Gaston Tuaillon during the discussion part of the talk given by Jean-Claude Potte at a 1971 conference on Romance dialects in France, where he presented the study of /ɫ/ > /ʁl/ published in the 1973 proceedings, assumed in general that the first half of the intervocalic lateral developed into an apical trill, */rl/, which subsequently became uvular, as did the other rhotics in these Auvernhat varieties (Potte 1973, 136-137). It is, however, more likely that we are dealing with a perceptual dissociation of the tongue body and tongue tip gestures of the lateral, where the restoration of full tongue tip closure in the generation born during the 20th century may perhaps be ascribed to an influence from the French intervocalic clear lateral.

The same sound change, /l/ > /ʁl/, has also been found in the Provençal Alpin variety spoken in the villages of Villar d'Arêne (05) and Venosc (05), where neighbouring varieties have evolved the intervocalic lateral to a uvular rhotic /ʁ/ (Loriot 1953), although Martèl (1983, 21) contends that the sound in question is really a very dark /ɫ/. At the other end of Occitania, the Lengadocian varieties of Lo Pòrt (09) and Lhers (09) in the Pyrenean mountains have intervocalic /ɫ/-vocalisation to /w/ before back and low vowels, alongside /ɫ/-vocalisation in preconsonantal and word-final position (Laurent 2002, 14).
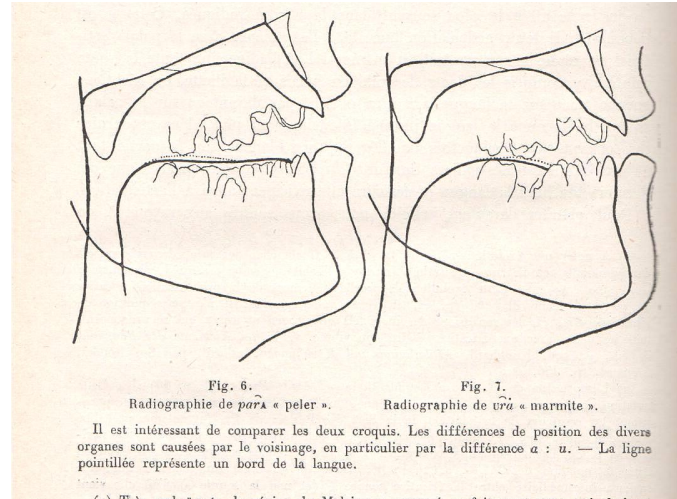
Other Auvernhat Occitan varieties of Naut-Léger and Cantal departaments, as well as the canton of Malasiu (48), have developed a properly pharyngeal sound from intervocalic /ɫ/ (Straka and Nauton 1947, 208). Its articulation is distinct from French /ʁ/, a sound which the bilingual speakers of these varieties have acquired as well,[56] and Straka (1979, 402-403) describes it as a horizontal displacement of the tongue body towards the pharyngeal wall with which it forms a constriction such that the resulting sound has more fricative than approximant characteristics (see also the description in Straka and Nauton (1947, 209) of palatographical results and p. 211 for a similar description of the sound). In Figure 6 on page 90, I reproduce two mid-sagittal views of this sound, as pronounced by a speaker of this variety, taken from Straka and Nauton (1947, 210, fig. 6 and 7).

Unfortunately, this particular evolution of intervocalic /ɫ/ seems to have been lost in the earlier part of the 20th century, when Straka and Nauton (1947, 213, 215) note that the younger speakers of these varieties prefer to shift the articulation of /ʕ/ to that of the more prestigious /ʁ/ of French.[57]

---

56 The Occitan rhotic of these varieties was still /ɾ/ at the time of Straka's fieldwork.

57 The fate of the rhotic /ɾ/, kept distinct in these varieties from the evolution of the intervocalic lateral (Dauzat 1938, 52), has since joined that of /ʕ/ under the growing influence of Standard French pronunciation (Straka and Nauton 1947, 213).

Figure 6: (reproduced from Straka and Nauton 1947, 210, fig. 6 and 7). Mid-sagittal views of the sound /ʕ/ resulting from intervocalic /ɫ/, obtained by means of radiography. On the left, a mid-sagittal view of /ʕ/ in the word /paˈʕa/ "pelar" ('to peel') (derived from "pèl" ('skin')); on the right, a mid-sagittal view of /ʕ/ in the word /ˈuʕɒ/ "ola" ('kettle') (< Lat. ōlam, Classical Lat. ōllam).

Fig. 6.
Radiographie de *parʌ* « peler ».

Fig. 7.
Radiographie de *ũr̃a* « marmite ».

Il est intéressant de comparer les deux croquis. Les différences de position des divers organes sont causées par le voisinage, en particulier par la différence *a : u*. — La ligne pointillée représente un bord de la langue.

Let me turn now to the question of relative chronology of the developments affecting the intervocalic lateral in Auvernhat Occitan. According to Dauzat (1938, 75-76), the evolution towards velarisation/pharyngealisation must have occurred very early on, at least in its incipient state, since it affects only the singleton intervocalic /l/ of Latin, not the geminate one which had however been simplified to a singleton by the 9th century in these varieties. The sound changes described above also didn't occur in former postconsonantal position from which the consonant has been elided (e.g., through /s/-aspiration), putting the lateral effectively into intervocalic position, or when the consonant preceding the lateral is an approximant such as /j/. For the subsequent changes, Dauzat (1938, 78-79), based on philological evidence, dates the evolution to /v/ back to the early 17th century, the one to /g/ to the period after 1700, and the one to /ɣ/ to the mid-17th century. Finally, these varieties also have /ɫ/-vocalisation in preconsonantal and word-final position (see above 2.1.1.1), as well as /l/-palatalisation in the onset clusters (see Chapter 3). While /ɫ/-vocalisation in preconsonantal and word-final position is chronologically quite distinct from the developments discussed in the present section, /l/-palatalisation in onset clusters evolved during approximately the same time period (Dauzat 1938, 83-84).

2.2.1.2 *Developments of intervocalic /ɫ/ in Romance and elsewhere*

As is the case with /ɫ/-vocalisation in preconsonantal and word-final position, Occitan is not the only Romance language to extend the

sound change to the intervocalic position. At least as interesting and diversified an evolution can be found in the dialects spoken in the southern part of Sardinia (see the map in Wagner 1941, 296). Here, the sound change occurred after the Old Sardinian period (Wagner 1941, 120, §187), and a dark lateral in intervocalic position is still reported for the Campidanese variety spoken by the working class of Cagliari (Wagner 1941, 120, §187; Blasco Ferrer (1984, 204-205), however, thinks that the dark quality of the lateral here is due to influence from Catalan).

The outcomes of dark /ɫ/ in intervocalic position in Southern Sardinian are more or less the same as in Auvernhat Occitan. Thus, we find developments to /w~β/ in Western Campidanese dialects (Wagner 1941, 120-121, §187, Contini 1987, 353-355; see also Meyer-Lübke 1934, 15, Rohlfs 1966, 308, §221a, Molinu 2009), where the sound may be elided before back rounded vowels and in unstressed syllables (Wagner 1941, 123-124, §190, Contini 1987, 355). According to Meyer-Lübke (1934, 15), the evolution in the village of Oristano continued to /b/. Further developments found in Southern Sardinian are /gw, ʁ, ʕ/ in Central Campidanese (Blasco Ferrer 1984, 204-205, Contini 1987, 355, Molinu 2009; see also Meyer-Lübke 1934, 15). Wagner (1941, 121-122, §188) describes an excrescent schwa-like vowel before the /ʁ/ in the varieties spoken to the east of Cagliari, which would have the quality of /a/ after low and back vowels and that of /o/ after high front vowels. These developments may also occur at word boundaries, i.e., when the intervocalic position is given at some higher prosodic level (Wagner 1941, 125, §194). Finally, in the varieties of Sàrrabus, the outcome of the sound change affecting intervocalic /ɫ/ is /ʔ/ (Wagner 1941, 122-123, §189, Blasco Ferrer 1984, 204-205, Contini 1987, 356, Molinu 2009).[58]

Developments similar to those found in Auvernhat Occitan and Southern Sardinian also occur in a number of Southern Italian dialects situated in Northern Calabria, to the south of Cozena, in the Lucania and Basilicata region, where both word-initial and intervocalic /l/ develop to /β, w, gʷ, g, γʷ, γ, ʁ/ (Rohlfs 1966, 217, §159, 308, §221a, Rensch 1968, 593-594, Romito and Belluscio 1996, 141, Loporcaro and Mancuso 1998, 84, see also Meyer-Lübke 1934, 19), as well as in the

---

58 The varieties in the northeast and in the extreme south of the island don't alter intervocalic /l/ (Contini 1974, 106), but those close to the area where the developments due to velarisation or pharyngealisation of the lateral take place lengthen the intervocalic /l/ (and /n/) to a geminate (Meyer-Lübke 1934, 15, Wagner 1941, 125, §193, Blasco Ferrer 1984, 204-205, Contini 1974, who interprets this lengthening as a reaction of protection against velarisation or pharyngealisation effects (p. 108), Contini 1987, 356). In all Southern Sardinian varieties, however, intervocalic /l/ in loanwords from Italian is geminated (Contini 1974, 110, footnote 5). Contini (1974, 112) points out that the evolution of this geminate /l:/ must have taken place after Latin geminate /l:/ had become /ɖ:/ (see Chapter 5).

Gallo-Italic variety of Caltagirone in Sicily where intervocalic /l/ developed into /ʁ/ (Rohlfs 1966, 310, §221a).[59]

In some varieties of Valais Franco-Provençal, e.g., in the Val d'Anniviers, both the intervocalic and word-initial laterals, as well as the laterals in the onset clusters, are dark and may vocalise to /w/ (Dauzat 1938, 81-82). In the variety of Bagnes, vocalised /ɫ/ has developed to /v/ (de Kolovrat 1923a, 169, Meyer-Lübke 1934, 16).

As in preconsonantal and word-final position, the intervocalic lateral developed to /ʕ/ in the Farsheriot variety of Aromanian(Weigand 1891, 5-6).

Finally, Bourciez (1930, 410, §337d) thinks that the elision of the singleton intervocalic lateral in 12th-century Old Portuguese is also due to vocalisation of /ɫ/ to /w/.

Outside of the Romance area, we find vocalisation of intervocalic /ɫ/ in a variety of Greek dialects which include Cappadocian (Allen 1974, 39, footnote 3, Kontossopoulos 2006a, 9), Tsakonian (Kontossopoulos 2006a, 6), Cycladic (Naxos island) (Kontossopoulos 2006a, 62), and the Northern Greek varieties of Eastern Romilia (Kontossopoulos 2006a, 95-96). Like the Southern Italian varieties described above, the dark lateral of the Albanian dialects spoken in Southern Italy could evolve into /ɣ, ʁ, w/ (Romito and Belluscio 1996, 143). Within Germanic, we can find intervocalic /ɫ/-vocalisation in the Swiss German variety of the Bernese Seeland and the upper part of the Wallis (recall that the trait is shared with the Franco-Provençal varieties of the Valais) (Selmer 1933, 226-227). Among English dialects, intervocalic /ɫ/-vocalisation has been described for the American English variety of Philadelphia, where it made its appearance during the second half of the 20th century in a working-class neighbourhood. Here, it occurs more frequently after stressed vowels than before them (Ash 1986, sociophonetic study). Finally, an evolution of the intervocalic lateral to /ɣ/ (or perhaps /ʟ/, see the description in Scheerer 1921, 245-246) has been reported for the Philippine languages Aklanon and Buhi'non (Olson et al. 2010, 208).

2.2.2   *Explaining the developments of intervocalic /ɫ/*

While the mechanisms behind the vocalisation of /ɫ/ in preconsonantal and word-final position have attracted much interest from scholarship over the years, there is, to my knowledge, not a single phonetic study which looks specifically at the topic of /ɫ/-vocalisation in word-internal intervocalic position. We can glean a few insights from experimental studies of the lateral in languages or dialects with a particularly dark /ɫ/; we know, for instance, that in the Majorcan variety of Catalan, an intervocalic /ɫ/ occurring in spontaneous speech

---

59 Meyer-Lübke (1934, 31) claims that Latin geminate /l:/, after simplification to a singleton lateral, acquired a dark quality in the Italian dialect of Venetian.

may lack tongue tip contact, and that this occurs more often after a low or back vowel than after a front vowel (Recasens 2009, 472-474). Thus, Majorcan Catalan may have an articulatorily vocalised intervocalic /ɫ/ in its present-day variation, and such a situation could be the basis for a sound change in the future. We may assume, for the time being, that the variation of intervocalic /ɫ/ in the languages and dialects described in 2.2.1 was similar to that in present-day Majorcan Catalan at the point in time where the sound changes of vocalisation took off.

Let me very briefly consider first the explanations offered by those linguists who described the phenomenon in their fieldwork studies. In general, scholarship agrees that the starting point of the evolution must have been the dark quality of the intervocalic singleton lateral, given also the fact that the languages and dialects presenting /ɫ/-vocalisation in intervocalic position also vocalise /ɫ/ preconsonantally and word-finally (de Kolovrat 1923*a*, 196, Dauzat 1938, 74 for Occitan and Franco-Provençal, Wagner 1941, 52, §72, 124, §192, 126-127, §196-197 for Sardinian[60], Camproux 1962, 326). As for the sound change under consideration, Straka and Nauton (1947, 218) suspect /ɫ/-vocalisation to originate from articulatory weakening. For the further developments in Occitan, the following stages of evolution have been assumed: /ɫ/ > /w/ > /gw, g/[61] > /ɣ/ > /ʁ/ > /ʕ/ (Dauzat 1938, 62-63; similarly for Northern Calabrian and Basilicata Italian dialects, Rensch 1968, 595), although the dialectological evidence put forth by Camproux (1962, 326-330) strongly suggests that the developmental pathway posited above split into two different directions: /ɫ/ > /w/ 1. > /gw, g/, and 2. > /ɣ/ > /ʁ/ > /ʕ/. The variants /g/ and /ɣ/ would then be independent developments from /w/ (see also Straka and Nauton 1947, 208, 218).

Given the absence of empirical and experimental research on the question of /ɫ/-vocalisation specifically in intervocalic position, I will outline in the remainder of this section some hypotheses and pinpoint some research questions which should be investigated in future studies.

1. Assuming that the articulatory and perceptual mechanism behind /ɫ/-vocalisation is fundamentally the same regardless of the position of the sound inside the word or syllable, we would expect a prominent acoustic contribution of the tongue body gesture, probably due to temporal desynchronisation of the tongue tip and tongue body gestures, with the tongue body gesture preceding the tongue tip gesture in time.

---

60 Concerning Sardininan, Molinu (2009) remarks that this language does not have /ɫ/-vocalisation in preconsonantal and word-final position, but rather rhoticisation or palatalisation. However, both the developments presented in this chapter and the retroflexion of Latin geminate /lː/ in Sardinian (see Chapter 5) are arguments in favour of an originally dark lateral in this position.

61 For Straka (1979, 406), similarly Straka and Nauton (1947, 218), this stage is a strengthening process implemented by the speakers in order to protect /w/ from intervocalic elision. The teleological flavour associated with this view, however, presents difficulties from the vantage point of scientific methodology.

Note that such a gestural configuration would be comparatively rare from a cross-linguistic or cross-dialectal point of view, since otherwise intervocalic /ɫ/-vocalisation would be expected to be as frequent as it is in preconsonantal or word-final position. Gick, Campbell, Oh and Tamburri-Watt (2006), in an ultrasound study of laterals in six different languages (Western Canadian English, Squamish Salish, Québec French, Serbo-Croatian, Korean and Beijing Mandarin) represented by one or two speakers each, found both gestures always to occur simultaneously in intervocalic position. Therefore, I hypothesise that in dialects where intervocalic /ɫ/ vocalised, its gestural constellation prior to vocalisation was such that the tongue body gesture preceded the tongue tip gesture in time. Future research should test this claim.

2. With regard to the tongue tip gesture, it is possible that it presents undershoot in the intervocalic /ɫ/ (articulatory vocalisation), either as a consequence of perceptual vocalisation (i.e., categorisation of /ɫ/ as /w, ɰ/ or some other, similar, velar, uvular or pharyngeal sound) or independently. A systematic study of tongue tip contact in intervocalic /ɫ/ in languages or dialects with an across-the-board dark lateral is still lacking in the body of research data. Should the hypothesis I proposed under 1 above turn out to be incorrect, i.e., should the tongue tip gesture and the tongue body gesture always occur simultaneously in intervocalic position, then the role of tongue tip contact for the sound change of intervocalic /ɫ/-vocalisation could turn out to be crucial. This is because, as long as the tongue tip contact is established, be it as a flapping movement, one position would be to say that lateral side channels ought be formed, a release should leave its acoustic traces in the signal, and the perception of a lateral ought not be impeded. On the other hand, recent research by Roussel and Oxley (2010) has shown that misperception of extremely dark /ɫ/ in intervocalic position is also possible when the higher formants are damped for this reduces the salience of the tongue tip release. According to this alternative, even with tongue tip contact present, perceptual vocalisation may occur. In any event, more data, in addition to the ones cited for Majorcan Catalan above (Recasens 2009, 472-474), are needed in order to sort out these claims and to ascertain the articulatory patterns encountered in different languages, before encompassing explanations of the phenomenon can be given. Additionally, an investigation of the role of the salience of the transitions from /ɫ/ into the following vowel in relation to the different levels of acoustic energy it may acquire in spontaneous speech and its relation to miscategorisation of /ɫ/ as /w/ is likely to be a promising line of research.

3. Given the relatively frequent occurrence of vocalisation outcomes which could be attributed to direct pharyngealisation (rather than to a gradual evolution of articulatory backing), an interesting and important question to be investigated in future studies is to learn the degree to which listeners are able to perceive the fine phonetic differ-

ences between a pharyngealised dark /ɫ/ and a velarised dark /ɫ/ and to imitate it faithfully. In general, it is said that pharyngealisation and velarisation (and whatever tongue position lies in between these two extremes) have similar acoustic consequences, namely that of a dark quality, indicated chiefly by a narrowing of the F2-F1 distance in the lateral. If listeners imitated a dark lateral presenting either clear pharyngealisation or clear velarisation, the null hypothesis would be to assume that they would imitate the acoustic darkness by using consistently whichever tongue body gesture they are accustomed to use, thus paying no attention or being unable to perceive the particular gesture employed by the speaker and not altering their behaviour. If, however, listeners were shown to be able to imitate, perhaps over the period of several learning sessions, the precise tongue body gesture used by the speaker, such a finding would constitute an important step in the understanding of processes such as /ɫ/-vocalisation and sound change in general.[62]

4. As a minor point, knowledge of the onset of lip-rounding in the vocalisation process would permit to test the hypothesis which would claim that the result /g/ would proceed directly from /ɰ/, and that lip-rounding need never be present in the evolution of this particular sound from /ɫ/. In this sense, the chain posited by Dauzat (1938, 62-63), described above on page 93, namely that /ɫ/ > /w/ > /gw/ > /g/ would not be necessary (although it still cannot be ruled out that the sound change did take this path, since language is not constrained to following the most direct and simplest way).

As, in this thesis, I am concerned with the initiation of sound change affecting /ɫ/, I shan't dwell on the further developments, i.e., how exactly /w, gw, g, ɣ, ʁ, ʕ/ could have developed from each other. These are, in themselves, very interesting sound changes, but it would be necessary to connect them to similar changes affecting similar sounds the origins of which are not to be found in the lateral, and in order to do them full justice, more space than would be possible in this thesis would need to be devoted to them.

2.2.3 *Conclusion*

/ɫ/-vocalisation in intervocalic position must certainly be considered within the context of the much larger phenomenon of /ɫ/-vocalisation in preconsonantal and word-final position. Most of what has been said in the first part of this chapter also holds for the intervocalic position. It is conceivable that perhaps the most important reason for why /ɫ/-vocalisation in the intervocalic position occurs only in a subset of those dialectal varieties that have /ɫ/-vocalisation preconsonantally

---

62 An experimental investigation of the imitation of laterals in rapid shadowing, though unfortunately with disregard to the precise location of the tongue body gesture, has been carried out by Honorof, Weihing and Fowler (2011).

and word-finally is the better perceptibility of the tongue tip closure and release in this position, due to its being released into a vowel.

But more questions need to be asked and many properties of /ɫ/ in intervocalic position are not yet well-understood. While I have presented the interesting and diversified developments that affected intervocalic /ɫ/ in Auvernhat Occitan and elsewhere both inside and outside the Romance area in 2.2.1, I have discussed in 2.2.2 some elements we would need to know more about in order to be able to explain with greater confidence the developments of dark /ɫ/ in intervocalic position. I shall not proceed here to advance analyses of a speculative nature; in this case, it will be better to wait until more evidence becomes available, in some cases through advancement of our imaging techniques, especially where tongue root and tongue body movements are concerned.

PALATALISATION OF /L/ IN ONSET CLUSTERS

3.1 THE GEOGRAPHIC EXTENT OF /L/-PALATALISATION IN ONSET CLUSTERS

3.1.1 *The palatalisation of /l/ in onset clusters in Occitan*

In onset clusters of the type obstruent + lateral, /l/ has palatalised in several Occitan dialects in the absence of a palatalising trigger such as a high vowel or glide that could have induced the change. Examples are given in Table 12 on page 98.

/l/-palatalisation occurs along the northern edge of the Occitan language area comprising the Occitan varieties of the Dalfinés (Trièvas, Isèra valley, the Valentinois), Northern Vivarés, the Velai, Auvernha Bassa (Puèi Domat departament), parts of Auvernha Nauta, Marcha (Cruesa departament), and Lemosin (Lemosin Naut, northern edge of Lemosin Bas, the varieties spoken in the Charanta departament, northern part of Perigòrd) (Jänicke 1997, 188-200, also Bouvier 1976, 93-100 for the Valentinois, Tausch 1954, 105 for Trièvas, Moutier (1882, 19) for the Droma valley). It is also found in a few Provençal localities on the linguistic border of Piedmontese, with which they share this dialectal trait[1], and in Gardiòl Occitan, a linguistic island in Calabria populated by Valdese emigration during the 14th century (Kunert 2007, 158). Ronjat (1932, 39-40, §242) adds a few examples from the Gascon-Lengadocian Pyrenean border region to these varieties. As regards the phenomenon, the Northern Occitan dialects are not isolated within the broader Gallo-Romance context, as /l/-palatalisation in onset clusters continues to be found in a large number of neighbouring Oïl and Franco-Provençal dialects (see below 3.1.2).

When looking at the distribution of /l/-palatalisation in onset clusters according to place of articulation of the obstruent – velar or labial – it is striking to see that palatalisation in the velar + lateral clusters covers a much larger area than palatalisation with labials as the first element of the onset cluster (cf. Ronjat 1932, 32-33, §238, Bouvier 1976, 97-98). With very few exceptions, which could be attributed to problems with data collection, all Occitan varieties that have palatalisation with labials also have palatalisation with velars. The reverse, however, is not true.

---

1 Jänicke (1997, 187, footnote 2) thinks that the palatalisation found in Menton and neighbouring locations is rather due to the influence from both Ligurian and Piedmontese.

Table 12: Examples for /l/-palatalisation in onset clusters from three Occitan
dialects. Departament numbers are given in parentheses, e.g., (06)
= Aups-Maritims; the reference point in the linguistic atlases is
also given, e.g., ALP 111 = point n° 111 in the *Atlas Linguistique
et Ethnographique de la Provence* (Bouvier and Martel 1975-1986);
finally, the dialect is given to which the particular village belongs.
The example words are given both in IPA transcription and in
orthographic transcription. The second-to-last column provides the
etymon of the example word, while the last column provides an
English gloss.

Location	reference point	dialect	example word	orthographic form	etymon	gloss
Menton (06)	ALP 111	Provençal	[ˈnebja]	"nèbla"	NEBULAM	'fog'
			[se pjaˈta]	"se platar"	*SĒ PLATTĀRE	'to hide'
			[ˈkjaʁa]	"clara"	CLĀRAM	'clear' (fem.)
			[ˈgjasa]	"glaça"	GLACIAM < GLACIĒM	'ice'
Saint-Martial (16)	ALO 117	Lemosin	[ˈbjãʃ]	"blanca"	*BLANKA	'white' (fem.)
			[ˈpjɛ̃]	"plen"	PLĒNUM	'full' (masc.)
			[ˈkju]	"clau"	CLĀVEM	'nail'
			[jɛˈne]	"glanar"	*GLENNĀRE	'to glean'
			[ˈfjam]	"flama"	FLAMMAM	'flame'
Job (63)	ALAL 2	Auvernhat	[ˈbjã]	"blanc"	*BLANK	'white' (masc.)
			[pjãˈtæ]	"plantar"	PLANTĀRE	'to put'
			[ˈkʎɔkɔ]	"clòca"	*CLOCCAM	'blister'
			[ˈgjãde]	"glandes"	GLANDES	'lymph nodes'
			[ˈfʎoʁ]	"flor"	FLŌREM	'cream'

Note that, once the clusters had become palatalised, i.e., /Cʎ/, they could develop into a host of directions, including loss of one of the elements of the cluster or change of place or mode of articulation for either element. These developments being very diverse, they will not be discussed here, as the point of focus is on the initiation of the sound change rather than its further evolution. The interested reader may find information about the ultimate phonetic outcomes of the sound change in all of the linguistic atlases, as well as in Ronjat (1932, 30-40, §§237-241) and in Jänicke (1997, 188-200), who both describe the forms found in individual Occitan dialects in great detail.[2]

Furthermore, /l/-palatalisation in onset clusters needs to be distinguished from palatalisation of intervocalic /gl/ (original /gl/ and voiced /kl/) during the transition phase from Late Latin to Proto-Romance, which also occurred in languages that did not undergo later /l/-palatalisation in onset clusters such as Standard French or Catalan. This early palatalisation in words such as OCULUM > *OCLUM > Oc. "uèlh" is thus not only chronologically distinguished from the kind of /l/-palatalisation in onset clusters under investigation here, but it also differs in scope. In fact, it is restricted to intervocalic /gl/-clusters, whereas the later Romance palatalisation can affect clusters across the board. Moreover, the Late Latin intervocalic /gl/-cluster in Gallo-Romance varieties yielded the same results as intervocalic /jl/ and /lj/, namely the palatal lateral /ʎ/. It has therefore been proposed that the Late Latin evolution is due to prior palatalisation or fricativisation of the velar stop and thus different in nature from the phenomenon of /l/-palatalisation in onset clusters studied in the present chapter (Jänicke 1997, 100, 241, Barbato 2005, 411). Such palatalisation of a velar stop may have been due to the presence of a high vowel prior to syncope, which has never occurred in the later Romance clusters. Moreover, the evolution of the /gl/-cluster affected by Late Latin palatalisation has gone further in many cases than for the same cluster under the influence of later Romance palatalisation. According to Jänicke (1997, 105-106), this state of affairs is not only due to the much earlier occurrence of Late Latin palatalisation, but also to the fact that Romance palatalisation affected clusters in different prosodic positions, such as word-initially vs. intervocalically, which naturally led to a much more uneven evolution.

3.1.2   */l/-palatalisation in onset clusters in Romance and elsewhere*

In several Romance languages and dialects, only the velar + lateral onset clusters have undergone palatalisation. This is the case for Ro-

---

2 Jänicke (1997, 97-99) also gives an overview of the evolution of palatalised onset clusters in Franco-Provençal and French (Oïl) dialects.

manian[3] (de Kolovrat 1923*a*, 282, Lausberg 1967, 20, §341, Repetti and Tuttle 1987, 64, Barbato 2005, 410, Kümmel 2007, 226), some Franco-Provençal dialects, e.g., those of Lyon, Bresse, the Dauphiné and the Valais (Gilliéron 1890, 215, Jänicke 1997, 94, Barbato 2005, 410-411, Kümmel 2007, 226) and in a number of French (Oïl) dialects such as those of Berry, Bourbonnais and Nivernais (Jänicke 1997, 94, 130-136).

All onset clusters, with labials and velars, were affected in Italian (Meyer-Lübke 1934, Rohlfs 1966, Lausberg 1967, 20, §341, Giacomelli 1970, Barbato 2005),[4] North and Northwestern Sardinian (Meyer-Lübke 1934, 44, Lausberg 1967, 20, §340, Contini 1987, 374),[5] Spanish (Castilian and Leonese) (Ford 1911, XXX-XXXI, XL-XLI, Malkiel 1963, Malkiel 1964, Morala 1988, Wireback 1997*b*, 57), Portuguese (Malkiel 1963, Malkiel 1964, Lausberg 1967, 20, §341, Wireback 1997*b*, 57), Ribagorça Catalan/Aragonese (e.g., Graus, Benasque varieties) (Rohlfs 1929, 390, footnote 9, Jungemann 1955, 160, Malkiel 1963, Malkiel 1964, Viudas Camarasa 1979 with an extensive historical overview of dialectological descriptions of the phenomenon), Franco-Provençal (Aosta and Piedmont valleys, Savoy, Ain, Lyonnais and Forez (save Saint-Etienne), Haut-Dauphiné and Eastern Isère varieties) (Gilliéron 1890, 215, Jänicke 1997, 164-185 with special attention to /gl/, Kümmel 2007, 226), Norman French dialects (Lower Norman and Channel Islands varieties) (Guerlin de Guer 1899, Jänicke 1997, 108-116, Brasseur 2009, especially his maps 2-5, pp. 109-110) and other Oïl dialects (Maine, some Haute-Bretagne (Gallo) varieties, Anjou, Poitou, Saintonge, Burgundy, South and Southeast Champagne, Lorraine save its northwestern part, Franche-Comté and Bernese Jura varieties) (Jänicke 1997, 116-130, 136-163 with special attention to the evolution of the /gl/-cluster).

The geographical distribution of /l/-palatalisation in onset clusters in the Gallo-Romance area is comprehensively described by Rousselot (1892, 262-263):

---

3 Meyer-Lübke (1934, 45) supposes that the Romanian lateral was dark after labials; this would explain the absence of palatalisation in these clusters. According to Malkiel (1964, 18), /gl/ alone was affected by the sound change in Romanian.

4 Instead of palatalisation, some Northern Italian dialects (e.g., Abruzzese, Lombardian, Bergamascan) may preserve the labial + /l/ clusters intact or undergo rhoticisation (Rohlfs 1966, 241-242, §177, 248-249, §183, 254-255, §186, 262, §190, 348-349, §247, 353, §249, 356, §252, see also Meyer-Lübke 1934, 45-46, Barbato 2005, 405, very briefly Giacomelli 1970, 140, 145). Learnèd vocabulary and loanwords, those from Standard Italian included, show generally more rhoticisation than inherited words (Rohlfs 1966, 245, §179, 251, §184, 351-352, §248, 355, §250, 356, §252, Giacomelli 1970, 149, footnote 46). The Greek dialects of Southern Italy did not develop /l/-palatalisation in onset clusters, even though they have retroflexion of the lateral as in the neighbouring Italian dialects (see Chapter 5). Words they borrowed from their Romance neighbours do not display /l/-palatalisation either, which is why Rohlfs (1974, 181-182) thinks that these words have entered the Greek dialects before palatalisation developed in Southern Italian.

5 Southern and Central Sardinian dialects have rhoticisation in onset clusters. Moreover, /gl/ usually evolved to /l/ (Meyer-Lübke 1934, 45, Contini 1987, 374). Wagner (1941, 155-156, §251) attributes /l/-palatalisation in Sardinian to influence from Italian.

Figure 7: Approximate spread of Romance palatalisation of /gl/ in Gallo-Romance, covering varieties of Occitan, French, and Franco-Provençal, after the indications of Jänicke (1997, 203-211). Palatalisation in /gl/ is likely to correspond to the maximal expansion of /l/-palatalisation in onset clusters in Gallo-Romance. Map background from http://www.d-maps.com/carte.php?lib=frankreich_Lankarte-&num_car=2824&lang=de (accessed 12/01/2011), used by permission.
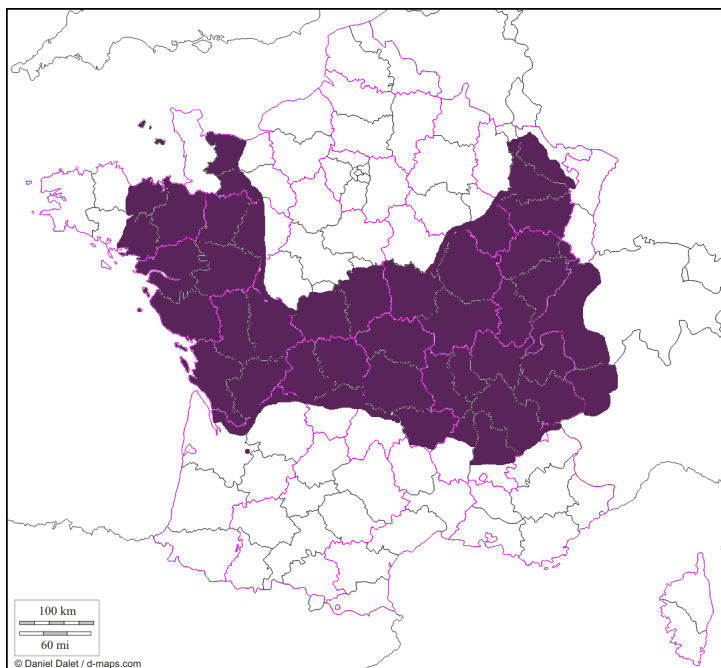
Le territoire sur lequel s'étend ce phénomène est très considérable. Il forme comme une large ceinture qui, s'appuyant sur la Gironde, le versant septentrional du plateau central et les Alpes du Dauphiné, enveloppe le français du Nord, depuis les côtes bretonnes de la Manche jusqu'aux frontières de la Belgique, et embrasse, au moins en partie, les parlers romans de la Bretagne (exc. le nord de l'Ille-et-Vilaine), de l'Anjou, du Maine, du Poitou, de la Touraine, de l'Aunis, de la Saintonge, de l'Angoumois, du Limousin (le nord), de la Creuse, du Berry, du Bourbonnais, de l'Auvergne (Puy-de-Dôme), du Forez, du Lyonnais, de la Savoie, de la Bourgogne, de la Franche-Comté, de l'Alsace et de la Lorraine (moins les environs de Verdun, de Longwy).

This shape is illustrated on Figure 7 on page 101, which depicts the sometimes detailed and sometimes approximate indications of the sound change as found in the /gl/-cluster in Gallo-Romance varieties in Jänicke (1997, 203-211).

In Franco-Provençal and in French, a small number of words such as the developments of Lat. secālē ('rye') or aquila ('eagle') underwent palatalisation of intervocalic /kl/ > /gl/ at a point in time between Late Latin intervocalic /gl/-palatalisation and Romance palatalisation in onset clusters, as indicated by alternative spellings such as "seille" – "seigle" or "aille" – "aigle" – "aile". The evolution of these words directly continues, however, the tendencies of Late Latin palatalisation. Its geographic extent is larger than that of Romance /l/-palatalisation in that it also occurs in Picardie, Wallonie, and Northern Champagne dialects which do not participate in the later developments of the onset clusters (Jänicke 1997, 241-276).

The Spanish and Portuguese facts are noteworthy in as far as /l/-palatalisation in these two languages only affects the clusters that contain a voiceless obstruent. Moreover, the phonetic outcome of palatalisation in Spanish differs according to the position of the cluster inside the word: word-initial palatalisation of /l/ in the voiceless onset cluster yielded /ʎ/, whereas in word-medial position after a consonant, the outcome is the affricate /t͡ʃ/. In Portuguese, the cluster evolved in both positions to /t͡ʃ/ and then lost its affricate character: /ʃ/. The voiced onset clusters, on the other hand, saw their obstruent disappear (Torreblanca 1990, 322, Wireback 1997b, 58, see also Meyer-Lübke 1934, 62-63, Lausberg 1967, 20, §341).[6]

Note that those Romance languages and dialects which today have dark laterals in the onset cluster did not undergo /l/-palatalisation.[7] This is the case for Catalan (except Ribagorçan) as well as for the Val d'Anniviers variety of Franco-Provençal (Haeberli 1908, 7, Dauzat 1938, 82). For other Romance languages which lack /l/-palatalisation, the quality of the lateral in onset clusters, specifically at the time when neighbouring varieties developed palatalisation, remains unclear. These include Dalmatian, Rhaeto-Romance, various Oïl dialects and Standard French, Sardinian (which has rhoticisation instead), some Italian varieties spoken in the Abruzzi mountains, as well as Gascon, Lengadocian, and Provençal Occitan (cf. Barbato 2005, 410). Also Latin, whose laterals are described as 'pingues' or 'pleni', i.e., dark, in onset

---

6 The evolution of the clusters in the two languages, Spanish and Portuguese, is not very regular. While some cases of failure to palatalise can be attributed to dissimilation with another palatal sound in the same word (Malkiel 1963, 156) – a similar phenomenon was also found by Bouvier (1976, 98-99) for the Occitan varieties of the Isèra valley and the Valentinois – most have to be studied on a word-by-word basis (see Malkiel 1963, Malkiel 1964 for such a study). A critical overview of studies pertaining to the sound change in Ibero-Romance up to the publication of his article is provided by Malkiel (1964) (but see also the critical reviews of Malkiel (1963), Malkiel (1964) by Baldinger (1968) and Meier (1968)).

7 It is interesting to see that the reverse evolution, namely /l/–velarisation and –vocalisation in onset clusters, is extremely rare even in dialects with dark /ɫ/s. Such an evolution took place in the Cappadocian Greek dialect of Farasa (Kontossopoulos 2006a, 9), as well as in the German dialect of Zips (today Spiš, Slovakia) (Selmer 1933, 223), both of which also have /ɫ/-vocalisation intervocalically and in syllable coda position (Zips also in word-initial position).

clusters by the 6th century CE grammarian Priscianus, has no traces of the sound change in question (see Chapter A for the quality of the Latin lateral).[8]

This leads us to the question of the age of /l/-palatalisation in onset clusters. The medieval attestations we have access to lead to believe that the sound change had been completed by the 10th-11th century in the case of Castilian Spanish (Macpherson 1975, 164, endnote 15, Torreblanca 1990, 319) and Leonese.[9] Specifically in Leonese, Lat. inter-vocalic /lj/, /kl/, /gl/, /tl/, the latter three of which arose through syncope, were predominantly spelled <ll>, indicating a palatal lateral, until the 13th century when the grapheme <y> took over, probably due to loss of laterality. At the end of the 13th century, spellings of these clusters in frequently-used words gradually changed to <j> and <g>, indicating affrication, as in Spanish (Cabrera Morales 1991). In the Aragonese and Catalan varieties of Ribagorça, /l/-palatalisation is attested in all onset clusters in 12th-13th-centuries texts (Viudas Camarasa 1979, 355).

Approximately the same chronology also holds for some Italian dialects such as Genovese (Haeberli 1908, 42, Meyer-Lübke 1934, 48, Giacomelli 1970, 149) or Neapolitan (Barbato 2005, 423-431). For instance, Rohlfs (1974, 182) reports that in medieval Greek manuscripts from Southern Italy, the spelling of Italian words already indicates palatalisation, e.g., "πιόπων" ('of the poplars') (1196) or "πρὸς τὴν μονὴν τοῦ χειοῦρε" ('to the Monastery of Fiore') (1211). The last first attestations of /l/-palatalisation appeared by the 15th century for Tuscan Italian (Bacinschi 1924, 262, Tuttle 1975, 400, cf. Barbato 2005, 424) and Sardinian (Contini 1987, 384). Some dialects that today have /l/-palatalisation, do not display traces of it in medieval documents, e.g. Venetian and Lombard Italian dialects (Rohlfs 1966, 241, §177, 244, §179, 249, §183, 254-255, §186, 348, §247, 351, §248). In these cases, the sound change is thought to have occurred after Renaissance times. In some of these varieties, such as in the Valtellina Superiore variety of Lombard Italian or in the dialect spoken around Trieste, the phenomenon entered the dialect as late as the 19th century (Rohlfs 1966, 251, §184, 355, §250), perhaps due to contact with the standard language.

The initiation of /l/-palatalisation in Gallo-Romance seems to have occurred much later than in Ibero-Romance and Italo-Romance varieties. On the basis of graphical indications for /l/-palatalisation in onset clusters in local dialectal texts from the various /l/-palatalising

---

8 Despite the sole form "piacet" for "placet" in an inscription from northern Perrhaebia province (on the border of Thessaly and Macedonia) from the year 101 CE; see an ample discussion of this example in Herbig (1913, 250) and Belardi (1984*a*, 103-104, footnote 46).

9 In Spanish, the evolution seems to be simultaneous with the palatalisation-affrication of /lj/, but predates the palatalisation of geminate /l:/ considerably, in that the latter did not take place before the 13th century (Macpherson 1975, 164, endnote 15).

areas of Gallo-Romance, Jänicke (1997, 10, 17-84, 89-90, 94, 221-226, 235, 240) (see also Rousselot (1892, 263) for Lemosin, as well as Ronjat (1932, 36, §240), also Dauzat (1938, 84) for Auvernhat Occitan) establishes the following chronological order for the appearance of the phenomenon in velar + lateral clusters: the first attestations stem from 16th-century Bretagne, Anjou, Poitou and Berry, which are joined in the 17th century by Maine, Saintonge, Auvernha Bassa, the Occitan varieties of Droma departament (Bouvier 1976, 97-98), Franche-Comté, Valais Franco-Provençal, and Bresse; finally, /l/-palatalisation emerges in the Bourbonnais, Lemosin Naut, Auvernha Nauta, Lorraine, Burgundy, and the Lyonnais in the 18th century.[10] Given this state of affairs, Jänicke (1997, 95, 240) proposes that the initiation of the sound change in Gallo-Romance took place in the 15th century.

Instances of /l/-palatalisation in onset clusters may also be found outside the Romance language branch. Still within Indo-European, there is /l/-palatalisation in velar + lateral clusters in the majority of Albanian dialects; it seems that this change took place towards the end of the Middle Ages, judging by the fate of loanwords from Latin which remained unchanged until this time (Repetti and Tuttle 1987, 65, footnote 9, Orel 2000, 85-86, 112, Kümmel 2007, 226). /l/-palatalisation in onset clusters has also been found in a variety of Transcarpathian Ruthenian Yiddish (Steiner 1977, 11, footnote 3, Richard C. Steiner, p. c., July 2008). Beyond Indo-European, further attestation of the phenomenon restricted to velar sequences may be found in the evolution of Hungarian (Kümmel 2007, 226), and in the historical evolution from Inscriptional Burmese to Written Burmese (Matisoff 2003, 70-71).[11]

/l/-palatalisation affected all onset clusters, however, in other languages of the Tibeto-Burman group, such as in Mpi (Southern Lolo-Burmese) (Matisoff 2003, 71-74). Moreover, Classical Tibetan zh- originated from a lateral in onset clusters (cf. Matisoff 2003, 69, Jacques 2004). Within the Thai family, several languages are reported to have /l/-palatalisation in onset clusters, so, for instance, Lung-chow, Po-ai, T'ien-chow, and Kam-Sui (Sui dialect) (Li 1954, 372, see also Li 1977, 84-96 for the labial clusters, 220-225, 226-228, 229-230 for the velar clusters). Dental stop + lateral clusters in Thai, on the other hand, have been simplified by losing either the lateral (in most cases) or the stop (Li 1977, 117-120).

---

10   The 16th-17th-century situation in the French dialect spoken in Ile-de-France, under direct influence of Paris and the Royal Court, was quite curious: while this French variety never developed proper /l/-palatalisation, a fashion of imitating an Italian accent in French led nevertheless to the introduction of some palatalised clusters. Thus, in 1578, the contemporary grammarian Henri Estienne (= Smith 1980, 411-412) describes words such as "plomb, pluie, plaisir" as being pronounced with initial /pj/ (Jänicke 1997, 84-89).

11   While the velar + lateral onset clusters palatalised in the evolution of Burmese, the labial + lateral clusters underwent rhoticisation (Matisoff 2003, 70-71).

3.1.3   */j/-lateralisation in labial + palatal onset clusters*

The reverse phenomenon, namely /j/-lateralisation in onset clusters, only occurs in clusters starting with labial consonants and is marginal in Occitan. It can be found in Lemosin and Auvernhat border varieties that also palatalise /l/ in labial + lateral onset clusters (e.g. [ˈplɑw] "pel"[12] at Prondines (63) (ALAL 15), [ˈpʎoʷ/ˈpʎɔ] "pel" at Ronhac (23) (ALAL 21)) (Dauzat 1906, 23, Rohlfs 1922, 69, Ronjat 1930, 386, §219). In these varieties, this may be a simple case of merger and instability of the two different onset clusters, and a similar argument can be put forth for the case of the Franco-Provençal variety of Geneva, where the situation is comparable (Haeberli 1908, 5, Rohlfs 1922, 69, footnote 2).

Lateralisation of the palatal approximant in labial + yod clusters has been observed in Istroromanian and Albanian dialects and attributed there to influence from neighbouring Slavic languages (Rohlfs 1922, 70), since these two languages have /l/-palatalisation only in velar + lateral onset clusters. Indeed, it is in the Slavic languages, which do not have /l/-palatalisation in onset clusters (Meillet 1965, 138, §144), that the sound change occurred widely and thus independently of the former phenomenon. Here, while a Proto-Slavic velar + yod onset cluster developed into an alveolar affricate, the labial + yod cluster shows lateralisation (Meillet 1965, 96-97, §113, Carlton 1991, 113).[13]

3.2   THE PHONETIC CHARACTERISTICS OF STOP + LATERAL ONSET CLUSTERS

A variety of studies have looked at the articulatory and acoustic characteristics of onset clusters composed of velar or labial stops and lateral approximants, both in languages with clear and dark laterals in these clusters. The languages investigated include Greek, German, French, Occitan, English (South African, Midwestern American, and British accents), Catalan, Italian, Swedish, and European Portuguese.

On the articulatory side, the main focus of research has been on the nature of coarticulation of the two sounds making up the onset cluster and the interaction of their gestures. In the velar + lateral cluster, all languages show some degree of double articulation whereby the velar closure is released only when the tongue tip has attained the alveolar zone for central closure. In these cases, the stop is released directly into the lateral, and its burst coloured accordingly. This can be shown for British English (Hardcastle 1985, Gibbon, Hardcastle and Nicolaidis

---

12 In this word, the final /ɫ/ not only caused diphthongisation of the preceding mid front vowel, but also underwent vocalisation, so that the evolution would have operated along the lines /ˈpeɫ/ > /ˈpjaɫ/ > /ˈpjaw/ > /ˈplɑw/.

13 Whilst /j/-lateralisation took place in lexical roots in all Slavic languages, only the Eastern Slavic languages, Slovenian, and Serbo-Croatian developed it across morpheme boundaries (Carlton 1991, 113).

1993, Hardcastle, Vaxelaire, Gibbon, Hoole and Nguyen 1996), Greek (Nicolaidis 2001, 73), German (Gibbon et al. 1993, Bombien et al. 2006), French (Gibbon et al. 1993, Marchal and Meynadier 1995, Fougeron 1998, Kühnert and Hoole 2006), Italian, and Swedish (Gibbon et al. 1993), which all have clear /l/ in onset clusters, as well as for Catalan with its dark /ɫ/ in onset clusters (Gibbon et al. 1993). The timing of the tongue dorsum gesture of the velar stop with the onset of movement for the tongue tip to travel up to the alveolar ridge seems to be much more closely aligned in time for dark /ɫ/-languages such as Catalan than for the clear /l/-languages mentioned above. This is probably due to the fact that the articulatory trajectory that the tongue dorsum must accomplish between the release of the velar stop and its reaching its position in the velarised lateral is much shorter than in the case of a clear lateral where the entire tongue body needs to be repositioned and the predorsum raised. It is possible that this particular configuration allows the tongue tip to reach its target faster when the lateral following a velar obstruent is dark rather than clear (Gibbon et al. 1993, 274-275).

A very interesting finding regarding the articulation of velar + lateral onset clusters is the absence of a velar loop or continuous closure fronting during the articulation of the velar stop (Hoole, Munhall and Mooshammer 1998). Gibbon et al. (1993), based on evidence obtained from EPG data, noted this characteristic in all of the six languages investigated in their study, i.e., Catalan, English, French, German, Italian, and Swedish, and added later the use of EMA to the experimental set-up in order to confirm their previous findings for the case of English (Hardcastle et al. 1996). In this study, they found that not only does the velar not display the looping trajectory, it also has a more posterior place of articulation in the cluster than when it occurs as a singleton intervocalic stop. Gibbon et al. (1993, 272) and Hardcastle et al. (1996, 55) suggest that the inhibition of the looping mechanism is conditioned by the raising of the tongue tip for the alveodental closure in /l/.[14]

In all of the studies touching on /kl, gl/-clusters, it was likewise found that the initiation of the tongue tip raising gesture occurs only once the velar closure is formed (see Giles and Moll 1975, 224 for American English, Hardcastle 1985, 260 and Hardcastle et al. 1996, 55 for British English, Kühnert and Hoole 2006, 547-548 for French), rather than during the approach to the velar closure. This seems to be due to the fact that the closure at the soft palate makes it more

---

14 It would be interesting to see whether the velar loop is also absent in /kt/ clusters, as also pointed out by Hardcastle et al. (1996, 56). That this cluster may be comparable to /kl/ in both synchronic and diachronic perspectives has been proposed earlier by Matzke (1890, 177) (but see Wireback (1997b, 86), who argues against such a comparison on the structural grounds that /kl/ is a proper complex onset, whilst /kt/ must consist of a syllable coda followed by a syllable onset).

difficult for the rest of the tongue, and particularly the tongue tip, to move quickly toward its target location.

Unsurprisingly, initiation of movement of the tongue tip may occur prior to stop closure formation in labial + lateral clusters, but in any case prior to the release of the bilabial closure, leading to doubly articulated clusters (Giles and Moll 1975, 220-221, 224 for American English, Kühnert and Hoole 2006, 545 for French). This finding ties in well with the observation that the tongue is free to anticipate the lateral during the articulation of the labial consonant (Kühnert and Hoole 2006, 547-548).

These different gestural configurations of velar + lateral and labial + lateral clusters lead accordingly to different consequences regarding the acoustic characteristics of the onset clusters, both for clusters with clear and dark laterals. After a labial obstruent, the lateral has a darker acoustic quality as measured either by the value of F2 alone or through the difference between the first and the second formant (Δ F2-F1) than when it occurs after a velar, due to the lowering effect of lip closure or narrowing. This was confirmed by Lehiste (1964, 29) for Midwestern American English, Faure (1972, 123) for South African English, Quilis et al. (1979, 325-328) for Spanish, Andrade (1999, 544) for European Portuguese, and in a contrastive study by Müller and Martín Mota (2009) for both Catalan which has dark /ɫ/s and Western Lengadocian Occitan which has clear /l/s. In this study, no significant difference could be found in the values for Δ F2-F1 in the transition from the labial stop into the /l/, regardless of the overall darkness of the lateral in the respective languages. The Occitan speakers had a mean Δ F2-F1 of 750 Hz in labial + lateral + back or low vowel sequences, whereas Catalan speakers had a mean Δ F2-F1 of 743 Hz in the same sequences. Similarly, Flemming (2007) reports low F2 values for the stop bursts in labial + lateral clusters in American English.

When the lateral is preceded by a velar consonant, on the other hand, it will be less dark in quality. This was found by Lehiste (1964, 29) for the Midwestern American English syllabic /ɫ/, where she also found the transitions from the obstruent into the lateral to be longer in the case of preceding velars vs. labials, by Faure (1972, 123) for South African English where the (syllabic) lateral was very dark all the same, Δ F2-F1 = 480 Hz for the labial + lateral cluster, Δ F2-F1 560 Hz for the velar + lateral cluster, and also by Müller and Martín Mota (2009) for Catalan and Occitan: with a mean Δ F2-F1 of 841 Hz in velar + lateral + back or low vowel sequences, the difference between clear-/l/ Lengadocian Occitan and dark-/ɫ/ Catalan with its Δ F2-F1 of 753 Hz in the same sequences was highly significant. As could be expected from the mean values given above, the dark /ɫ/ of Catalan was not significantly different when preceded by a velar or a labial consonant, whereas the difference in Occitan /l/ was highly significant. Also, the F2 values of the stop burst in American English velar + lateral

clusters investigated by Flemming (2007) were somewhat higher than in the corresponding labial + lateral clusters. In addition, Flemming (2007, 236) reports a compact burst in labial + lateral clusters vs. a diffuse falling burst in velar + lateral (and alveolar + lateral) clusters.

To sum up the phonetic characteristics of complex onset clusters involving /l/, the research reviewed above indicates that

- velar + lateral clusters are articulated closer together when the lateral is dark as opposed to clear;

- the velar stop in velar + lateral clusters may be released laterally;

- continuous closure fronting of velar stops is absent in the /kl/-cluster;

- the tongue tip raising gesture is initiated only after velar closure, but may precede the labial closure;

- the lateral is always darker after labials than after velars, but this difference is not significant for languages with dark /ɫ/ in onset clusters.

3.3   evolution of /l/-palatalisation in onset clusters

The evolution of palatalisation in onset clusters continues to puzzle scholars to this day. The earliest accounts of the phenomenon primarily sought an articulatory explanation, in line with the general attitude toward sound change at the time. Their proposals will be retraced and discussed in light of the phonetic research on the clusters reviewed above. Recent hypotheses, however, have begun to seek an understanding of /l/-palatalisation in onset clusters by looking at acoustic and perceptual features, especially those during the turbulent transition from the stop into the lateral. Thus, in the last subsection I shall discuss the relevance of related sound changes affecting lateral fricatives to /l/-palatalisation in onset clusters and outline further research questions to be answered experimentally in future studies.

3.3.1   *Articulatory explanations*

Most scholarly research on the topic of /l/-palatalisation in onset clusters assumes that it constitutes an articulatory assimilation of the sounds present in the cluster. Several variants of this hypothesis can be discerned in the literature. Most of them acknowledge the less frequent occurrence of palatalisation in labial + lateral clusters and therefore suppose an articulatory origin of the sound change in velar + lateral clusters only and then a subsequent propagation via analogy to the labial + lateral clusters.

Rousselot, in his 1892 study of /l/-palatalisation in the Lemosin Occitan variety of Cela Froïn (16), seems to be the first to propose an assimilation account of the phenomenon:

> Le mouillement de l'l après une consonne présente donc deux étapes : 1° après une gutturale ; 2° après une labiale. C'est la première qui met en évidence la cause déterminante de l'évolution. En effet, kl, gl, exigent deux mouvements bien distincts de la langue : l'un de la racine, l'autre de la pointe. kʎ, gʎ, au contraire, demandent un mouvement intermédiaire, non plus de la pointe, mais du dos de la langue. L'ʎ est donc appelée naturellement par la gutturale. On ne voit pas les mêmes raisons pour le mouillement de l'l après les labiales. Mais, le mouvement une fois commencé, on conçoit qu'il se soit propagé à toutes les l placées après une consonne. (Rousselot 1892, 263)

According to this view, the tongue tip movement for /l/ is transferred to the tongue body, already implicated in the articulation of the velar stop, which itself seems to become fronted ("mouvement intermédiaire"). The principle alluded to here belongs probably to some version of the principle of least articulatory effort: aside from the issue of stop closure formation and lateral inward compression of the tongue, fronting of the tongue body and reduction of the tongue tip results in one single gesture instead of the previous two distinct movements. Extension of palatalisation to the labial + lateral clusters is considered here an effect of analogy; I will discuss this aspect later in 3.3.2.

Rousselot's hypothesis remained popular throughout the next century: he is followed by Guerlin de Guer (1899, 15) in his study on Calvados Norman French and by Haeberli (1908) in her investigation of Franco-Provençal dialects, then by Sjögren (1928, 203) and Ronjat (1932, 31, §237), who speaks of 'the laziness of the organ [i.e., the tongue tip]', and in the second half of the 20th century by Tausch (1954, 106) and Nandris (1965, 937-938). A similar explanation is offered by Macpherson (1975, 157-158) who calls the sound change a 'process of mutual assimilation'. Holt (1997, 127) speaks of regressive assimilation and of the addition of a dorsal component to the lateral (similarly Wireback (1997a, 285-286, 289, 292).[15]

---

15 A rather curious version of the assimilation assumption is entertained by Tuttle (1975, 404-406), also Repetti and Tuttle (1987, 57), who propose that "the posture of the back of the tongue, raised against the soft palate to produce an occlusion k or g, caused the tip to be in a retracted position (to the rear of the alveola in the palatal area) when it was allowed to make contact with the roof of the mouth to produce the lateral resonant." They were followed in this view as recently as Barbato (2005, 410). Retraction of the tongue tip would result, however, in a retroflex sound and thus goes in a direction opposite to that of palatalisation (see 5.3.1 for a discussion of this claim).

It is not clear in all cases whether the authors see the reduction of the tongue tip as a consequence of or as a prerequisite for palatalisation. If the situation can be compared to the one found with vocalisation of dark /ɫ/ (see Chapter 2), then reduction of the tongue tip should only have occurred once palatalisation was firmly on its way. We would expect it to be subsequent to tongue predorsum raising, not to provoke it. Otherwise, it would be difficult to explain why velar + rhotic sequences have not undergone an evolution parallel to the velar + lateral clusters.

A somewhat different articulatory explanation is proposed by Matzke (1890, 177), who draws a parallel to the evolution of the intervocalic /kt/-cluster, which also palatalised in Romance (see also Ronjat 1932, 31, §237). For him as for others, the driving force of the evolution is the reduction of articulatory effort to a minimum, but the pathway he suggests differs from the mutual assimilation described above: /k/ would front to /c/ and then fricativise, leaving the alveolar lateral unaffected; it is only once the palatal fricative has attained the stage of /j/ that the /l/ would merge with it into /ʎ/. His argument, as well as the mutual assimilation hypothesis reviewed above, rests on the alleged propensity of the velar to front in velar + lateral clusters, but, as we have seen in Section 3.2 above, the research carried out so far on /kl/ onset clusters disproves this particular claim. If Matzke's explanation is, however, confined to the intervocalic clusters, the gestural configuration of which may be less tightly coordinated than in word-initial or postconsonantal onset clusters, it may turn out to have some validity; in this case, it would apply to the instances of Late Latin palatalisation as described in 3.1.1 above, including palatalisation in the ubiquitous suffix –CULUM.

A third version of the articulatory approach to /l/-palatalisation is offered by Grammont (1933, 209-212), who sees the process in the velar + lateral clusters as an assimilation of the lateral to both the preceding velar stop and the following vowel, due to articulatory inertia. Since neither of these involve tongue tip movement, the tongue tip gesture will also be absent in the lateral. By a leap of reasoning, he argues that blending of all three tongue body gestures (for the stop, the lateral, and whichever vowel) then results in a palatal lateral. As for the labial + lateral clusters, conflicting tongue body positions for the labial stop (lowered tongue body) and the lateral (raised tongue body) would account for the fact that palatalisation occurs less often in labial + lateral clusters.

Some other researchers, too, have extended the articulatory approach to the labial + lateral clusters. Sjögren (1928, 204), for example, sees weakening of the tongue tip, due to assimilation to the following vowel's articulation, as the initial trigger of /l/-palatalisation in labial + lateral clusters, but he does not explain how this state of affairs

would lead to the emergence of a palatal lateral rather than, say, an alveolar approximant.[16]

In another early account, Haeberli (1908, 33) stresses the possible role of aerodynamic factors in the palatalisation of labial + lateral clusters. According to her view, the tongue tip reaches the alveolar zone and forms the lateral before the labial closure is released, a scenario well-supported by the phonetic research discussed above. The sudden outflow of air during the release of the closure would then throw the unconstrained tongue tip back toward the hard palate, and this would lead to articulatory palatalisation. Her account, however, remains somewhat speculative, and the proposed mechanism would, if anything, lead rather to some kind of retroflex consonant than to palatalisation. The misunderstanding seen here and also in footnote 15 on page 109 seems to rest on the failure to distinguish between retraction of the tongue tip and predorsum raising when determining what a palatal articulation is made of.[17]

Before moving on to proposals which consider /l/-palatalisation in labial + lateral clusters to be an analogical extension from the velar + lateral clusters, let me briefly summarise the articulatory approaches to /l/-palatalisation in onset clusters reviewed above. For /kl/ and /gl/, all authors with the exception of Grammont (1933, 210) (who explicitly adopts a stance against it) suppose some kind of articulatory blending, or mutual articulatory assimilation, or at least fronting of the velar consonant. Phonetic investigations of the clusters (see Section 3.2 above), however, contradict this hypothesis. The few attempts at an articulatory explanation of /l/-palatalisation in labial + lateral clusters remain rather opaque; given that a labial articulation has a darkening effect on the acoustic quality of the cluster, palatalisation is likely to arise from somewhere else.

3.3.2 */l/-palatalisation in labial + lateral clusters as an effect of analogy*

Given the somewhat restricted success of articulatory approaches to /l/-palatalisation in labial + lateral clusters, other explanations have been sought for the extension of palatalisation onto all onset clusters containing /l/. Rousselot (1892, 263), as cited above on page 109, views this extension as an effect of analogy, without going into details (for this view see also Lausberg 1967, 21, §342, Tuttle 1975, Repetti and Tuttle 1987, 78, Holt 1997, 128). Meyer-Lübke (1934, 47) links this analogy effect to frequency of occurrence of the individual complex onset clusters: "Danach würden also die pl-Mundarten einen älteren

---

16 That loss of the alveolar closure in /l/ can indeed lead to the emergence of alveolodental approximants has been observed and described for some Philippine languages by Olson et al. (2010).

17 See Chapter 5 for similar misunderstandings in early accounts of retroflexion of geminate /lː/ in Gascon and elsewhere.

Zustand darstellen, während in den andern das häufigere kʎ, gʎ das seltenere pl, bl, fl nach sich gezogen hätten."

Later decades have seen explanations of /l/-palatalisation in onset clusters sought in constraints on the phonological systems of the languages affected. Tuttle's 1975 account of the phenomenon takes this perspective. While he considers palatalisation in velar + lateral clusters to be conditioned by articulation (see above 3.3.1), he concedes that it is not satisfactory to suppose the same for the labial + lateral clusters.[18] Instead, palatalisation in the labial + lateral clusters would be due to systemic constraints on the phonological inventory with the assumptions of the phonemic principle as a backdrop, and with weights determined by frequency of occurrence of the individual clusters in the language. And here, the cluster with the highest frequency of occurrence would undoubtedly be /kl/ because of the popularity of the Latin diminutive suffix -CULUM, which syncopated in Proto-Romance to yield the velar + lateral-sequence (Tuttle 1975, 407-408). This approach, with respect to palatalisation in Spanish and Portuguese, is also taken by Holt (1997, 128, 133), who, like Tuttle, stresses the preponderance of /kl/-clusters and the pressure they exerted on the system of onset clusters with /l/.

Although the proposals stressing the role of systemic pressure can be read as fitting in nicely with a usage-based account of sound change in the sense of Bybee (2001), their argumentation is not quite the same: They posit that speakers, for various reasons which often involve some kind of economy, in terms of articulation feature-load ("lexicon optimisation", Holt 1997, ch. 4), or otherwise, would wish for a unification of allophones. But in a phonemic approach, to which the above-mentioned approaches are indebted, wouldn't it be precisely the nature of allophones that they vary, and depend on context? Analogy, rather, guides misperceptions and makes the listener assume that what is in one context could also be in a similar one without explicitly striving for uniformity of her phonological inventory.

So what exactly are these frequencies which the researchers discussed above alluded to? If the velar + lateral clusters acted as attractors via analogy, then they should have a higher type frequency, i.e., a greater frequency of occurrence in the lexicon, than the corresponding labial + lateral clusters. When we compare the incidence of the individual clusters, as well as of the suffixes –CULUM and –BULUM which also syncopated and led to the emergence of new stop + lateral clusters, in the Lewis and Short (1879) Latin Dictionary for Classical Latin and in the *Französisches Etymologisches Wörterbuch* (von Wartburg 1928-2003) for the variety of Late Latin which ultimately gave rise to Gallo-Romance, we find that velar + lateral clusters do indeed occur

---

18 In this sense, according to his point of view, talking about 'palatalisation' in the labial + lateral clusters would be somewhat misleading since this would imply an articulatory origin of the sound change (Tuttle 1975, 401; the definition of palatalisation as an exclusively articulatory process can be found on p. 404 of his article).

Table 13: Type frequencies of velar + lateral and labial + lateral clusters in Classical Latin (Lewis & Short) and Proto-Gallo-Romance (FEW), respectively. The ratio of velar + lateral to labial + lateral clusters is 1.3 in both Classical Latin and Proto-Gallo-Romance. Without the –CULUM suffix, this ratio drops to 0.7 in both language varieties. Note that /fl/-clusters have not been taken into account.

	type frequency in Lewis & Short (Classical Latin)	type frequency in the FEW (Late Latin/Proto-Romance)
/kl/	561 words	119 words
/kul/ (suffix -CULUM)	724 words	166 words
/gl/	214 words	77 words
total velar + lateral clusters	1499 words	362 words
/pl/	782 words	175 words
/bl/	266 words	63 words
/bul/ (suffix -BULUM)	112 words	49 words
total labial + lateral clusters	1160 words	287 words

slightly more often than the labial + lateral clusters (see Table 13 on page 113). In the two dictionaries, the ratio of velar + lateral clusters to labial + lateral clusters is 1.3 (i.e., 13:10). Table 13 on page 113 also clearly shows that the –CULUM suffix contributed very largely to raising the number of /kl/-clusters in Gallo-Romance. Although the ratio of velar + lateral to labial + lateral clusters is not very large, there seems at first glance to be some support for the view that the latter cluster was influenced by analogy from palatalisation in the former. Precisely for the case of Gallo-Romance however, given the distinction we made above between Late Latin palatalisation of intervocalic /kl/ > /gl/ and Romance palatalisation of all onset clusters, we would need to discount the –CULUM suffix since this belongs plainly to the Late Latin palatalisation phenomenon. Without this suffix, however, the ratio of velar + lateral to labial + lateral clusters drops down to 0.7, thus yielding many more labial + lateral than velar + lateral clusters. Given this finding, the case for analogy for Romance palatalisation is much less readily made. When only word-initial clusters, which fall under the scope of Romance palatalisation only, are taken into account, the case becomes even less clear (see Table 14 on page 114). Here, we find that the ratio of velar + lateral to labial + lateral clusters is 1.1 in Classical Latin and 1.0 in Late Latin/Proto-Gallo-Romance. From

Table 14: Type frequencies of word-initial velar + lateral and labial + lateral clusters in Classical Latin (Lewis & Short) and Proto-Gallo-Romance (FEW), respectively. The ratio of velar + lateral to labial + lateral clusters is 1.1 in Classical Latin and 1.0 in Proto-Gallo-Romance. Note that /fl/-clusters have not been taken into account.

	type frequency in Lewis & Short (Classical Latin)	type frequency in the FEW (Late Latin/Proto-Romance)
/kl/	243 words	57 words
/gl/	135 words	43 words
total velar + lateral clusters	378 words	100 words
/pl/	275 words	82 words
/bl/	58 words	20 words
total labial + lateral clusters	333 words	102 words

this, it seems that analogy might not be enough in order to explain palatalisation in labial + lateral clusters.

3.3.3 *Experimental phonetic approaches to /l/-palatalisation in onset clusters*

Only a couple of studies have taken an experimental approach to /l/-palatalisation in onset clusters. Both focused on the possibility of palatalisation arising through an acoustic similarity between onset clusters involving laterals and onset clusters involving yod. In his 1978 doctoral dissertation, ch. 3 (p. 61-76), Javkin investigates this hypothesis for Spanish and Italian. He assumes that, given that geminate /lː/ may also develop palatalisation, the first step in the evolution of /l/-palatalisation in onset clusters was a lengthening of the lateral.[19] Here, palatalisation would have an articulatory origin, namely, overshoot of the tongue dorsum movement towards the hard palate (Javkin 1978, 65-67). In an acoustic investigation of stop + lateral onset clusters and word-initial laterals in a speaker of Buenos Aires Spanish, he compared F2 values during the first 25 ms of the approximant, but couldn't find any significant difference between them. Visual inspection of two spectrograms of the sequences /plo/ and /pjo/ (Javkin 1978, 70, fig.

---

19 Williams (1938, 63) and Entwistle (1962, 287) maintain a similar hypothesis. Wireback (1997*b*, 89, footnote 1) rejects this view on the grounds that there are no other permissible three-segment onsets (a geminate consonant counting for two) in these Romance languages. Macpherson (1975, 157) also rejects the gemination stage.

1), however, showed some similarities in F2 values (although not with the higher formants) (Javkin 1978, 67-71).

Another interesting hypothesis for the origin of /l/-palatalisation in onset clusters is also discussed by Javkin (1978, 75), in his footnote 5: that of a zero in the transfer function reducing the prominence of F2 in the lateral, so that listeners would mistake F3 for being the lateral's F2, and this formant would be so high as to be interpreted as a palatal. Unfortunately, none of the second formants in his data were reduced to this point, so that the hypothesis could not be substantiated. Also, in none of the many spectrograms of /l/ I have scrutinised for this dissertation, has the second formant been so reduced in prominence relative to F3 as to justify the maintenance and further investigation of Javkin's hypothesis.

In a 2009 study, Müller and Martín Mota looked again at the acoustic similarities of onset clusters with laterals and palatals, respectively. We compared Δ F2-F1 values during the first 20 ms of the approximant in recordings of /pl, bl, kl, gl/ and /pj, bj, kj, gj/[20] followed either by /a/ or /u/[21] from speakers of Lengadocian Occitan, who had clear /l/s, and speakers of Catalan, whose laterals were dark. In all of the speakers, the labial + lateral and the labial + yod sequences had significantly different Δ F2-F1 values at approximant onset, with the lateral being, of course, darker than the palatal. Of the clusters starting with a velar stop, however, the differences between velar + lateral and velar + yod sequences were only maintained for the Catalan speakers, whereas the Δ F2-F1 values were very similar in the sequences uttered by the Occitan speakers, especially in the case of the /kl/ vs. /kj/ clusters. These results show that velar + clear /l/ and velar + /j/ clusters may indeed sound alike, at least during the first tens of milliseconds of the approximant, and, assuming sound change can be based on reinterpretation by the listener, may explain the emergence of palatalisation on the lateral in these clusters. Note that these same results do not predict palatalisation in labial + lateral clusters based on acoustic resemblances.

---

20 It would be interesting to replicate this study comparing /Cl/- and /Cʎ/-clusters, since dialectological data indicate that a palatalised and then palatal lateral were subsequent stages in the sound change before arriving at the /Cj/-clusters. This was not done in Müller and Martín Mota (2009) for lack of available speakers presenting these clusters.

21 As Catalan and Occitan phonotactics rule out /Cji/-sequences, /Cli/ tokens have been excluded from the comparative analysis, but acoustic investigation revealed partial palatalisation of the lateral in these cases.

3.3.4   *The lateral fricative hypothesis*[22]

Building on the assumptions presented in 3.3.3 above, namely that palatalisation in the velar + lateral onset clusters is due to perception, not to articulation, I will present in this section the idea that it is the turbulent portion of the stop burst in between the velar stop and the lateral in which the similarities lie. As discussed in Section 3.2, this burst is coloured by the anticipation of the lateral gesture and can thus be described as a devoiced part of the following lateral or as lateral frication. Therefore, I will start this section by describing the phonetic properties of lateral fricatives. I shall then go on to present sound changes in which either a lateral fricative changed into a fricative articulated at another point of articulation or in which a non-lateral fricative acquired laterality. This will be followed by a brief excursion into a related sound change, that of velar + lateral clusters changing into alveolar + lateral clusters, and its relationship to /l/-palatalisation in onset clusters, and the final part of this subsection will sum up the elements presented to support the lateral fricative hypothesis and discuss some open questions for further research.

3.3.4.1   *Phonetic characteristics of lateral fricatives*

There are two types of laterals which exhibit frication: a devoiced lateral approximant and a fricative proper which comes in the regular two voicing states: voiced and voiceless. Sound change and synchronic variation indicates that they bear close acoustic resemblance to palatal, alveolo-palatal and (inter-)dental fricatives. Since it is the resemblance to the palatal fricatives which is of greatest interest for the study of /l/-palatalisation in onset clusters, I will cover only these in the following subsection.

In 1984, Maddieson and Emmorey studied both word-initial lateral fricatives and voiceless lateral approximants in Navaho, Zulu, Taishan Chinese, Burmese, and Tibetan in order to determine the differences between the two types of sounds. They found that voicing started later in the fricatives, that they had higher amplitude, and a greater amount of energy at the higher frequency levels (Maddieson and Emmorey 1984, 181). This energy was concentrated in the fricatives in a region between 3150 to 6400 Hz, whereas the devoiced lateral approximants had their energy peak in a region below the one for the fricatives, namely between 2700 and 3150 Hz (Maddieson and Emmorey 1984, 186). Similarly, Gordon, Barthmaier and Sands (2002) calculated an average centre of gravity value of 4456 Hz for /ɬ/, as averaged over

---

22   This idea has independently been suggested to me by Mark Jones (p.c., July 2008), to whom I am indebted for discussion and references. It is, however, not entirely new, but has already been suggested en passant by Bouda (1947, 53) with respect to the historical evolution of these clusters in Portuguese (but not Spanish).

tokens from speakers of six genetically diverse languages (Chickasaw, Western Apache, Western Aleut, Montana Salish, Hupa, and Toda).

Maddieson and Emmorey explain the spectral differences between devoiced lateral approximants and lateral fricatives as a difference in articulatory aperture, but at the same time stress the fact that aperture is continuous rather than discrete and thus the distinction between devoiced lateral approximants and lateral fricatives is also a gradual one. At least one language in their sample, Taishan, had sounds which plainly lie in between the two extremes. In line with this, no language seems to exist which contrasts a devoiced lateral approximant and a lateral fricative (Maddieson and Emmorey 1984, 187). In addition, Maddieson and Emmorey (1984, 187) note that lateral fricatives may appear in all syllable positions, that they sometimes vary between fricative and affricated pronunciations, and that a language which has a lateral fricative doesn't necessarily have a voiced lateral approximant, too. None of this holds for the devoiced lateral approximant, which they say is restricted to syllable-initial position,[23] is never affricated, and always occurs in languages which also have voiced /l/.

Whereas there seems to be a difference in degree of aperture between lateral fricatives and devoiced lateral approximants, this is not necessarily the case for devoiced lateral approximants vs. voiced lateral approximants, as demonstrated by Ohala (2005b). Increase of intraoral pressure in voiceless sounds as opposed to voiced ones increases volume velocity and consequently particle velocity; this in turn creates turbulence in the devoiced lateral.[24]

I shall now turn to sound changes in which a lateral fricative has acquired another place of articulation, or vice versa.

3.3.4.2   *Sound changes involving the lateral fricative*

We find fricativisation and often concomitant devoicing of /l/ not only after a consonant as in onset clusters but also in preconsonantal position, for instance in Icelandic[25] where one of the contexts of the emergence of lateral fricatives is before the voiceless stops /p, t, k/ (but not voiced /b, d, g/) (Bothorel 1967, 53, 184). A similar evolution occurs in Northwestern Sardinian (Logudoro, Anglona, Nurra and Sassari varieties) where all three /s, ɾ, l/ can merge into a lateral fricative before an alveolar stop; the voicing state of the lateral fricative is dependent on the voicing of the following stop, i.e., /ɬ/ before /t/

---

23 Although see below for examples in preconsonantal position from Icelandic, Sardinian, and other languages.

24 It comes then as no surprise that phoneticians have sometimes compared the devoiced lateral of French, which occurs after voiceless obstruents, to the lateral fricatives of Icelandic and Welsh (Davis 1934, Classe 1935). That this similarity plays a role in /l/-palatalisation in onset clusters is the basic tenet of the lateral fricative hypothesis.

25 The Icelandic lateral fricative is described as pre-stopped or affricated by Bothorel (1967, 53, 184, 197) and as pre-aspirated and partially voiced when in prevocalic position by Rositzke (1939).

and /ɮ/ before /d/ (Contini 1982, 127-131, Contini 1987, 337-338).[26]
The lateral fricative of Northwestern Sardinian comes in three main
variants, as revealed by Contini's static palatographic investigation:
1. a palatal lateral fricative where the tongue tip is lowered behind
the lower incisors; 2. an interdental lateral fricative; 3. a dental lateral
fricative where the tongue tip touches the upper incisors. In all three
variants, the lateral airflow seems to occur at the back molars, with
the exception of variant 1, the least frequent one, where lateral airflow
may be absent altogether, thus producing effectively a palatal fricative.
Palatal contact only occurs in variant 1; moreover, a markedly uni-
lateral spreading of the lips accompanies all of the variants.[27] These
articulatory characteristics hold for the voiced and voiceless laterals
alike (Contini 1982, 139-141, Contini 1987, 344-346). On the acoustic
side, the concentration of energy occurs in the same region as men-
tioned above, i.e., mainly in the region between 2000 and 4000 Hz,
slightly lower or higher according to vowel context; further peaks of
lower intensity may be found at higher frequencies. Unsurprisingly,
the voiced lateral fricative has a lower intensity overall than the voice-
less one. /ɮ/ often shows formant structure, especially so during the
vowel-fricative transition, but sometimes also throughout the entire
duration of the consonant; the formant structure is that of a clear /l/.
The acoustic structure of the fricatives seems relatively independent
from the articulatory variants described above, from which fact Contini
infers that the origin of turbulence at the back molars remains stable
throughout the variable articulations (Contini 1982, 141-146, Contini
1987, 346-348). A great amount of inter- and intraspeaker variability
exists between all these variants and non-altered /ld/ (but apparently
not /lt/) (Contini 1982, 136-137, 148). Further along the evolutionary
path, the /ɬt, ɮd/-clusters may gradually lose the alveolar stop and
effectively become intervocalic lateral fricatives, but here as well, inter-
and intraspeaker variability is present (Contini 1982, 146-147, Contini
1987, 351). In an acoustic study, Marotta and Nocchi (2001, 302-303)
also note frication noise on the preconsonantal lateral followed by a
voiceless stop in the Italian variety of Livorno.

Just like in these Romance languages, the intervocalic /lt/-cluster
becomes /ʃ/ in the Common and Benadir dialects of Somali (Afroasi-
atic), while it remains unchanged in the other dialects of this language
(Saeed 1992, 173). The reverse sound change seems to have occurred
in Akkadian: here, a voiceless lateral fricative merged with /l/ before

---

26 Before labial consonants, the lateral and /s/ both palatalise to /j/, and before velar
consonants, /l/ and /s/ evolve into a palatal or velar, voiceless or voiced fricative:
whether palatal or velar depends on the following vowel; whether voiceless or voiced
depends on the voicing state of the velar stop (Contini 1982, 128). As in the case
of /ɬ/-vocalisation in preconsonantal position (see Chapter 2), the preservation of
lateral quality before alveolar consonants may be attributed to the homorganicity of
the cluster favouring continuing tongue tip contact in the dento-alveolar region.

27 The lateral fricatives of Modern South Arabian languages are also articulated with a
unilateral spreading of the lips (Steiner 1977, 13-16, Lipiński 2001, 135-136).

alveolar stops and fricatives during a period going from Old Babylonian (1950-1530 BCE) to Middle Babylonian/Assyrian (1530-1000 BCE). This sound change, largely attested on tablets written in cuneiform script, began before /t/ and only later spread to /d/. Where it didn't merge with /l/, Proto-Semitic /ɬ/ later developed to /ʃ/ in Akkadian (Steiner 1977, ch. 19 (pp. 144-148), Steiner 1991, 1509). It seems therefore likely that Old and Middle Babylonian/Assyrian /l/ had a fricativised variant before alveolar stops, just like Icelandic and Northwestern Sardinian do. When /ɬ/ started to lose its laterality in all other contexts and became an alveolo-palatal fricative, the /ɬ/ before alveolar obstruents could have been reinterpreted as being a variant of /l/ and merged with it. Moreover, just like in Sardinian, /lt/ in Neo-Assyrian (1000-600 BCE) eventually merged with /sː/ (Steiner, 1991, 1509-1510). Alternations between /l/ and /(t)ʃ/ also occur in the Chukotko-Kamchatkan languages Chukchi, Koryak, and Kamchadal/Itelmens, in Yugakir languages, all spoken in northeast Siberia, as well as amongst Tungusic languages, which Bouda (1947, 48-49, 51) hypothesises involve a lateral fricative at some stage.

In order to describe the acoustic impression of the lateral fricative especially to a public of European language scholars who might not be familiar with the sound, various linguists have compared it to alveolar, alveolo-palatal, and palatal fricatives. For example, Contini (1982, 127-131), Contini (1987, 337-338) considers the lateral fricative of Sardinian to be closer to /s/ or /ʃ/ than to any of the lateral approximants and compares it to the lateral fricative of Welsh, which may indeed alternate dialectally with the palatal fricative /ç/ (Mark Jones, p.c., September 2009). Likewise, Troubetzkoy (1922, 203) describes the lateral fricative of Adyghe (Northwest Caucasian) as akin to /çl/, and for Lafon (1963, 19), /ɬ, ɮ/ are a combination of /ç/ or /x/ with a voiceless or voiced lateral. Finally, in Old Arabic, the emphatic sounds ḍād and šīn were /ɮ/ and /ɬ/, respectively (Steiner 1977, ch. 4 (pp. 57-67)), and ḍād is preserved as such in Arabic dialects of Southwest Saudi Arabia where it has a perceptually palatal component, as already described by medieval grammarians (Al-Azraqi 2010, 58-60, 62, 65).

It is thus not unexpected that a few sound changes around the world illustrate this acoustic closeness. A well-known case is the phenomenon of "la lisca" ('lisping') in Italian dialects and some Northern Sardinian varieties (Wagner 1941, 190-191, §340, Rohlfs 1966, 380, §266), in which a word-initial or word-internal /sC/-cluster evolved into /ɬC/ (Steiner 1977, 11, footnote 4). It is thought that in the Italian varieties of Tuscany, "la lisca" had originated in Pisa, which lost it subsequently, and spread from there to Livorno, where it is nowadays almost extinct as well (Marotta and Nocchi 2001, 308-309, who also provide a thorough overview of the available literature on the topic).

It may be useful at this point to have a look at the pathological case of lisping. This phenomenon, also known as lateral misarticulation of

/s/, seems to occur on a cross-linguistic basis. According to Suzuki et al. (1995, 242) and Akagi et al. (2001), who studied this sound in Japanese and British English, lateral /s/ has a concentration of energy in the range of 3000-5000 Hz unlike normally articulated /s/, for which the centre of gravity is higher than that. Also, its distribution of energy is rather flat instead of acute, as for normal /s/. At this point it is interesting to note that lateral /s/ indeed comes acoustically close to both /ʃ/ and /ɬ/, a fact to which the flat character of the spectrum also contributes. Given that lateral /s/ in the case of lisping is a pathological rather than an established sound, it is not surprising that an articulatory survey of ten subjects conducted by Suzuki et al. (1995, 244) showed that the exact place of articulation of fricatives judged by trained clinicians to be tokens of lateral /s/ can vary to a great extent. Finally, in the acoustic study of Gordon et al. (2002), (normal) /s/ was the greatest source of interspeaker variation in all seven languages studied.

Similar changes as in Italian "la lisca" can be found in the history of the Chadic (Afroasiatic) languages. Proto-Chadic seems to have possessed both /s/ and /ɬ/, as well as, perhaps, /ʂ/, and these sounds evolve mutually into one another to and fro in the different Chadic languages; the corresponding voiced fricatives undergo similar developments (Newman (1977), who describes these sound changes in great detail, see also Kraft 1971, Steiner 1977, 11, footnote 4). Similar processes occur in other parts of the world as well. The voiceless lateral fricative of Southern Bantu seems to have developed out of a voiceless palatal stop, whereas one of the ancestors of Bantu /ʣ/ seems to have been a palatalised lateral (Steiner 1977, 11, footnote 4, 34 and references therein). In the Modern South Arabian language Shahari, /l/ in the context of /i/ became a voiced lateral fricative and merged with already existing /ʣ/ (Steiner 1977, 21, 32-34 and references therein).

Finally, Ohala (1974, 254-256) proposes that the sound change /sl/ > /ʃl/ which took place in Norwegian (as well as in other Germanic languages) is due to the voiceless portion of the lateral at the transition between the voiceless fricative and the /l/ on the grounds of the acoustic similarity between /ʃ/ and /ɬ/ (Ohala 1987*b*, 219-220). This analysis is supported by the findings of Gordon et al. (2002, 167, 169) where the relative centres of gravity of /ʃ/ and /ɬ/ were the greatest source of interlanguage variation in seven unrelated languages; moreover, these two sounds had extremely similar acoustic characteristics, in some speakers to the point of merger. Therefore, the idea that palatalisation is provoked by a voiceless portion of the lateral is not entirely new, but has never before been applied systematically to the case of /l/-palatalisation in onset clusters.

To conclude the list of sound changes involving a lateral fricative, I shall look at changes involving velar place of articulation in one way

or the other. The developments of the North Caucasian consonants are extremely complex due to their large numbers, but there are three which are of particular interest to us. 1. A voiceless velar fricative /x/ of Common North Caucasian became a palatal fricative /ʃ/ in reconstructed Proto-Avar-Andian and is today a lateral fricative /ɬ/ in Avar-Andian and Archi; 2. A voiceless velar lateral affricate of Common Northeast Caucasian evolved into a voiceless velar affricate /k͡x/ and finally, in the modern languages of the area, into various sounds including /kˀ, ʔ, kʰ, q/; 3. A voiced velar lateral affricate of Common Northeast Caucasian /g͡L/ evolved into a voiced lateral fricative /ɮ/ and is at the origin of a wide range of sounds in the modern languages including /ɮ, l, ɣ, ʒ, j, w, ʁ, ɬ, h/ (Troubetzkoy 1922, 190-202, Lafon 1963, 20, 23, Lafon 1964; a book-length treatment of reconstructions of laterals in Caucasian languages can be found in Starostin 2007).

Northern Caucasian is not the only language group where such developments can be found. In Zulu, it seems that /k͡xˀ/ and /k͡ɬˀ/ are interchangeable, and Steiner (1977, 40), see also Steiner (1991, 1501), draws the parallel to Old Aramaic, for which he proposes a sound change whereby glottalised /t͡ɬˀ/ developed to /q͡ɬˀ/, and then further to /q͡χˀ/ and /qˀ/. Furthermore, Sands (2007) reports on a number of similar sound changes in different languages. In Dahalo, a South Cushitic language, there is an evolution whereby a reconstructed voiceless velar ejective /kʼ/ became a kind of prestopped voiceless palatal lateral /cʎ̥/ (Sands 2007, 210-211). In the ǂHoan dialect of Ju-ǂHoan, a Khoisan language, an expected /kχˀ/ is found to be rather lateral /kʟ̥ˀ/, and this has been observed in the literature for the Khoe languages |Gui and ǁGana as well (Sands 2007, 211-212). Moreover, in Proto-!Ui, palatal clicks seem to have developed into all three types of laterals in the now extinct ǁXegwi: voiced and voiceless pulmonic lateral affricates, a glottalic ejected lateral affricate, and a linguo-glottalic lateral click (Sands 2007, 215). Sands proposes that these sound changes have an articulatory origin in the properties of the hyoglossus muscle which contracts in order to lower the tongue body; doing so, the muscle tends to pull the sides of the tongue body down, thus allowing for lateral airflow in the dorsal region (Sands 2007, 215-216; see 1.1.3 for a similar proposal by Stone et al. (1992)). This is certainly a hypothesis which should be investigated in future studies, perhaps when better methods become available to study fine movements in the back of the mouth and in the pharyngeal and laryngeal region in greater detail, to see in which way they can help understand /l/-palatalisation in velar + lateral onset clusters.

3.3.4.3   *Relating /l/-palatalisation in onset clusters to velar-to-alveolar changes in the velar + lateral cluster*

/l/-palatalisation is but one sound change that can affect the velar + lateral cluster. Fronting of the velar to an alveolar stop is another possibility; although such a change is not recorded for Occitan, it does occur in a number of languages and dialects. It is pervasive in some varieties of Franco-Provençal, most notably Haute-Savoie varieties (Gilliéron 1890, 215, Haeberli 1908, 16-22, 31, Meyer-Lübke 1934, 62, Jänicke 1997, 174-175), in the Norman French spoken in the village of Mesnil-Patry (in the voiceless cluster only, while the voiced cluster shows /l/-palatalisation (Guerlin de Guer 1899, 17, 19-20, 37-38, Meyer-Lübke 1934, 62)), and in some Rhaeto-Romance varieties (Tuttle 1975, 403, Meyer-Lübke 1934, 54), as far as the Romance languages are concerned. Note that in the cases of Franco-Provençal and Norman French, neighbouring varieties have /l/-palatalisation in onset clusters. Velar-to-alveolar place of articulation change in the velar stop + lateral cluster is also found regularly in dialects of British and American English as well as in German dialects (see Blevins and Grawunder (2009, 269-280) for a very detailed examination of the literature and a thorough discussion of the phenomenon in these languages). Importantly, the English and German dialects which have this sound change also have a clear lateral in the velar + lateral cluster (Blevins and Grawunder 2009, 281). Apart from these Indo-European languages, the sound change is a wider cross-linguistic phenomenon; see Blevins and Grawunder (2009, 286-287, table 2, 295) for an overview. In this context, as with the Romance varieties, at least one Thai language, Saek (Northern Thai), has the velar-to-alveolar change in the velar stop + lateral cluster, while other Thai languages present /l/-palatalisation in this cluster (see 3.1.2 above) (Li 1977, 220). Moreover, contrary to received opinion, Blevins and Grawunder's 2009 study shows that, in a cross-linguistic perspective, neither /kl/ nor /tl/ is typologically favoured as a cluster, but that it is rare to find /kl/ and /tl/ contrasting within the same dialect (Blevins and Grawunder 2009, 267, 289, 294, 296).

It is beyond the scope of this thesis to fully discuss the different explanations for this evolution put forth over the course of a century, but it should be noted that there is evidence that the stop bursts of the velar and the alveolar stop in the stop + lateral clusters, as opposed to those of prevocalic velar and alveolar stops, resemble each other on the acoustic level to a point where perceptual confusion can occur (Ohala and Kawasaki 1984, 124, Ohala and Kawasaki-Fukumori 1997, 351, 353, Hallé et al. 1998, Flemming 2002, 132-135, Flemming 2007, Hallé and Best 2007, Blevins and Grawunder 2009, 282-284). However, to my knowledge the question why some languages would alter the velar + lateral clusters by changing the stop's place of articulation and why some other languages, like Occitan, would instead use palatal-

isation of the lateral has never been asked, let alone solved. If the sound change is to be sought in both cases in properties of the stop burst of the velar before the lateral, i.e., in a lateral release of the stop, the question arises as to why a language would ascribe the altered property in one case to the stop and in the other case to the lateral of the /kl, gl/-clusters. It could be said that this depends on how accustomed listeners are to stop bursts in general, i.e. whether their language possesses aspirated vs. non-aspirated stops. Listeners of the first type of language would be predicted to focus rather on the cues for place of articulation in the stop burst, while the attention of listeners of the second type of language would be attracted to the frication property of the stop burst in the /kl/-cluster, since it is longer and therefore presumably more salient than the bursts of simple stops. This admittedly very tentative hypothesis is supported by findings from a study by Best and Hallé (2010), who presented American English and Parisian French listeners with Zulu /ʛa, ɬa/, Tlingit /d͡ʒa, t͡ɬa/, and Hebrew /dla, tla/ in word-initial position. They found that English listeners heard more velar stops (which were not present in any of the sounds presented) than French listeners (67% vs. 59%), with the difference for the two language groups being significant in the case of the Hebrew /dla, tla/-clusters (English 86%, French 69%)[28]. Similarly, the voiceless lateral affricate /tɬ/ of Tlingit was perceived more often as a stop + /l/-cluster by English than French listeners (78% vs. 54%) (Best and Hallé 2010, 119-120). The question shall be pursued in future studies.

3.3.4.4 *Summing up*

The lateral fricative hypothesis, namely the idea that the turbulent portion of the stop burst between the stop and the lateral is responsible for the perception of palatalisation in the cluster, remains untested, as of the date of writing. The research I have undertaken in this respect centred mainly on the transitions between the stop and the lateral (Müller and Martín Mota 2009). One major issue that has to be solved with the present hypothesis is the question of to what extent clusters containing a voiced or a voiceless velar stop differ. Amongst the sound changes presented in this chapter we have seen several cases where languages were affected differently, so for instance in the evolution of /l/-palatalisation in Spanish and Portuguese where only voiceless clusters underwent the sound change, in Northeast Caucasian languages where only the voiceless velar lateral affricate lost its laterality and the voiced one retained it, in Icelandic, where fricativisation of /l/ only takes place before the voiceless stops, not the voiced ones,

---

28 Few Zulu lateral fricatives were heard as beginning with an initial velar stop (English 17.5%, French 9%), and almost all Tlingit lateral affricates were perceived as starting with a velar stop (English 97%, French 99%), but these differences between groups were not significant (Best and Hallé 2010, 119).

and in Akkadian, where an evolution like the Icelandic one began before /t/ and only later spread to positions before /d/. Given the findings by Best et al. (2001, 784-785, table 3), who, in a perceptual study, presented American English listeners with consonants from other languages not present in their native language, and found that their listeners classified Zulu /ɬ/ as a (post-)alveolar fricative or affricate and Zulu /ɮ/ half the time as /l/ and half the time as a voiced (post-)alveolar fricative or affricate,[29] it can be surmised that voicing in the fricative or in the stop burst preserves cues to laterality better, perhaps because it allows for some remnants of formant structure to be maintained. Unlike Zulu fricatives, the lateral affricates of Tlingit were generally perceived as containing a lateral, although a very few responses indicating some kind of perceived frication or aspiration were also present ("gl-kh", "kl-kh" for /d͡ɮ/ and "kh", "kl-kh", "chl" for /t͡ɬ/) (Catherine Best, p.c., July 2011).

Another issue to be addressed by the lateral fricative hypothesis will be the sound change from labial + palatal to labial + lateral clusters discussed above in 3.1.3. If the hypothesis is right, its origin should also be sought in the properties of the stop burst. A labial stop burst will lead to a certain degree of flattening of the burst spectrum even when released into a palatal approximant. Whether this is enough to induce perceptual merger of the two clusters needs to be investigated experimentally.

3.4   CONCLUSIONS

I have presented and described in this chapter developments of the palatalisation of /l/ in onset clusters. In 3.1.1, the dialectal distribution in Occitan was presented, and 3.1.2 dealt with the phenomenon in other Romance languages, as well as languages outside the Romance area. 3.1.3 briefly introduced the related phenomenon of /j/-lateralisation in labial + yod clusters. Following the description of the facts, Section 3.2 turned to articulatory and acoustic analyses of onset clusters with /l/ in different languages, and in Section 3.3, I discussed the various approaches taken by scholars in order to explain the phenomenon. Among these approaches were articulatory hypotheses (3.3.1), explanations via analogy specifically for palatalisation in the labial + lateral clusters (3.3.2) and earlier experimental approaches (3.3.3). In 3.3.4, I finally advanced a hypothesis which contends that one has to look into the characteristics of the velar stop

---

29 In a replication of the experiment, Best and Hallé (2010) found far fewer occurrences of perception of Zulu /ɮ/ as /l/ by American English listeners. In fact, the only naïve spelling given by the listeners and containing a lateral was "sshl", with "z" being the most frequent one. This may be due to a cut-off of frequencies at 5 kHz in the stimuli of the 2001, but not the 2010 experiment (Catherine Best, p.c., July 2011). The voiced-voiceless asymmetry still holds, however, since no lateral responses at all were given by either group for the voiceless lateral fricatives of Zulu.

burst in velar + lateral clusters in order to find out what initiated the palatalisation process in these clusters, and I have substantiated this idea with findings from sound changes from all around the world.

How the hypothesis will work out in detail is something which remains to be seen. While many Romance scholars, as recent as Jänicke (1997) or Barbato (2005), think of /l/-palatalisation in onset clusters to have been explained by Rousselot (1892) to everybody's entire satisfaction, I have been able to point out several problems with this approach. The new lateral fricative-hypothesis sets things back to the starting point, so more needs to be learned about the fine phonetic detail and, importantly, the amount of inherent variation in these clusters in order to gain a more complete and detailed picture of the phenomenon at hand. While in this chapter I have avoided taking into consideration the /fl/-cluster in a desire to keep things simple, it has to be acknowledged without question that further research has to account for palatalisation in fricative + lateral-clusters, too. It is likely that the hypothesis put forth here will be equally capable of explaining the sound change in these clusters.

Finally, it will be important to relate /l/-palatalisation not only to /j/-lateralisation and velar-to-alveolar changes in velar + lateral clusters, but perhaps also to palatalisation in intervocalic /kt/-clusters. Here, it is of course not only the acoustics which will be of interest to phoneticians, but also the gestural configurations of these clusters across languages, which might differ substantially from that in /kl/-clusters. It is thus hoped that the present discussion of /l/-palatalisation in onset clusters constitutes an important stepping stone to further investigations.

RHOTICISATION OF THE LATERAL

4.1 RHOTICISATION OF /L/ IN OCCITAN, IN ROMANCE, AND ELSEWHERE

It is well-known that rhotics and laterals commonly interact and alternate in many languages of the world. Even a moderately comprehensive list, never mind an exhaustive one, of all the languages and dialects where sound changes and synchronic processes occur that fall under the general heading of rhoticisation and lambdacisation and often involve morphological and other conditions would be an impossible feat. Therefore, in this chapter I shall concentrate on Occitan and the Romance languages and only pick some examples from other, genetically unrelated languages from around the world to illustrate the pervasiveness of /l/-rhoticisation. For a very informative overview of the interaction between rhotics and laterals in general, as well as phonological questions relating to the class of liquids, see Proctor (2009, ch. 2).[1]

4.1.1 *Rhoticisation in Occitan dialects*

/l/-rhoticisation can be found in all Occitan dialects except Gascon (for rhoticisation of Lat. intervocalic geminate /lː/ in Gascon see Chapter 5). Often, while some varieties have completed /l/-rhoticisation into an alveolar tap, other neighbouring varieties retain a reduced lateral which is usually described as an intermediate sound between /l/ and /ɾ/. Such is the situation, for instance, in some Auvernhat varieties of Léger-Naut departament where villages such as Bas-de-Bassés or Aurec have rhoticised their intervocalic /l/s into a tap, but Beauzac and Vachieras show said intermediate sound (Ronjat 1932, 144, §300, Dauzat 1938, 70-72, Straka and Nauton 1947, 216, Straka 1979, 404-405). In some places of southern Auvernha, e.g., in the canton del Malasiu (48) and some parts of Cantal departament, former word-final geminate /lː/, reduced to a singleton, also rhoticised (the singleton word-final lateral having earlier vocalised, see Chapter 2) (Straka 1979, 409). On the other hand, a few of the Auvernhat varieties spoken in Léger-Naut departament, such as those of Beauzac (43), Sant-Didèir-de-Velai (43), Monistròl-de-Lèir (43), and Chamalèira (63), have seen their intervocalic singleton rhotic, an alveolar tap, develop into a lateral

---

1 Although liquids comprise all kinds of rhotics, the tap as well as the trill and a variety of other sounds, the discussion in the present chapter will refer only to laterals and the alveolar tap.

or into the aforementioned intermediate sound described by Straka and Nauton (1947, 202-203) as a 'reduced rhotic', for which the tongue tip is raised towards the alveolar ridge without actually touching it (Straka and Nauton 1947, 197, 207).

In the eastern part of Occitania, from Niça (06) to La Ciutat (13), according to Ronjat (1932, 143-144, §300), and even up to Cantal departament (see above on the preceding page), according to Meyer-Lübke (1934, 11) (and to Blinkenberg (1939, 35), Blinkenberg (1948, 35-36) for the villages of Entraunes (06) and Buèi (06)), /l/-rhoticisation has resulted in said intermediate sound, half /l/, half /ɾ/. Proper rhoticisation seems to have taken place in the Valdese valleys, as well as in the language islands of Valdese descent of Neu-Hengstett and Pinache-Serre (Württemberg, Germany); these are dialects where otherwise the intervocalic singleton lateral is dark (Paul Meyer in Arnaud and Morin 1920, XII, Meyer-Lübke 1934, 10). In the speech of the Valadas Occitanas, the regions of Briançon and Lo Cairàs, as well as the hinterland of Niça, /l/-rhoticisation also occurs before labial and velar consonants, as well as word-finally in most of the aforementioned varieties (Ronjat 1932, 207, §331γ4, 307, §395β, Chabrand and de Rochas d'Aiglun s. d., 10 for the Lo Cairàs region, Blinkenberg 1939, 35-36 for the village of Entraunes (06), Compan 1965, 151 for the village of Robion (06)).

For Provençal, the rhoticisation zone of intervocalic /l/ covering the departaments of Auts Aups, Aups d'Auta Provença, and Var reaches west to the mountain areas of Diés (26) and the Baroniás (26) and north to the Trièvas region (38). In these two varieties, the first attestations of rhoticisation of Latin singleton /l/ date back to the end of the 16th century for the Droma departament and to the 18th century for the Trièvas region. Given that Latin intervocalic geminate /l:/ had been reduced to a singleton as early as the 10th century, the fact that rhoticisation here affected only singleton /l/ attests to a continuing distinction in quality of the developments of the Latin intervocalic singleton and geminate laterals in these varieties until the 16th century at least (Moutier 1882, 23-24, Tausch 1954, 95-96, 103, Bouvier 1976, 217-224).[2]

Likewise, for Eastern Lengadocian, Ronjat (1932, 143-145, §300) reports a reduced pronunciation of intervocalic /l/ for the region of Montpelhièr. In Western Lengadocian, we find /l/-rhoticisation in both intervocalic and preconsonantal position, for instance in the variety of Ambialet, as described by Maurand (1974, 168, 171), especially in

---

2 A similar distinction in quality must have held as well in those Auvernhat varieties where the Latin singleton lateral, but not the geminate one, vocalised in intervocalic position (see Section 2.2). Both phenomena, /ɫ/-vocalisation and /l/-rhoticisation, appear to suggest a (relatively) dark quality of the singleton intervocalic lateral and a clear quality of the former geminate intervocalic lateral.

fast speech rate.[3] Table 15 on page 130 provides examples of /l/-rhoticisation across Occitan dialects.

Loanwords constitute a special case for rhoticisation. Generally speaking, preconsonantal /l/ in older loanwords may rhoticise in all Occitan dialects (whether they have otherwise had /ɫ/–vocalisation in this position or not), e.g., "armanac, arquèmi, carcular" from French "almanac, alchimie, calculer", whereas recent loanwords keep the /l/ intact, perhaps due to the further evolution of the rhotic to uvular /ʁ/ (Ronjat 1932, 209, §333, for Léger-Naut departament Straka and Nauton 1947, 229, 231, Straka 1979, 407, for the variety of Cela Froïn (16) Rousselot 1892, 329, for Provençal varieties in the northernmost part of Droma departament Bouvier 1976, 240-241).

4.1.2 *Rhoticisation in other Romance languages*

Before I describe cases of /l/-rhoticisation in other languages of the Romance area, let me turn briefly to Latin. It seems that in this language, rhoticisation, and also lambdacisation of /ɾ/, took place in dissimilatory contexts only[4] (Sommer 1948, 212, §121B, Maniet 1975, 117-118, §51, Leumann 1977, 231, §232A and references therein), i.e., if two laterals or two rhotics were present in the same word, one of them would be dissimilated. The most widely cited example of this is probably the suffix –ĀLIS which is dissimilated to –ĀRIS when another /l/ occurs in the stem, except in the case of an intervening rhotic in which case the –ĀLIS form remains. Further extensive examples can be found in Seelmann (1885, 327), Meillet (1930, 125-126), Leumann (1977, 212, §216a, 231, §232A), and Niedermann (1985, 162-164). There is no evidence for a rhoticisation process in Latin as systematic as that described for some of the Occitan varieties in 4.1.1. During the Late Latin period, however, dissimilatory rhoticisations and lambdacisations seem to have become more frequent in words that had not undergone dissimilation in earlier periods; these later dissimilations also seem to have had a lower sociolinguistic status (Meillet 1930, 127, Sommer 1948, 212, §121B, Niedermann 1985, 164), and some of these dissimilated words have found their way into the Romance languages, e.g., Spanish "lugar" < Lat. LOCĀLE or "árbol" < Lat. ARBOREM (Lathrop 2003, 131-132)[5] and Occitan "aubre" < Lat. ARBOREM.

In Gallo-Romance, apart from the Occitan dialects discussed in 4.1.1, we find regular rhotic lambdacisation in intervocalic position within Norman French in the village of Teurtheville-Hague (50) (Brasseur 2009, 116, footnote 22). In Franco-Provençal, there is rhoticisation, but

---

3 /l/ and /ɾ/ can also merge with /ð/ in Ambialet (Maurand 1974, 168, footnote 4).

4 But Priscianus, *Institutiones Grammaticares*, I, 38 notes a case of rhoticisation without a dissimilatory context: "L [...] transit [...] in r, ut 'tabula taberna'" ("L becomes r, as in 'tabula – taberna'") (Keil 1961*b*, 29).

5 In addition to these, some words have undergone what Proctor (2009, 55) terms 'mutual metathesis', as in Spanish "milagro" < Lat. MĪRĀCULUM.

Table 15: Examples illustrating intervocalic /l/-rhoticisation in different Occitan dialects. Departament numbers are given in parentheses, e.g., (06) = Aups-Maritims; the reference point in the linguistic atlases is also given, e.g., ALP 86 = point n° 86 in the *Atlas Linguistique de la Provence* (Bouvier and Martel 1975-1986); finally, the dialect is given to which the particular village belongs. The example words are given both in IPA transcription and in orthographic transcription. The second-to-last column provides the etymon of the example word, while the last column provides an English gloss. Note that in many dialects, both Lat. singleton /l/ and geminate /l:/ undergo rhoticisation, probably after durational merger.

Location	reference point	dialect	example word	orthographic form	etymon	gloss
Saorge (06)	ALP 86	Provençal	[pœˈɾaə]	"pelar"	*PELLĀRE	'to graze'
			[beˈɾuɾa]	"belola"	BELLULAM	'weasel'
			[matœˈɾaə]	"martelar"	*MARTEL-LĀRE	'to whet'
Saint-Sauveur-en-Rue (42)	ALLy 69	Provençal Vivarés	[afjaˈɾɑ]	"afilar"	*AFILĀRE	'to whet'
			[suˈɾɑ]	"solada"	*SOLA-TAM	'sheaves spread on the threshing floor'
			[vuɾaˈmɑ]	"volama"	*VOLAM-MAM	'sickel strike'
Vabre-Tisac (12)	ALLOc 12.21	Western Lengado-cian	[aɾawˈʒeto]	"alauseta"	*ALAU-DITTAM	'lark'
			[esˈtɛɾɔ]	"estèla"	HASTEL-LAM	'chopped piece of wood'
			[kuˈjuɾɔ]	"coguola"	CUCULAM	'common wild oat'
La Salvetat-d'Agot (34)	ALLOr 34.04	Eastern Lengado-cian	[kawˈɾet]	"caulet"	*CAULIT-TUM	'cabbage'
			[ˈtewɾe]	"teule"	TEGULUM	'tile'
			[musˈtɛɾɔ]	"mostèla"	MUSTELAM	'weasel'

in preconsonantal position before labials only (de Kolovrat 1923*a*, 296). Otherwise, lateral rhoticisation and rhotic lambdacisation do not seem to occur in these two Gallo-Romance languages.

The situation is quite different in a range of Spanish dialects. In the speech of the region of Murcia and in many varieties of Extremaduran and Andalusian Spanish, but also in Caribbean dialects such as Cuban, Dominican and Puerto Rican Spanish, the rhotic and the lateral in preconsonantal and word-final position may merge into an intermediate sound (Jiménez Sabater 1986, Quilis-Sanz 1998 (with an extensive overview of dialectological research on rhoticisation in Andalusian Spanish pp. 125-126, footnote 2), Hualde 2005, 188, Alfaraz 2008, 36, Proctor 2009, 55-56 and references therein) which Navarro Tomás (1917, 270-271) calls a 'reduced lateral' or 'fricative rhotic' and which he describes as follows: "[E]n ambas articulaciones, la punta de la lengua alcanza aún a los alvéolos; pero sólo rozándolos ligeramente y sin formar con ellos un contacto completo; [...]." Furthermore, the lateral is reduced not only in the magnitude of its tongue tip gesture, but also in its temporal extension, where its duration comes closer to that of /ɾ/ (Navarro Tomás 1917, 273). It is not clear how much laterality is preserved in this merged articulation, but it seems quite evident that we have here a kind of central approximant, perhaps /ɹ/. In some Spanish varieties, preference is given to lambdacisation of both liquids, so in the speech of Santo Domingo, capital of the Dominican Republic, whilst both liquids merge into a rhotic in the southern varieties of the same island (cf. the map in Jiménez Sabater 1986, 150).[6] In other varieties such as Andalusian Spanish, where the preconsonantal lateral goes much more often to a rhotic than the reverse, the liquid may also simply disappear, especially in word-final position (cf. Quilis-Sanz 1998, 127-129, 149, based on an in-depth examination of the *Atlas Lingüístico y Etnográfico de Andalucía* (Alvar and Llorente Maldonada De Guevara 1961-1973)). Moreover, as appears from Quilis-Sanz's study, in Andalusian Spanish following dento-alveolars and velars but not labials seem to favour rhoticisation. This is at odds with the dialectological observations for Franco-Provençal (see above on page 129) and Italian (see below on page 133). On the other hand, the word-final position turns out to be the most frequent context for lambdacisation of the rhotic, followed by the prelabial position. In some of the dialects discussed, rhoticisation can also occur in onset clusters (Proctor 2009, 56). In addition, the same kind of dissimilation as occurred during the Late Latin period (see above on page 129) apparently still exists as an active process in some varieties of Spanish (Proctor 2009, 54-55).

There is less rhoticisation overall in Portuguese, but two cases are worth notice. The Minho dialect of European Portuguese has forms

---

6 In the Cibao area of the Dominican Republic, both the rhotic and the lateral merge into a palatal approximant (cf. the map in Jiménez Sabater 1986, 150).

in which both vocalisation of /ɫ/ and rhoticisation of the lateral are evident in preconsonantal position (de Kolovrat 1923*a*, 231, Meyer-Lübke 1934, 78-79), whereas in Brazil, /l/-rhoticisation is a feature of the Caipira dialectal area (Feldman 1972, 137, see also de Kolovrat 1923*a*, 231-232).

In Catalan, there is intervocalic /l/-rhoticisation in the variety spoken in L'Alguer on the western coast of Sardinia (Meyer-Lübke 1934, 14, Contini 1987, 353); the resulting tap often presents an incomplete closure and may resemble a dental fricative, according to Wagner (1941, 122, §188, footnote 2). In this variety, /l/ also rhoticised before labials and velars (de Kolovrat 1923*a*, 213).

Turning to Sardinian proper, the same kind of rhoticisation as in Alguerese Catalan, at least in intervocalic position, can be found in the regions of Sàssari and Sorso (perhaps due to Genovese influence, cf. Wagner 1941, 122, §188, footnote 2, Blasco Ferrer 1984, 204) as well as on the western coast of the island (Meyer-Lübke 1934, 14, Blasco Ferrer 1984, 204, Contini 1987, 353). In preconsonantal position, the lateral and the rhotic tap merged into a lateral in only two Northern and Northwestern dialectal areas (for geographical details see Contini 1987, 361), whereas in the remaining parts of the island, the merger occurred in favour of the rhotic, with some villages having, not unexpectedly, an intermediate sound. In the villages of Villanova Tulo and neighbouring Nurri, lambdacisation of /ɾ/ only took place before /d/, and the outcome of this process is a dark /ɫ/ (Wagner 1941, 176, §§287-293, Contini 1987, 361-362, also Grammont 1933, 209). Rhoticisation in onset clusters occurs in Central and Southern Sardinian, while North and Northwestern dialects have /l/-palatalisation in this position (see Chapter 3)[7] (Wagner 1941, 159, §254, Contini 1987, 374), with rhoticisation to /gɾ/ being rare because of a prior evolution from /gl/ to /l/ (Meyer-Lübke 1934, 45, Wagner 1941, 162-163, §260). The majority of Old Sardinian texts show no signs of rhoticisation, and this until the 16th century for the Southern dialects. On the other hand, documents from the second half of the 18th century onwards show rhoticisation on a regular basis. Given these facts, Contini (1987, 380, 383-384) proposes that the sound change started during the second half of the 17th century; loanwords from Italian are also usually affected (Meyer-Lübke 1934, 44). Overall, /l/-rhoticisation in onset clusters seems to be less widespread than in preconsonantal position (Meyer-Lübke 1934, 65, Wagner 1941, 153-155, §§247-250, 176-179, §§294-304, Contini 1987, 380-383).

Returning to the Alps for a moment, we note that Rhaeto-Romance has rather little to offer in terms of /l/-rhoticisation: There are some examples of dissimilation in Sutsilvan, and in all dialects rhoticisation

---

7 The only varieties of Sardinian to neither rhoticise nor palatalise the lateral in onset clusters are those of Baunei and Orgosolo which metathesised it instead (Contini 1987, 373-374, footnote 79).

of intervocalic laterals appears sporadically; the only dialect where intervocalic rhoticisation occurs systematically is Ladin (de Kolovrat 1923*a*, 270, 273, Meyer-Lübke 1934, 14).

The Rhaeto-Romance situation stands in stark contrast to Italian, in many of whose dialects rhoticisation is frequent in all syllable positions. Beginning with the intervocalic singleton lateral, we note that rhoticisation is systematic in Southern Piedmontese, in the Canton Ticino dialects north to the Lago Maggiore, in Ligurian and in Milanese, and in at least some of these varieties the rhotic is "poco energica, debolmente vibrata (con limitata elevazione della lingua verso i denti)" (Rohlfs 1966, 306-307, §221) (cf. the description of the Andalusian Spanish tap by Navarro Tomás 1917, 270-271 on page 131 above). In other varieties of Ligurian down to La Spezia and the Lunigiana, the rhoticised lateral disappeared altogether. This sound change dates back to the Middle Ages (Meyer-Lübke 1934, 13, Rohlfs 1966, 306-307, §221). In Southern Italy, rhoticisation of intervocalic /l/ can be found in Northern Calabria, the Basilicata, and in some of the Gallo-Italic colonies of Sicily. In the varieties of Lucca and Elba, as well as in the dialects of Southern Lazio and Campania (including Naples), rhoticisation of intervocalic /l/ is restricted to the last syllable of proparoxyton words (Meyer-Lübke 1934, 14, Rohlfs 1966, 309-310, §221a, Rensch 1968, 594). For rhoticisation of Latin geminate /lː/ in unstressed contexts in areas which regularly undergo retroflexion of the geminate lateral (Meyer-Lübke 1934, 31, Rohlfs 1966, 333-334, §235), see Chapter 5.

In preconsonantal position as well, many sundry Italian dialects have rhoticisation. This happens, for instance, in several Tuscan varieties (de Kolovrat 1923*a*, 251-253, Meyer-Lübke 1934, 73, Folena 1959, Rohlfs 1966, 342, §243), with first attestations of the phenomenon from the 14th century, alongside examples of /ɫ/-vocalisation in preconsonantal position (Folena 1959, 6). More often than not, rhoticisation in preconsonantal position is restricted to cases where a labial or velar consonant follows, while before alveolars /ɫ/-vocalisation may occur. Examples where the latter may occur are the Ligurian variety of Genova, Piedmontese, a group of varieties close to the city of Subiaco in Lazio, the variety spoken in Lecce, Neapolitan and Sicilian, and the Corsican variety of Bastia and its surroundings[8] (de Kolovrat 1923*a*, 241-242, 244-245, 256-257, 259-261, Meyer-Lübke 1934, 71, 73). Before labials only, there is rhoticisation in the variety of Ancona or in the dialect of the Abruzzo region. In still other varieties, such as in southern Calabria or in Lazio (especially Rome), rhoticisation can occur in all preconsonantal laterals (de Kolovrat 1923*a*, 254-255). An interesting overview of rhoticisation in the word TALPA ('mole') and its derivatives across Italian dialects is found in Schürr (1927, 494-500), who notes

---

8 In the case of Corsican, according to Meyer-Lübke (1934, 14), this is due to influences from Genovese.

on p. 497 that areas of rhoticisation always occur in Italian next to areas of /ɫ/-vocalisation. In many of the aforementioned varieties, we also find cases of /ɾ/-lambdacisation, but because of the simultaneous presence of /l/-rhoticisation, it is difficult to determine whether these should be regarded as an independent evolution or as examples of hypercorrection (Folena 1959, 7, Rohlfs 1966, 376, §263). As in Occitan dialects, more recent loanwords from Standard Italian have usually been adapted into the dialects via rhoticisation (Rohlfs 1966, 342-344, §243, de Kolovrat 1923*a*, 261 for Sicilian, see also Meyer-Lübke 1934, 70).

Where there is no /l/-palatalisation in onset clusters in Italian dialects (see Chapter 3), we may find rhoticisation instead, as in some Abruzzo varieties (Rohlfs 1966, 241-242, §177, 245, §179, 248-251, §§183-184, 254-255, §186, 262, §190, 348-355, §§247-250, 356, §252 for a complete overview, see also Meyer-Lübke 1934, 45-46, Barbato 2005, 405, very briefly Giacomelli 1970, 136, 140, 145). Learnèd words show more instances of rhoticisation in onset clusters than words which have undergone the full phonetic evolution of the language (Giacomelli 1970, 149, footnote 46).

Finally, Romanian is well-known as presenting overall rhoticisation of Latin singleton /l/ already in the earliest documents; the sound change is thought to have occurred between the 4th and the 7th centuries CE. Latin geminate /l:/ was simplified to a singleton in Romanian (Meyer-Lübke 1934, 12, 32, Graur and Rosetti 1936, also Lausberg 1967, 39, §385, Belardi 1984*a*, 97).

4.1.3   *Rhoticisation (and lambdacisation) cross-linguistically*

As mentioned in the opening paragraph of this section, synchronic alternations and historical sound changes affecting laterals and rhotics are extremely widespread. Let me illustrate the pervasiveness of the phenomenon with a few examples from around the world. I shall start with the Indo-European domain. In practically all the dialects of Greek, the preconsonantal lateral rhoticises on a regular basis, with the only exception of foreign and learnèd words, especially those from the standard language (Newton 1972, 112-113, Kontossopoulos 2006*a*, 66, 108, 146, 149, 174, 177, 181, 193, both with numerous examples). There are fewer instances of rhoticisation in onset clusters, but it does seem to occur in Tsakonian and in the Greek dialects of Southern Italy (Rohlfs 1977*a*, 36, §49, Kontossopoulos 2006*a*, 6, 137), whereas in intervocalic position, some lone examples can be found in Crete (Kontossopoulos 2006*b*, 205). Liquid metathesis and dissimilatory lambdacisation of /ɾ/ are also widespread in Greek dialects (Newton 1972, 112-113, Kontossopoulos 2006*a*, 154-155, 167-168, 186, 201, Kontossopoulos 2006*b*, 153, 208, 213, 229). In the varieties spoken in Southern Italy, rhoticisation is attested as early as the first half of the 14th century

(Rohlfs 1977*a*, 36, §49). In the Indo-Iranian languages, the Proto-Indo-European lateral and rhotic merged into a rhotic, or, expressed in much the same way, /l/ rhoticised in these languages (Meillet 1930, 127, Blevins and Grawunder 2009, 290, footnote 16).

Among the non-Indo-European languages, Basque is of particular interest to Occitanists, especially to those concerned with Gascon, in light of the extensive and millennia-old contact between them. It seems therefore worthwhile to devote a paragraph to this language's lateral. In Pre-Basque, there were two kinds of lateral, a so-called fortis /l/ and a lenis /l/ which contrasted in intervocalic position. The fortis /l/ alone occurred word-finally, and the lenis /l/ word-initially.[9] Michelena (1985, 321) holds that these two laterals differed in quality and that the fortis lateral was likely palatal or palatalised. At some point in time before the first medieval documents known to us were composed, the intervocalic lenis /l/ underwent rhoticisation and merged with the already existing alveolar tap, while intervocalic fortis /l/ was reduced to lenis /l/. This happened in all dialects, except, in some cases, in the Zuberoan variety. In medieval manuscripts, word-final fortis /l/ is usually spelled <ll>. In Latin loanwords, Latin singleton /l/ was adapted as lenis /l/ (i.e., it rhoticised), whereas Latin geminate /l:/ underwent the same evolution as fortis /l/ (i.e., it has become singleton /l/). In Modern Basque, there is no qualitative or quantitative distinction between word-initial lenis /l/ and word-final fortis /l/: both are pronounced as a clear singleton /l/, and such is also the quality of the preconsonantal lateral.[10] The palatal lateral /ʎ/ is marginal in Basque in that it occurs only in loanwords from Spanish, in contexts where the clear lateral is assimilated to a palatal vowel and in cases of affective palatalisation (Michelena 1985, 179-183, 311-326, 549-553, Trask 1997, 142-144, also Gamillscheg 1950, 34-36).

The Caucasian language Georgian presents an interesting case of liquid dissimilation which is akin to what we find in Latin (see 4.1.2 above). While suffixes containing /l/ never rhoticise, the suffixes of the type /-Vɾi/ (where /i/ is a case marker) have the form /-Vli/ when the root contains a /ɾ/, unless this /ɾ/ is separated from the suffix by another lateral. Moreover, no native root of Georgian has two /ɾ/s (Fallon 1993, 106-111).

Among Afroasiatic languages, there are frequent interchanges between laterals and rhotics for instance in Berber where a rhotic in Tarifit Berber corresponds regularly to a lateral in Tachelhit Berber, and similar alternations can be found among the various other Semitic languages (Lipiński 2001, 142 with examples and details). A Proto-Algonkian lateral developed into a rhotic in Atikamek Cree (Picard

---

9 There is some dialectal /l/~zero alternation in word-initial position. On the other hand, dialectal /l/~/n/ alternation is also reported in this position (Michelena 1985, 323-324).

10 With the exception of some parts of the Suletine area, where the preconsonantal lateral is dark (Michelena 1985, 311).

2001). In the Kwa language Ega (Niger-Congo), the only liquid of the language is realised freely as either /l/ or /ɾ/. Cognate forms in languages of the Moru-Madi group (Central Sudanic) of the Nilo-Saharan language family show alternations of /r/~/l/~/ɽ/. In some of the Karnic languages of Central Australia, some present-day rhotics seem to have evolved out of a lateral (see Proctor 2009, 23, 33-34 and references therein). We find a rhotic dissimilation process similar to that of both Latin and Georgian (see above) in Sundanese (Austronesian) where the distributive infix /ar/[11] becomes /al/ in words that either start with a lateral or that contain another rhotic unless it is the onset of the second syllable of the word. Rhotic lambdacisation of a dissimilatory nature is also possible in loanwords and morphologically complex words (Robins 1959, 343, Cohn 1992). A similar dissimilation occurred in the history of neighbouring Javanese, whereas in Toba Batak the reverse process, namely liquid harmonisation, can be found (Proctor 2009, 29-30 and references therein). Within the Philippine languages, Proto-Manobo /r/ developed into Agusan Manobo /l/ (while Proto-Manobo /l/ became Agusan Manobo /j/) (Schumacher and Schumacher 1978, 184).

Having now amply illustrated the widespread occurrence of /l/-rhoticisation and associated processes in the languages of the world, I shall turn to phonetic characteristics of both laterals and alveolar taps in Section 4.2 which will be of use when discussing the possible origins of these sound changes in Section 4.3.

4.2   PHONETIC DIFFERENCES AND SIMILARITIES BETWEEN /L/ AND /ɾ/

4.2.1   *Differences and similarities in articulation between /l/ and /ɾ/*

As liquids, both /l/ and /ɾ/ are composed of a tongue tip and a tongue body gesture (Proctor 2009, 102). The exact position of the tongue body according to liquid seems to differ across languages; for instance in Spanish, the tongue body is in the position of the vowel /e/ in the clear lateral, whereas for the alveolar tap, it takes that of /ə/; admittedly, these two tongue body positions are rather similar to each other, but not quite the same; moreover, given the relative resistance of both sounds to coarticulatory influences, compared to alveolar stops, their tongue body needs to be considered to be rather constrained (though more constrained in dark /ɫ/ than in clear /l/) (see 1.1.3) (Proctor 2009, 94, 188, ultrasound study).

Differences arise with respect to the tongue tip. Although both /l/ and /ɾ/ can undergo continuous closure fronting (Recasens 2007*a*), it is obvious that the main difference lies in the fact that the tongue

---

11 The Sundanese rhotic is either a trill or a tap, depending on prosodic position; the lateral is relatively clear (Abigail Cohn, p.c., August 2011).

tip effects a central closure in the lateral which can potentially be prolonged as long as one pleases, whereas the movement of the tongue tip in the tap is characteristically short and only briefly touches the alveolar ridge. A further, important difference, of course, lies in the presence of side channels in the lateral, but not in the tap.

4.2.2 *Differences and similarities in the acoustic structure of /l/ and /ɾ/*

Both sounds, by virtue of their liquid nature, allow for spontaneous vibration of the vocal folds: the lateral since air continues to flow through the side channels, the tap because its brief interruption of the airstream is not enough to call for manœuvres regarding voicing maintenance in the face of intra-oral air pressure build-up. Against this background of sonorant voicing coloured according to the tongue body's precise location, the tongue tip closure produces a modulation, which is why it is frequently called the 'consonantal' element of the liquids (Carlson 2007, Proctor 2009, 15, 189). In the case of the lateral, this produces an attenuation in overall intensity and in most cases a marked amplitude drop (zero) in the spectrum (see 1.2.2); the tongue tip movement of the tap results in a very short, but marked, interruption of the acoustic carrier. Reduced taps, i.e., in which the tongue tip travels toward the alveolar ridge without touching it, show a short period of reduction of the acoustic energy, but without interruption of (all of) the formant structure.

Some dialectologists have pointed to the reduced duration of the lateral undergoing rhoticisation, so for instance Navarro Tomás (1917, 273) for Spanish. A number of publications on the phonetics of the lateral have investigated its duration, though not always in a systematic way. Sometimes only results across syllable conditions are given, while in other cases, detailed measurements are available. The following Table 16 on page 138 and Table 17 on page 139 provide lateral durations gleaned from the literature.

The values in Table 16 on page 138 and Table 17 on page 139 give a rough indication of the duration values the lateral can take on across speech styles. Note that hardly any of the values in these tables have been normalised with respect to speech rate. Moreover, Fougeron (1998, 226, 236-237) observes that the duration of the French lateral increases in higher prosodic constituents, while its acoustic energy simultaneously diminishes, which she explains as being due to a greater constriction in the longer consonant where the rising air pressure makes it more difficult to maintain adequate aerodynamic conditions for voicing.

In comparison to the lateral, duration values for the alveolar tap are much smaller. For Thessaloniki Greek, the tap was found to have an average duration of 28.5 ms (Standard Deviation (SD) 10.2 ms) in intervocalic position and 21.9 ms (SD 6.7 ms) in preconsonantal

Table 16: Durations of the lateral across different Romance languages. The first column specifies the language and the variety analysed if available, the second column gives the duration of the lateral in milliseconds (standard deviation where available in parentheses), the third column specifies the context in which the lateral occurred, the fourth column indicates the kind of speech analysed, and the fifth and last column gives the source from where the duration values have been taken.

Language (variety)	Duration in ms (standard deviation in ms)	Syllable-/ word-context	Kind of speech	Reference
Occitan (Upper Arièja Lengadocian)	61 (23)/ 58 (30)	word-initial (Caishax/ Saurat)	spontaneous speech	Müller, unpublished material
	49 (18)/ 32 (11)	onset cluster (Caishax/ Saurat)		
	66 (35)/ 63 (30)	intervocalic (Caishax/ Saurat)		
	80 (37)/ 56 (20)	preconsonantal, word-final		
Occitan (Western Lengadocian)	148 (25)/ 69 (9)	word-initial (speakers SC/ XB)	laboratory speech	Müller, unpublished material
	61 (9)	intervocalic		
	67 (13)/ 68 (16)	labial / velar + lateral		
Spanish	80 (24)	intervocalic	read speech	Proctor 2009, 75, table 4.2
	88.7/ 66.9	word-initial (stressed/ unstressed)		Quilis et al. 1979, 322
	70.2/ 71.3	intervocalic (stressed/ unstressed)		
	94/ 82.7	word-final (stressed/ unstressed)		
	58.1/ 61	labial/ velar + lateral		Quilis et al. 1979, 325-328
	62.9/ 64.9/ 64.6	lateral + labial/ alveolar/ velar		Quilis et al. 1979, 329, 331-332, 337
Italian	97.5	word-initial		Bladon and Carbonaro 1978, 46, fig. 2
	115.5	preconsonantal		
	81/ 182	intervocalic (singleton/ geminate)		
Sardinian	92.5/ 135	singleton/ geminate		Contini 1987, 376

Table 17: Durations of the lateral across different non-Romance languages. For details see Table 16 on page 138. Note that the last value, for Patras Greek, indicates a range rather than an average value.

Language (variety)	Duration in ms (standard deviation in ms)	Syllable-/ word-context	Kind of speech	Reference
English (British: Northern RP)	58 (13)	in "real afters"	read speech	Wrench and Scobbie 2003, 318
English (British: Leicestershire)	58.4	intervocalic		Newton 1996, 182-183
English (British: Greater Manchester)	70.3	intervocalic		
English (British: Northern Ireland)	53.6	intervocalic		
English (British: Southern RP)	61.2	intervocalic		
English (General American)	77/ 110	word-initial after a consonant-final word/ word-initial after a vowel-final word	read speech	Oxley et al. 2007, 529, table 2
	75/ 81	word-final before a vowel-initial word/ word-final before a consonant-initial word		
Greek (Thessaloniki)	127 (18)	intervocalic	laboratory speech	Müller 2010
	112 (15)	preconsonantal		
Greek (Athens)	79 (7)	across all contexts	spontaneous speech	Loukina 2010, 122, table 2
Greek (Thessaly)	65 (1)	across all contexts		
Greek (Cyprus)	63 (19)/ 119 (34)	singleton/ geminate		
Greek (Patras)	30-110	across all contexts	spontaneous speech	Papazachariou 2003, 26

position. The reduced preconsonantal tap, however, had a longer duration of 83.5 ms (SD 11.5 ms) in the laboratory speech of the speaker under analysis (Müller 2010). The postconsonantal tap in the study of Nicolaidis and Baltazani (2011) on /Cɾ/-clusters in Greek had an average length of 24 ms (SD 8.7 ms). The alveolar tap of the Spanish speakers in Proctor's ultrasound study was 34 ms on average (Proctor 2009, 75, table 4.2).

4.3   EXPLAINING /l/-RHOTICISATION (AND /ɾ/-LAMBDACISATION)

As in previous chapters, I'd like to start by providing a short overview of explanations of the phenomenon which have been proposed over the course of the last century. We will see that, according to the fashion of the time, articulatory approaches prevailed over acoustic ones until quite recently.

Two researchers have wondered how best to explain the apparent preponderance of the lateral to rhoticise before labials and velars, as seen in various Romance dialects (see above Section 4.1). Grammont (1933, 208) imputes the prerequisite conditions of articulatory weakening of the lateral to its being subjected to influences from the preceding vowel; given that the following labial or velar lacks a tongue tip gesture, the lateral will lose its tongue tip gesture, too, due to anticipatory assimilation. The result would be a 'non-trilled r', possibly an approximant rhotic, although the description given by Grammont seems to be that of a palatal approximant. This 'non-trilled r' would then be subject to reinterpretation and be recategorised as an alveolar tap, assuming such a sound is already present in the language.

For Straka (1942, 29) and Straka and Nauton (1947, 218), who ask the same question, the explanation runs along slightly different lines. They observe that, while /ɫ/-vocalisation before alveolars took place very early in the history of the Romance languages, rhoticisation before labials and velars occurred at a later date. The absence of rhoticisation before alveolars is therefore explicable, according to them, by /ɫ/-vocalisation bleeding it of laterals which could have undergone the process. On the other hand, in their view, alveolars would have accelerated articulatory weakening of the lateral (see 2.1.3, for a discussion of this claim), while labials and rhotics never achieved a degree of weakening in their preceding lateral which would have driven it into vocalisation. Instead, Straka and Nauton argue, the lateral's tongue tip, weakened as it is, would have been pushed back slightly by the airflow, and this would have given rise to /ɾ/.

These two approaches have in common that they view rhoticisation of the lateral as a result of articulatory weakening, especially of the tongue tip. Tongue tip reduction, and not temporal reduction, would lead the weakened lateral to be included in the category of the rhotics. Conversely, Straka (1979, 482) also advances a lenition account for

rhotic lambdacisation (also Grammont 1933, 209). If an /ɾ/ weakens, he argues, and this weakening concerns not only the tongue tip but also the tongue body, lateral side channels could appear. The tongue tip meanwhile, in an attempt not to lose contact with the alveolar ridge, would form a firm closure with it. This latter move is curious insofar as the new tongue tip contact needed in order to produce the lateral would be an example of strengthening rather than weakening. Contini (1987, 383), on the other hand, characterises the lambdacisation process found in Central and Southern Sardinian dialects as a hypercorrective effort after articulatory weakening of the lateral had paved the way to rhoticisation rather than the result of an alteration in the pronunciation of the tap .

Some recent approaches still emphasise the articulatory side. Since both the tap and the lateral share a very similar tongue body gesture, which is moreover determined to some degree by its surrounding vowels, heed is paid to changes in the tongue tip. Writing from the vanguard of Articulatory Phonology, Proctor (2009, 115) proposes that "[r]hotacization [. . .] could result from a reduction in the degree of damping of the tongue tip gesture, while stiffening of the tongue blade would be a contributing factor in the reverse process of lateralization. In other words, a tongue tip which would fail to make firm contact with the alveolar ridge can lead to rhoticisation, while the reverse, the establishment of such contact, can be accountable for lambdacisation." In the event that the tap and the lateral merge into the oft-observed intermediate sound, Proctor (2009, 189) considers this to "result[ ] from the loss of distinction between tongue body constriction locations and tongue tip gestural control." I would like, however, to raise the question whether rhoticisation of /l/ and, conversely, lambdacisation of /ɾ/ by necessity need to be treated as weakening or strengthening processes and whether changes in the articulatory configurations of the sounds in question lead to or result from misperception.

Readers will have noticed that the previously discussed explanations of /l/-rhoticisation have somewhat neglected the role of duration. Smaller durational values are perhaps implied by the description of /l/-rhoticisation as weakening, given the fact that weaker prosodic environments such as unstressed syllables often lead to reduction of articulatory gestures in both their magnitude and temporal extent. Nevertheless, it is interesting to ask how important the role of durational variation is and to what extent it can be separated from articulatory reductions. Some answers to this question are suggested by results of a perceptual study of /l/-rhoticisation in Greek (Müller 2010).[12]

---

12 A similar study focusing on rhoticisation of /s, z/, as occurred historically in Latin and Old English and as exists today in synchronic variation in Castilian Spanish and Majorcan Catalan, has been carried out by Romero and Martín (2003). They presented American English listeners with words containing /s/ or /z/ whose duration had been manipulated by 0%, 25%, 50%, 75% or 100%. Their results show that a category

In this study, I presented Greek listeners in a forced-choice test with nonsense words in which /ɾ/ or /l/ were embedded either in a symmetric intervocalic context with either of the vowels /a, i, u/ or in preconsonantal position with either of the voiceless stops /p, t, k/ following (the vocalic context being again symmetrical /a, i, u/). The lateral was not only presented as it was recorded, but also in two different shortened durations: while the original lateral had an average duration of 127 ms (SD 18 ms) in intervocalic position and 112 ms (SD 15 ms) in preconsonantal position (see Table 17 on page 139), it was shortened in both positions to 75 ms (corresponding to the duration of the speaker's reduced, approximant-like /ɾ/) and to 30 ms (corresponding to the duration of the speaker's tap closure) (see Figure 8 on page 143, Figure 9 on page 143, and Figure 10 on page 143). In essence, the results showed that only the 30-ms-long laterals gave rise to rhoticisation in perception; overall, rhoticisation rates were highest in the context of /u/ (60% intervocalically, 53% in preconsonantal position) and lowest in the context of /a/ (20% intervocalically, 15% in preconsonantal position), with the /i/-context lying somewhere in between (28% intervocalically, 33% in preconsonantal position). Interesting results were also yielded by the rates of misperception of rhotics as laterals. The speaker had two distinct varieties for his rhotic: a tap (fully-articulated or reduced) which was accompanied in preconsonantal position by a svarabhakti vocalic element or an approximant which lacked any trace of the svarabhakti vowel (see Figure 11 on page 144 and Figure 12 on page 144). Of these, 2% of the taps and 28% of the approximants were misperceived as laterals; note that none of the rhotics were manipulated and all occurred in carefully articulated laboratory speech. For further details, see Müller (2010).

In Müller (2010), I could show that even clearly articulated laterals, when shortened in duration, could be misperceived as alveolar taps at rates between 15% and 60%, depending on vocalic context. It can and should be argued, of course, that reduction in duration is most probably always accompanied by some articulatory reduction. It seems nevertheless that specifically the tongue tip may still form contact with the alveolar ridge in a shortened lateral. I'd like to argue that it is the presence of a rather constrained tongue body gesture of similar position in both /l/ and /ɾ/ which leads to /l/ evolving into the tap rather than, say, /d/, which, as a stop, also has a different aerodynamic mechanism.[13] In other words, it seems quite conceivable that /l/ be able to rhoticise through temporal reduction rather than through

---

switch from fricative to tap occurred somewhere between the 50% and 75%-shortened /s, z/. It thus seems that duration is a key element in understanding rhoticisation not only of the approximant /l/, but of the sibilant fricatives as well. Romero and Martín (2003) didn't test, however, for the reverse process, a hypothetical assibilation of /ɾ/.

13 This is not to deny that alternations between /ɾ/, /l/, /d/ and even /ɖ/, both in sound change and in synchronic variation, are very common in the languages of the

Figure 8: Spectrogram of nonsense word [alˈka] as spoken by a male speaker of Thessaloniki Greek.
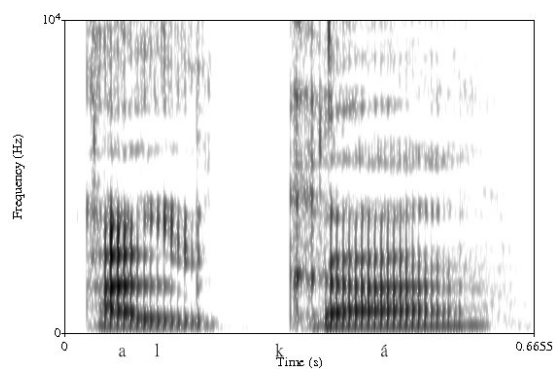

Figure 9: Spectrogram of nonsense word [alˈka] as spoken by a male speaker of Thessaloniki Greek. The duration of the lateral has been shortened to 75 ms.
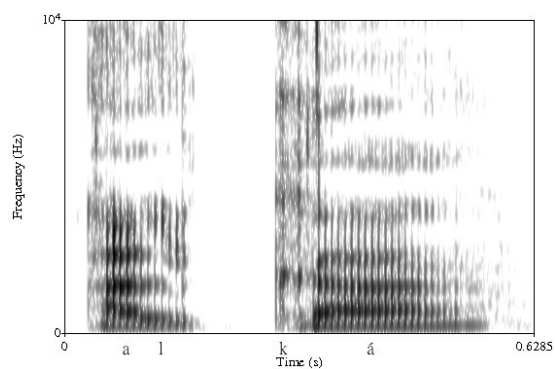

Figure 10: Spectrogram of nonsense word [alˈka] as spoken by a male speaker of Thessaloniki Greek. The duration of the lateral has been shortened to 30 ms.
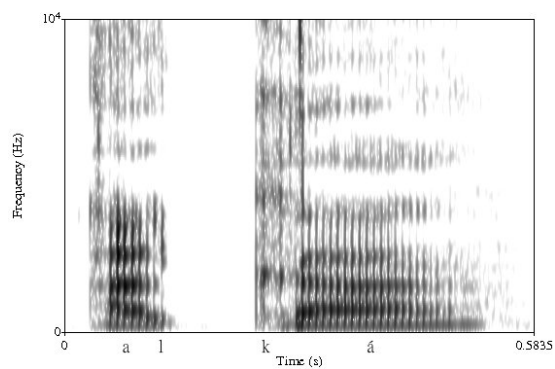
Figure 11: Spectrogram of nonsense word [aɾˈka] as spoken by a male speaker of Thessaloniki Greek. The symbol @ is used to designate the svarabhakti vowel.
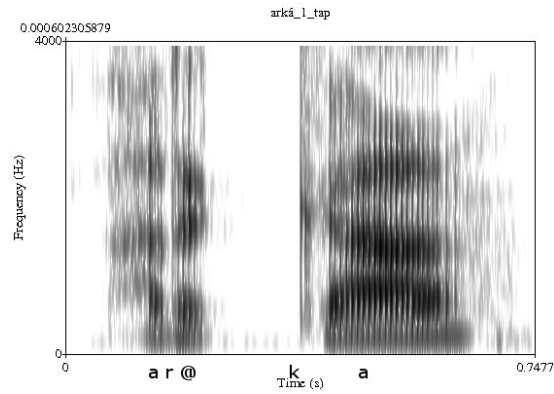
Figure 12: Spectrogram of nonsense word [aɹˈka] as spoken by a male speaker of Thessaloniki Greek. Note that speakers of Greek do not consciously distinguish between the realisation of the rhotic as a tap shown in Figure 11 on page 144 and as an approximant shown here.
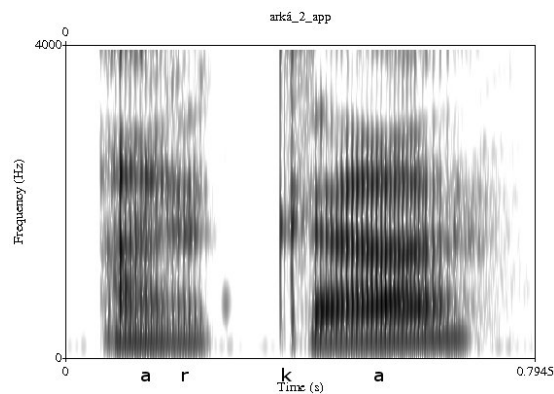
substantial reduction in magnitude of its articulatory configurations. In this sense, /l/-rhoticisation relies heavily on perception. If indeed the tap can be seen as a short momentary interruption of the acoustic carrier (Carlson 2007), which, in some cases, may just be a reduction in acoustic intensity as in reduced taps, then a shortened lateral whose acoustic intensity is characteristically less than that of adjacent vowels should be subject to confusion with the tap. The results by Romero and Martín (2003) on /s, z/-rhoticisation also point in this direction, in the sense that it seems that what listeners attend to in order to identify a tap is essentially its characteristically short duration, regardless of remnants of acoustic zeroes in the case of the lateral or of high-frequency frication in the case of the sibilant fricatives.

With respect to the prediction that preconsonantal /l/-rhoticisation should occur more often before labials and velars, no significant results were obtained in my study on Greek (Müller 2010). It needs to be investigated, however, whether more reduced taps occur before labials and velars; such a hypothesis arises from the fact that tongue tip reduction is more frequent in this phonetic context in /l/, as already observed with respect to /ɫ/-vocalisation (see 2.1.2.1).

The reverse case of lambdacisation, on the other hand, seems to hinge on more than simple duration issues. A tap, even a reduced one, is a fast ballistic movement of the tongue tip (Barry 1997) designed to create a short interruption in the acoustic carrier, as discussed above, and as such cannot readily be lengthened. The results from Müller (2010) strongly suggest that taps are generally not perceived as laterals (only 2% of lateral responses). The presence of a variant of the tap which I have classified as an approximant because of its lack of a svarabhakti vowel and its significantly longer duration when compared to the tap and the svarabhakti vowel taken together seems therefore a prerequisite for lambdacisation to take place. While no articulatory data as to the precise tongue tip movement of this kind of approximant rhotic is available, I assume that the target position of the tongue tip is just below the alveolar ridge without touching it. This means that the approximant rhotic would not just be an undershoot version of the tap, but a gesturally-reorganised rhotic variant that has emerged in Greek and now occurs in free variation with the tap proper. Recall that the approximant rhotic yielded 28% of lateral responses in the forced-choice test. While this is still far from chance level, there is at least a tendency toward lambdacisation. Given the more complex requirements for lambdacisation – the tap has to be lengthened via gestural reorganisation – as compared to rhoticisation for which temporal reduction alone can suffice, it becomes understandable why lambdacisation occurs at much lesser rates cross-linguistically and cross-dialectally than rhoticisation of /l/.

---

world. This fact rather shows that the contribution of the tongue body may be missed by the listener.

One wonders, of course, whether the sound intermediate between /l/ and /ɾ/ so often described by the dialectologists (see Section 4.1) would in fact be this kind of approximant rhotic found in the Greek speaker analysed in Müller (2010). Straka and Nauton (1947, 197, 207) described the 'reduced rhotic' of Léger-Naut and Puèi-de-Doma Auvernhat Occitan as having a raising movement of the tongue tip, but without contact occurring at the alveolar ridge. In a few locations, this has given rise to lambdacisation (see 4.1.1 above). Similar descriptions are reported for other varieties of Occitan as well as for varieties of Spanish (see 4.1.2), and said intermediate sound is presumably found in many more languages of the world.

The question then arises as to why the approximant rhotic would be perceived as a lateral at all. Where does laterality come from? In the Greek case, the guess can be ventured that the longer duration and the lack of the characteristic short interruption of the carrier in the approximant rhotic were sufficient for listeners to group it with the laterals instead of with the rhotics. The same reasoning may apply to Occitan and Spanish, which are phonetically similar to Greek in this respect. This hypothesis also draws on the fact that these languages do have a category 'lateral' into which to put the misperceived approximant rhotics. Whether approximant rhotics could give rise to a lateral category in a language which phonetically completely lacks laterals, remains an empirical question the answer of which could well constitute a test case for the hypothesis put forth in this paragraph.

This leads us into the realm of open questions, desiderata and other speculations in relation to /l/-rhoticisation and /ɾ/-lambdacisation. It is therefore time to move to the conclusion.

4.4 CONCLUSION

In this chapter I have discussed the widespread phenomenon of /l/-rhoticisation and its less widespread counterpart, /ɾ/-lambdacisation. In Section 4.1, I have described its geographical distribution in the dialects of Occitan as well as in the Romance languages in general. I have also given examples of the /l/ – /ɾ/-interplay, through sound change or synchronic variation, sometimes morphologised variation, in various languages across the world, as an indicator of the pervasiveness of the phenomenon. Section 4.2 has been a brief discussion of the phonetic commonalities and differences between /l/ and /ɾ/; duration has been given special attention since it is thought to play an important role in the process of rhoticisation and lambdacisation. This has been followed in Section 4.3 by a historical overview of the approaches to the phenomenon, mainly from an articulatory vantage point. Finally an attempt at understanding key aspects of rhoticisation and lambdacisation has been presented.

Let me build on this last point to discuss the vast array of research questions which have arisen during this study. The role of lateral quality has not been addressed in the foregoing discussion, but there is reason to believe that there is some relevance to this issue. When one looks closely at the geographical distribution of /l/-rhoticisation, it is striking to see that it often occurs in the immediate vicinity of varieties whose intervocalic or preconsonantal laterals are moderately dark. This is certainly true for the Occitan varieties presented in 4.1.1 (recall that the clear laterals of Lengadocian seem to be a recent evolution, perhaps due to contact with clear-/l/ Standard French). Auvernhat varieties which present rhoticisation are geographically adjacent to those which have /ɫ/-vocalisation in intervocalic position (see Section 2.2). Moreover, in both Auvernhat and Provençal, /l/-rhoticisation affected the Latin singleton /l/ only, despite the prior simplification of the former Latin geminate lateral to a singleton preserving its clear quality. In Provençal Alpin Occitan varieties, some have rhoticisation in intervocalic position, others dark laterals. When, in the Sardinian villages of Villanova Tulo and Nurri, /ɾ/ undergoes lambdacisation before /d/, the outcome is a dark lateral (Wagner 1941, 176, §§287-293, Contini 1987, 361-362). In Italian dialects, rhoticisation in preconsonantal position is often restricted to cases in which a labial or velar consonant follows, whereas /ɫ/-vocalisation took place before alveolars (see Section 2.1), thus suggesting a dark quality of the lateral in preconsonantal position in these dialects. While Brazilian Portuguese has pervasive /ɫ/-vocalisation in preconsonantal position, the Caipira dialect has rhoticisation instead (Feldman 1972, 137). Portuguese Minho dialects even have both /ɫ/-vocalisation and rhoticisation (see 4.1.2 above). Furthermore, in the variety of Southern Kurdish spoken by women, rhoticisation occurs with dark /ɫ/, but not clear /l/ (dark and clear laterals contrast in this language, see 1.1.4) (McCarus 1997, 694). A counterexample to this trend is, however, the Catalan variety spoken in L'Alguer (Sardinia) with its clear laterals (Recasens forthcoming); one wonders nevertheless whether these clear laterals are as much a relatively recent evolution as in Lengadocian Occitan. Similarly, the fact that rhoticisation occurred in loanwords from standard Italian and French, which both have decidedly clear /l/s (see 2.1.1.2), seems to cast doubt on the need for a moderately dark lateral involved in the sound change. But a correlation between degree of darkness and propensity to rhoticisation is certainly to be expected on the grounds that a clear lateral such as that found in Standard German should have quite a different tongue body position from that of the tap and thus be less close to it in acoustic terms. Whether this hypothesis turns out to be right will need to be shown experimentally.

Similarly, the nature of liquid dissimilation has yet to be understood. While in the heydays of formal phonology such as the Feature Geometry framework, liquid dissimilation (or any dissimilation for

that matter) was ascribed to the workings of the Obligatory Contour Principle which stated that no like segments may occur next to each other, and the process invoked was one of delinking followed by a default rule which filled in the desired feature (here: [±lateral]) (see, e.g., Fallon 1993, 105, Blevins 1994, 340), such a perspective remains rather unsatisfactory. Ohala's view of dissimilation as hypercorrection (Ohala 1983a, 58-60, Ohala 1987b, 221-223, Ohala 1987a, 215-218, Ohala 1988, 181, Ohala 1989, 188-190, Ohala 1992c, 23, Ohala 1993, 249) states that only slow features such as nasalisation which are capable of stretching over several syllables are likely to dissimilate, since listeners would attribute their presence in an earlier syllable to their presence in a later syllable and hypercorrect what they heard. We know that the acoustic effects of a tongue body gesture can be discerned several syllables ahead of the sound they belong too, i.e., some anticipatory articulation must be present. Thus, Heid and Hawkins (2000, 80) found that the acoustic effects of the tongue body of the Southern British English rhotic and lateral can be observed up to 5 syllables, and 0.5-1 s before the conditioning /ɹ/ or /l/. But what is being dissimilated in liquid dissimilation is not the tongue body gesture, which is rather similar in both sounds, but the tongue tip gesture or rather its acoustic effects, i.e., a short interruption in the carrier for the rhotic vs. a longer reduction of energy and creation of a zero in the transfer function for the lateral. Now, it is hard to see how the momentary reduction of acoustic energy during the short closure of the tap would qualify for a slow transition, and I would like to say that it doesn't. When listeners misperceive the nature of the lateral or the tap in a dissimilatory context, they seem at least to grasp that there is a liquid present, but they appear to be confused as to its identity. Directions in which to look for answers may include the realm of working memory. Studies have shown that the auditory trace decays by 400 ms (Remez 2003, 295); depending on speech rate, this can well include several syllables, but may nevertheless be somehow responsible for the arising confusion. Clearly, much more research into long-distance dissimilation such as occurs with the liquids is needed.

A further question concerns the variability of the rhotic in relation to lambdacisation: Which is the degree of reduction or even reorganisation of the tap needed in order for it to be perceived as a lateral? What is the prevalence of such reduced taps in a particular language and how does it relate to the sound changes discussed in this chapter? Finally, one wonders where the perceptual boundary between /l/ and different types of reduced /ɾ/ in terms of duration is situated and how steep it would be. These are all topics for further research. In conclusion, it doesn't seem to be an overstatement to say that even a phenomenon which seemed to be so readily understood that few scholars deemed it worth devoting their time and paper to it raises more questions than can be answered by the present investigation.

RETROFLEX DEVELOPMENTS OF THE LATIN GEMINATE LATERAL IN GASCON

5.1 RETROFLEX DEVELOPMENTS OF LATIN /l:/ IN GASCON AND ELSEWHERE

In this section, I will present the developments of the Latin geminate lateral ascribable to retroflexion as we encounter them in Gascon and other Romance languages and dialects. I will begin with the description of these developments in Gascon (5.1.1); in 5.1.2, we will see related developments in Upper Aragonese and Western Asturian before moving in 5.1.3 to the retroflexion of Lat. /l:/ in Southern Italy, Sicily, Sardinia, and Corsica. Finally, in 5.1.4, I will mention some related developments outside of the Romance language area, before turning, in Section 5.2, to the convoluted explanatory history of the phenomenon, and later, in Section 5.3, to the phonetics of the sound change.

5.1.1 *Developments of Latin /l:/ in Gascon*

In the Occitan dialect of Gasconha (see Figure 13 on page 150), the Latin geminate lateral, when it came to be in word-final position after the Latin word-final vowels had disappeared, developed into an alveolar or palatoalveolar stop or affricate,[1] i.e. /t/ or /tʲ/ > /t͡ʃ/[2] (for the regional distribution of the different outcomes, see Bec 1968,

---

[1] According to Rohlfs (1929, 392), in unstressed word forms such as the masculine definite article, the result of the sound change can also be /ʒ/, e.g., in Santenh (09). Rohlfs would like to link this to the palatalised results of Latin geminate /l:/, but it can also be seen in relation to the postalveolar affricate /t͡ʃ/. In some scattered varieties of the Val d'Aran and the upper Garona valley, the masculine definite article "èth" < Lat. ɪʟʟᴜᴍ has the form /ɛɾ/ before vowel-initial words, but this would be, according to Bec (1968, 86-87), a recent evolution perhaps due to analogical pressure.

[2] Moreover, Gascon also has undergone a sound change whereby word-final /t/ palatalised to /tʲ/ (> /t͡ʃ/). The dialectal zone where this happened corresponds almost perfectly to that where word-final /l:/ developed into a palatalised stop /tʲ/ (with a possible further affrication to /t͡ʃ/). The word-final /t/ which palatalised originated in the intervocalic stops /t/ and /d/, where /t/ merged through intervocalic voicing with /d/, before it came to be in word-final position after the elision of the Latin word-final vowels. Where this /d/ stayed in intervocalic position, it is today /ð/, so for instance in words derived from those which present today /tʲ/ < Lat. /t, d/ in word-final position. Latin /t:/, even in word-final position (/tut/ "tot" < Late Latin *ᴛᴏᴛᴛᴜᴍ (Classical Latin ᴛᴏᴛᴜᴍ), was not affected. In Old Gascon up to circa the 13th century, the word-final /t/ < Lat. /VtV, VdV/ is usually spelled <d> (or <g>), while the word-final /t/ from Lat. /t:/ or /Ct/ is spelled <t>. Bec thinks that the <d> represented an unaspirated devoiced /d/, while the sound written as <t> had aspiration. All final stops in these Gascon varieties today seem to be aspirated,

Figure 13: Geographic extent of Gascon Occitan with respect to the other
          Occitan dialects.
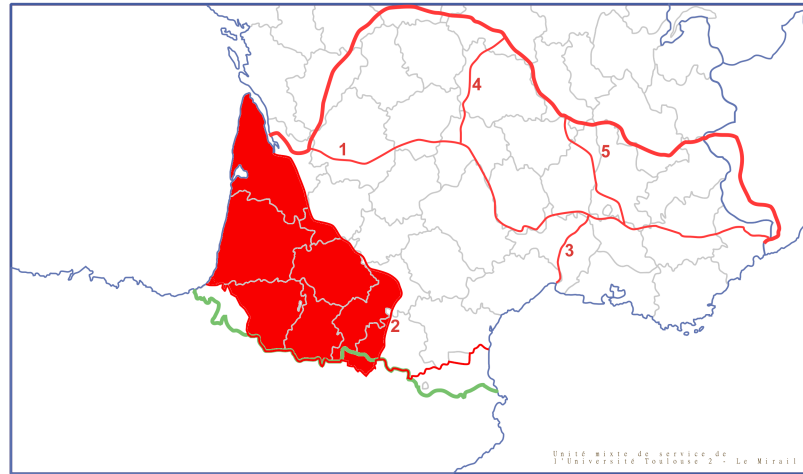
isogloss 7). In intervocalic position, the sound change affecting Lat. /lː/ led to a rhotic /ɾ/ (Zauner 1898, 22-23, Passy 1904, 69-75 and 148-158, Fleischer 1912, 52-57, Rohlfs 1929, Ronjat 1932, 315-316, §398, Menéndez Pidal 1954, 174-175, Lausberg 1967, 69, §496, Bec 1968, 85-98). This evolution is illustrated in Table 18 on page 151 for the rhoticisation of Latin intervocalic /lː/ and in Table 19 on page 152 for the evolution to /t, tʲ, t͡ʃ/ in word-final position.

The evolution has been attested very early on in medieval texts, with the earliest example being "asag"[3] from circa 980 (Meyer-Lübke 1934, 37, Rohlfs 1977*b*, 152, §468). Given that in the earliest written records, we are in the presence of an already completed sound change, it is very difficult to tell with precision when exactly its evolution took place and through which variants it passed. Chambon and Greub (2002, 478) suggest that the assumed stage of retroflexion must have occurred prior to the elision of the word-final vowels (other than /a/) since such an articulation would only have been able to develop in intervocalic position (probably owing to the fact that the Latin geminates occurred nowhere other than in this position). Drawing on numismatic evidence for word-final vowel deletion from the 6th century CE, they conclude that retroflexion must date from that period (Chambon and Greub 2002, 481-482).[4] In any event, forms such as "cabaugar" < Lat. CABALLICĀRE or "beutat" < Lat. BELLITĀTEM, both with preconsonantal

---

but it seems difficult to tell whether this aspiration is due to former affrication or has itself induced the affrication (Bec 1968, 76-84).

3 The spellings used almost interchangeably during the 11th-12th centuries were <g> and, most notably, <d> (<t> being rarer), while palatalised sounds were usually noted by <it>, <g>, or <ig> (Bec 1968, 94, similarly Luchaire 1973, IX, footnote 1).

4 Contra Bourciez (1967, 305-306, §271), who opts for the 9th century CE as the initiation point of the sound change.

Table 18: Examples illustrating rhoticisation of Latin intervocalic /lː/ in Gascon. Departament numbers are given in parentheses, e.g., (33) = Gironda; the reference point in the linguistic atlases is also given, e.g., ALG 685 = point n° 685 in the *Atlas Linguistique de la Gascogne* (Séguy and Ravier 1954-1973). The example words are given both in IPA transcription and in orthographic transcription. The second-to-last column provides the etymon of the example word, while the last column provides an English gloss.

Location	reference point	example word	orthographic form	etymon	gloss
Artics (64)	ALG 685	[aˈnɛɾəs]	"anèlas"	ANNELLAS	'ring of the scythe'
Jigun (32)	ALG 668	[aɾˈmɛɾɔ]	"armèla"	ARMILLAM	'oxbow'
Aubèrt (Val d'Aran)	ALG 699E	[esˈtɛɾes]	"estèlas"	HASTELLAS	'chopped pieces of wood'
La Tèsta-de-Bug (33)	ALG 662	[paðəˈɾɔt]	"padelòt"	*PATEL-LOTTUM	'saucepan'
Hoalhés (47)	ALG 656	[klaweˈɾa]	"clavelar"	*CLAVEL-LĀRE	'to nail'

Table 19: Examples illustrating the evolution of Latin word-final /lː/ to an alveolar or alveolopalatal obstruent in Gascon. See Table 18 on page 151 for details.

Location	reference point	example word	orthogra-phical form	etymon	gloss
Armons-e-lo-Cau (32)	ALG 678NO	[aˈɲɛt]	"anhèth"	ĀGNELLUM	'lamb'
Banhères-de-Luchon (31)	ALG 699	[sawˈmɛt]	"saumèth"	SAGMELLUM	'ass'
La Tèsta-de-Bug (33)	ALG 662	[aˈnɛt]	"anèth"	ANNELLUM	'ring'
Galan (65)	ALG 689N	[aɾˈmɛt]	"armèth"	ARMILLUM	'oxbow'
Labrit (40)	ALG 664S	[ˈbɛt]	"bèth"	BELLUM	'big, beautiful'

/ɫ/-vocalisation (see Section 2.1) suggest that syncope of the short high and mid-high vowels took place before the advent of retroflexion (Zauner 1898, 23). The evolution of the palatalised sounds /tʲ, t͡ʃ/ dates back to the 11th century, according to Bec (1968, 95). Furthermore, a large number of words with the suffix –ELLUM > "-èu" exists today, which are thought by Bec (1968, 96-97) to be 16th-century or earlier loanwords from French (i.e., before monophthongisation of "-eau" took place in that language) or else from Occitan varieties such as Lengadocian. Still today, words having the French suffix "-eau" are adapted into Gascon by use of the suffix "-èu", e.g., "bureau" ('office') as "burèu".

5.1.2   *Developments of Latin /lː/ in Upper Aragonese and Western Asturian*

Gascon is only one of three Western Romance varieties for which a retroflexion process is assumed to have played a role in the evolution of the Latin geminate lateral. On the southern slope of the Pyrenees, Upper Aragonese had a very similar evolution of Latin geminate /lː/ to that of Gascon. In this variety, the outcomes of the evolution

are, with a rather complex geographical distribution,[5] /t͡ʃ, t, l, ʎ[6], ɾ/ (Elcock 1938, 184-186, Elcock 1952 with evidence from toponymy, Catalán 1954 with a useful map, Blaylock 1968, 403), with the rhotic sound being reserved for weak forms such as personal pronouns, demonstrative pronouns and the definite article (Catalán 1954, 10; see also Menéndez Pidal 1954, 174-175, Lausberg 1967, 69, §496, Blaylock 1968, 404), as well as, perhaps, the clitic form of Lat. VALLEM as found in toponyms (Elcock 1952). In contrast to Western Asturian (see below), word-initial /l/ did not undergo the sound change (Rohlfs 1955b, 409).

The outcome of the evolution of Latin geminate /l:/ is still spelled <ll> in Upper Aragonese medieval documents, and the later spellings <z, tz, zs, ts, tch, ss> alternate with <ll> during the 15th-16th centuries (Vázquez Obrador 1993, 413, who interprets these spellings according to tradition as representing the retroflex affricate /t͡ʂ/). Also, as in Gascon, Latin /lj/ developed into /ʎ/ in Upper Aragonese and does generally not merge with the developments of Lat. /l:/ (Elcock 1952, 13).

In his article on the sound change in Upper Aragonese, Kuhn (1939) reports that Rohlfs, in a 1938 review of his monograph on Aragonese (*Der hocharagonesische Dialekt*), proposed that the sound change is an imported feature from neighbouring Gascon (Rohlfs 1938, 555-556). Kuhn (1939, 79-81) refutes this idea on both sociolinguistic (strong influence of Gascon wandering shepherds on toponymy unlikely) and phonological (no regular rhoticisation in intervocalic position as in Gascon) grounds.

Despite Western Asturian being separated from Upper Aragonese and Gascon by Bascophone regions, retroflexion of Lat. /l:/ also occurs in this language variety (Menéndez Pidal 1954, 174-175, 193, Rohlfs 1955b, 410-412, Lausberg 1967, 69, §496). In this dialect, Latin geminate /l:/ and word-initial /l/ (probably prosodically lengthened)[7] developed into a voiceless retroflex affricate, stop or affricated stop (Rodríguez-Castellano 1953, Catalán 1954, Rohlfs 1955b, 410, Celata

---

5 According to toponymical evidence, /t/ appears (or rather appeared, since these are reconstructed geographical distributions) in the valleys of Hecho and Sobrarbe, /t͡ʃ/ in the valley of Tena, /ʎ/ in the region to the north of Boltaña, as well as sporadically /l/ elsewhere (Elcock 1952, 18-20); in the northern part of Huesca province, we find /t͡ʃ/ in Sobremonte and in the villages in northern Ribera de Biescas and Sobrepuerto, /ʎ/ in villages of southern Ribera de Biescas and Sobrepuerto, and sporadically /t/ in Escartín (far east of Sobrepuerto) (Vázquez Obrador 1993, 391). This intricate dialectal distribution led Menéndez Pidal (1954, 184) to call it "un gran enigma dialectal."

6 The occurrence of the palatal lateral /ʎ/ for Lat. /l:/ is attributable, according to Elcock (1952, 21), to strong influences from Castilian Spanish.

7 Rohlfs (1955b, 413) very cautiously proposes Ancient Ligurian as a substrate for initial lengthening, given that initial lengthening also occurs in Gallo-Italic settlements in Southern Italy. Initial lengthening is, however, a general feature of Southern Italian varieties (see, for instance, Celata 2006, Kunert 2007, 183, Gili Fivela et al. 2008, Costagliola and Khatiwada forthcoming).

2006, 34).[8] Rodríguez-Castellano (1953, 223), a native speaker, describes it as an alveolar or post-alveolar affricate with a relatively large tongue tip contact zone, varying with vocalic context; its acoustic quality is dark and its frication part of a sibilant character. This is the most common variant (Rodríguez-Castellano 1953, 224); the diocese of Sisterna (Degaña e Ibias) has a more markedly retroflex stop, which is also shorter in duration than the affricate, to the point of resembling a kind of rhotic in rapid speech (Rodríguez-Castellano 1953, 225, Rodríguez-Castellano 1954, 148-149); finally, in the southern part of Aller district (Felechosa and Casomera valleys), the sound in question is a slightly affricated, slightly retroflex stop which also may resemble a rhotic in rapid pronunciation (Rodríguez-Castellano 1953, 226-227). The exact geographic extent of retroflexion and the distribution of its variants are described in great detail and with several useful maps by Rodríguez-Castellano (1953, 202-221, 227-228, 237). Moreover, Catalán (1954, 16-24) shows that Latin geminate /n:/ palatalised only in those Asturian varieties where Lat. /l:/ underwent palatalisation as well; in the retroflexion areas, however, /n:/ simply degeminated, but remained otherwise unaltered.

Importantly, the outcome of /l/-palatalisation in onset clusters where the obstruent is voiceless, /tʃ/, (see Chapter 3) is distinct from the retroflex affricate from Latin geminate /l:/ (Rodríguez-Castellano 1953, 222), although, by the time of Rodríguez-Castellano's fieldwork, some confusion between the two affricates started to appear, mostly in favour of the post-alveolar affricate and perhaps due to influences from both Galician and Spanish. This merger was most noticeable in the districts of Pola de Lena, Mieres and in some parts of Aller (Rodríguez-Castellano 1953, 228-229).

5.1.3   *Developments of Latin /l:/ in Southern Italian and Sardinian dialects*

It has been noted very early on by Romance philologists (see Section 5.2) that there was a certain resemblance between the developments affecting Lat. /l:/ in the Pyrenean/Cantabrian region and the Romance dialects spoken in Southern Italy and on the Tyrrhenian islands. Indeed, the presence of retroflex articulations of Latin geminate /l:/ (but not only) is well-established and investigated for this part of the Romance-speaking world. I will describe the complex developments in each variety separately.

In Italian dialects, retroflexion generally affects both the Latin geminate lateral as well as the lateral lengthened by prosodic conditions such as radoppiamento sintattico (see Meyer-Lübke 1934, 33-35, Laus-

---

8 The first mention of the sound in the literature as retroflex comes from Juan Antonio González Valdés (1785), *Ortopeia Universal*, according to Rodríguez-Castellano (1953, 221). Catalán (1954, 39-43) gives an overview of the description of the sound in the dialectological literature up to the early 1950s.

berg 1967, 69, §496). The retroflex lateral /ɭ:/ is said to be found in some villages of Reggio di Calabria province around the village of Locri (Rohlfs 1929, 398, Bianco 1981, 136, but see Celata 2006, 126), with neighbouring villages having interdental /l/s instead of retroflexes in this context; it also seems to occur in some Sicilian varieties (Ruffino 1997, 372). The retroflex stop /ɖ:/ occurs in almost all of Sicily, in most of Calabria and the south of the Salentinian peninsula. Further evolution to /d:/ or /d͡ʒ:/ may be encountered in some of these dialects. The northern border of the phenomenon would be an imaginary line stretching from Monte di Procida in the west to Vico del Gargano in the east. Inside this territory, in southern and south-central Calabria, there is degemination of the consonant and various other outcomes of Latin geminate /l:/ can be found, such as /ɖ, d, ð, ɟ, j, ʐ, d͡ʐ, ʒ, ɻ, ɽ, ʎ/[9] (Romito and Milelli 1999, 21); Bianco (1981) gives a detailed overview over the geographical distribution of the developments of Lat. /l:/ in Calabria, and a small-scale overview of the region around Catanzaro can be found in Romito and Scuticchio (2009). Still inside the retroflexion area, some dialects today have a plain lateral, and Rohlfs speculates that these are backformations from former /ɭ:/, while Rensch (1968, 600) points out that Lat. /l:/ generally did not undergo retroflexion or any other evolution in those varieties which altered Latin singleton intervocalic /l/ (for which see Section 2.2), although this is more of a tendency rather than an absolute principle in the patterns and subpatterns he identified in the Southern Italian dialects of northern Calabria and the Basilicata (Rensch 1968, 603-604 with a useful map, see also Bianco 1981, 132 with another useful map which geographically complements that of Rensch). Retroflexion is also a feature of Corsican: on this island, it occurs south of an imaginary line going from Calcatoggio to Bocognano and Ghisoni, but in former times, it would have been found in the entire island. The phenomenon also took place in northwestern Tuscany (Lunigiana and Upper Garfagnana), where the outcome is normally /ɖ/ (sometimes /j/ or /ɟ/ before /i/), and perhaps also on the island of Elba.[10] Cases of rhoticisation inside the retroflexion area have also been reported (Rohlfs 1966, 333, §235), especially in unstressed words such as the definite article and personal pronouns (Rohlfs 1938, 556-557, Bianco 1981, 128).

---

9   This is not to say that all of the palatal sounds in this list necessarily originate from earlier retroflexion (but see Bianco (1981, 128), for whom /j/ evolved out of the /ɽ/-stage). Politzer (1954, 325) thinks that other variants such as /g, ɣ/ also proceed from earlier /ɖ:/.

10 Meyer-Lübke (1934, 33) (also von Wartburg 1950, 5-6, footnote 1) suggests that the sound change in Tuscan is due to the fact that Corsican refugees settled in this area after the Saracen incursion onto the island. Since this event occurred in Late Latin times (5th century CE) and thus well before the emergence of the sound change in Eastern Romance varieties, its contribution to the appearance of retroflexion in Tuscan is questionable. Later immigration from Corsica may, however, have brought the phenomenon to Tuscany.

An acoustic phonetic study of the retroflex outcomes in the Corsican varieties of Fiumorbu Valley and the Alta Rocca region conducted by Celata (2006, ch. 3) revealed a great deal of inter- and intra-speaker variability in the production of these sounds. The realisations for etymological /lː/ included /ɖː, ɖ, dː, d, ð, ɾ, lː, l/, with /d/ being the most frequent one and with shorter sounds more likely to occur in post-stress position. The most stable production seems to be that of the suffix "-ello", "-ella" < Lat. –ELLUM –ELLAM, which regularly has /ɖː/ or /d/ in Alta Rocca (Celata 2006, 71-72, 74).[11] Given the great frequency of occurrence of this diminutive suffix, it could act as a stabiliser of the retroflex/alveolar pronunciation to the detriment of the other variants mentioned above. This idea will be taken up again in the discussion of the pathways of retroflexion in Gascon (see below 5.3.2).

Unlike the proposed chronology for Gascon which makes the sound change appear very old in the Pyrenees, the developments in Southern Italy seem to be relatively modern. In effect, Celata (2006, 39) proposes that the evolution is younger than the 13th century, and Bourciez (1967, 494, §408) thinks that it originated in the 14th century. In Corsican, retroflexion of Lat. /lː/ goes back to at least the 16th century.

The same evolution as in the Southern Italian dialects, namely retroflexion of Lat. /lː/ to /ɖː/, also occurred in Sardinian (de Kolovrat 1923a, 265, Wagner 1941, 195, §347, Lausberg 1967, 69, §496, Blasco Ferrer 1984, 6-7, 209-210, Contini 1987, 157-176, Molinu 2009). As with the Corsican developments of etymological /lː/, the Sardinian retroflexes are characterised by great inter- and intra-speaker variability in place of articulation (mostly alveolar; it is farther back in the case of a following low or back vowel, and its articulation is generally subapical); these sounds are flapped and followed by a short period of frication noise which is greater than in the alveolar stop /d/; also, as retroflexes, they are acoustically darker than their non-retroflex counterparts (Contini 1987, 163-172).

According to Wagner (1941, 195, §347) and Contini (1987, 175), Sardinian documents prior to the 14th century still have the spelling <ll> for the developments of Latin /lː/, while texts from the 14th-15th centuries show much wavering between the spellings <ll> and <d, dd>. This may be the reason why Bourciez (1967, 494, §408), as well as Contini (1987, 175), opt for the 14th century as the starting point for the sound change in Sardinian. Retroflexion seems to have imposed itself by the end of the 16th or the first half of the 17th century, when /lj/ developed into /lː/ and remained unaltered (Contini 1987, 176). The proposed chronology is in line with the one assumed for Southern

---

11 Etymological /lj/ in Alta Rocca also underwent the retroflexion process or else was later assimilated to this sound category by a process of analogy (Celata 2006, 68, 129). The realisations found in inter- and intra-speaker variation for this sound include /ɖː, ɖ, dː, d, ʎː, ʎ, jː, j, lː, lj, tːˢ/ (Celata 2006, 72).

Italian (with Corsican), but at odds with that established for Gascon (but not Upper Aragonese).

Finally, in Southern Italy, the Occitan dialect of La Gàrdia participated in the developments of Lat. /l:/ (and word-initial stressed and lengthened /l/) as they took place in the surrounding Southern Italian dialects (Hans Peter Kunert, p.c., October 2008). Judging from the recordings assembled in the *Vocabolario dell'occitano di Guardia Piemontese* (Kunert 2004), the realisation of the retroflex result of Lat. /l:/ is highly variable, ranging from stop to affricate, and delateralisation and retroflexion are more marked in some instances than in others (acoustic impression). The Occitan population of La Gàrdia, of Eastern Provençal Alpin origin, settled in Calabria in the 14th century, and one can ask whether they arrived at the moment when the sound change was in its initial stages, since the laterals of La Gàrdia Occitan are likewise affected.

To complete the Southern Italian picture, it remains to be said that the Greek dialects of Southern Italy also developed retroflexion on both intervocalic singleton and geminate laterals, especially when these are in post-stress position (Rohlfs 1929, 399-400, Rohlfs 1974, Rohlfs 1977a, 55-57, §75-76, Kontossopoulos 2006a, 18).

Overviews of the developments depicted above can be found in Rohlfs (1981, 361-363) and, in the form of large and comprehensive maps, in Menéndez Pidal (1960), as well as, restricted to Southern Italy and the islands in von Wartburg (1950, map 1).

5.1.4   *Retroflexion processes affecting the lateral elsewhere*

While retroflexion affecting exclusively the geminate lateral is peculiar to the Romance areas discussed in 5.1.1, 5.1.2, and 5.1.3 above, similar developments of laterals, most noticeably dark laterals, exist elsewhere. This short subsection will present some of these developments which might prove useful to a more extensive understanding of the sound change in the Pyrenean-Cantabrian and Southern Italian regions.

Still inside the Romance language family, a minor, alternative evolution to preconsonantal /ɫ/-vocalisation in the Bahia and São João de Barra dialects of Brazilian Portuguese is retroflexion to a rhotic, /ɻ/ (do Socorro Demasi 1995, 1995: 123 and references therein).

In the Greek dialect of Western Crete, any lateral followed by a back or low vowel is dark, /ɫ/, or a retroflex rhotic, /ɻ/ (Rohlfs 1977a, 56, §75, Trudgill 1989, 18, Kontossopoulos 2006a, 38, 152),[12] which also has a socially more prestigious fricative variant, /ʐ/ (Trudgill 1989,

---

12 An analysis using the gestural score representation of Articulatory Phonology has been attempted by Proctor (2009, 182, fig. 9.5), who assumes a clear lateral as the starting point and who treats the process as gestural blending of tongue body gestures of the lateral and the following vowel (Proctor 2009, 189). His representation seems, however, more like the depiction of the outcome of the retroflexion process than of the process itself.

20). A similar evolution, to /ɭ, ɖ, ɭɖ/, is said to be found on Naxos (Cyclades) (Kontossopoulos 2006a, 61, 169), on Karpathos, Kos, and Rhodos (Dodecanese) (Rohlfs 1974, 114, footnote 99, Rohlfs 1977a, 56, §75).

A few languages have dialectal variations between /ɭ~ɻ/ and /ɫ/, and these include, for instance, Norwegian with its Eastern dialects (Vigeland 1981, 24), Swedish dialects (Livijn, 2002),[13] and the Philippine languages Madukayong Kalinga, Balangao, Mansaka, Upper Tanudan Kalinga, the Guinaang variety of Central Bontoc, and Southern Kalinga (Grayden 1979, 94, Olson et al. 2010, 208).

5.2   A CENTURY OF PUZZLEMENT — EXPLAINING THE FATE OF LATIN /L:/ IN ROMANCE

The whys and wherefores of the fate of Latin /l:/ in Gascon and elsewhere in the Pyrenean-Cantabrian and Southern Italian areas have occupied the mind of many a distinguished scholar throughout his professional life. In this section, I will try to trace the intricate and interwoven opinions and hypotheses put forth and discussed since the late 19th century. It is possible to distinguish several distinct strands of opinion. On the one hand, one can identify three different suggested pathways for the articulatory process involved in the evolution of Latin /l:/ in Gascon, namely retroflexion, palatalisation, and a curious merger of the two, which states that one type of lateral evolved out of the other. On the other hand, as theoretical frameworks are subject to scientific evolution themselves, the underlying approaches have changed as well. The earlier part of the 20th century saw a predilection for substrates, most prominently so Ramón Menéndez Pidal's Colonisation Hypothesis, and I will briefly discuss the problems associated with this kind of approach. Later in the century, researchers tried to frame their analyses within structuralist terms, laying emphasis on the relationship between the systematisation of the sound inventory of a given language and the chain effects in sound change that can sometimes be observed. Finally, during the last decade, approaches to developments of Lat. /l:/ relying on a more thorough phonetic understanding of both the acoustics and articulation of retroflexion have been able to shed further light on the process that had, with some probability, existed in Gascon and elsewhere on the Iberian peninsula. I will evaluate and discuss these latter, phonetically-driven, approaches in Section 5.3 and present my own account of the evolution there.

So, instead of proceeding in a strictly chronological manner, I shall group the propositions and opinions voiced by researchers throughout more than a century according to one of the thematic fields outlined

---

13 Voelkel (1888, 46) observes that some Swedish learners of English use a retroflex articulation in order to approach English dark /ɫ/.

above. Some names will therefore resurface under several headings, according to the relative importance their contributions have played in the explanatory tradition of the developments of Latin /l:/.

5.2.1 *Substrates and colonisations*

The idea that some prior language community, somewhere in the depth of time, is responsible, through their own idiosyncratic manners of articulation, for the peculiar developments affecting the Latin geminate lateral in Gascon and elsewhere, is rather old and arose partly from the fact that researchers noted that these developments had emerged in two different, unconnected areas in the Romance-speaking world. The first to have seen this fact was the French philologist Achille Luchaire in a footnote in the introduction to a book on the Gascon dialect (Luchaire 1973, IX, footnote 1), but he didn't pursue his observation any further than that.

The first scholar to explicitly propose a substrate to explain the similar developments found in the Cantabrian-Pyrenean and Southern Italian-Tyrrhenian regions seems to be Foerster (1898*b*, 511), Foerster (1898*a*, 164): in his view, retroflexion would formerly have affected a continuous zone stretching from the Iberian to the Italian peninsula and encompassing southern Occitania; this area would have been populated by pre-Roman and pre-Celtic tribes. Later Celtic invasions into Lengadòc and Provença would then have torn this former unity apart, causing the loss of retroflexion. A similar pre-Indo-European substrate, dubbed X-substrate for lack of any appreciable evidence as to its nature,[14] is proposed by Millardet (1933, 368-369, see also pp. 365-366),[15] and he is followed by von Wartburg (1950, 5-6).

Other scholars have tried to pin down the identity of the substrate more closely. Thus, Gamillscheg (1950, 36-37) ventures the guess that the retroflex articulation of Lat. /l:/ could be ascribed to a pre-Basque Cantabrian substrate, presumably a dialect of Ancient Ligurian, once spoken in the Pyrenean region, and Martinet (1952, 214-215, 217), while warning against unfounded uses of substrate assumptions as an ad hoc device, discusses the influences of Celtic on the developments in Gascon and elsewhere in Western Romance. He is followed in this by Blaylock (1968), who, like Martinet, thinks that the comparatively smaller influence of Celtic 'leniting speech habits' in the Pyrenean

---

[14] Both Millardet in his 1933 article and von Wartburg (1950, 5-6, footnote) would like to identify Berber as being the elusive substrate.

[15] It is interesting to note that Pierre-Jean Rousselot, in a personal communication to Georges Millardet, thought that retroflexion should be due to the influences of an insular climate, since it occurred both in the Tyrrhenian islands, the British Isles, and Madagascar, as well as in the Indian peninsula. For Millardet, this ensured that the substrate was pre-Indo-European, and he proposes that islands and peninsulas in general are ideal refuges for populations chased by invaders, which is why dialects spoken on islands are more conservative than those spoken on mainlands (Millardet 1933, 361-362).

region could explain why retroflexion, considered as articulatory strengthening, would have been allowed to emerge there.

A different hypothesis is entertained by Menéndez Pidal (most noticeably Menéndez Pidal 1954, Menéndez Pidal 1960) throughout his professional life: that of a colonisation of the Pyrenean region by Latin speakers from a different language background than the Romans proper. More precisely, given the similarities in the evolution of Lat. /lː/ between Southern Italy and the Pyrenean-Cantabrian region, he proposes that the colonists sent by Rome to settle Hispania Citerior in the 3rd-2nd centuries BCE would have been speakers of Oscan and Umbrian origin (Menéndez Pidal 1954, 193, Menéndez Pidal 1960). Arguments in favour of this hypothesis put forward by Menéndez Pidal make use of commonalities in toponym and anthroponym formation between the two areas, in addition to the phonetic similarities.[16] In a later publication, he refined his analyses of the epigraphic and otherwise archeological evidence to go as far as to propose that Osco-Sabine colonists would be the origin of the palatalisation to /ʎ/ of Lat. /lː/ in Catalan and Castilian Spanish, whereas it would have been the Osco-Lucanian pronunciation habits which would have brought about retroflexion (Menéndez Pidal 1960, 135).[17] A delicate point of his hypothesis, as acknowledged by Menéndez Pidal himself (1954, 204), is the fact that Portuguese shows neither phenomenon, neither palatalisation nor retroflexion; he explains this by Lusitania having allegedly been settled by a different colonisation wave whose spoken variety of Latin would have been more 'correct'.

Appealing to substrate in order to understand and explain a sound change, especially so when it occurred in the remote past, is a delicate endeavour. Several scholars, such as Straka (1979, 381), working on the phenomenon discussed in this chapter, as well as on related sound changes, opposed themselves to what they perceived as a simple displacement of the problem they sought to investigate. Among these researchers, we find structuralists such as Politzer (1954, 331, see also p. 329) and Brixhe (1976, 84), for whom sociohistorical factors played a minor role in language change (for the opposite view, see Menéndez Pidal 1954, 176), philologists such as Rohlfs (1929, 400), who reminds his readers that the possibility of independent developments still needs be taken into account, given the relatively high cross-linguistic frequency of retroflexes, and Kuhn (1939, 80), who points out that the fact that a particular evolution seems peculiar to the linguist doesn't mean that it has to be an archaic trait of the dialect in which it occurs and so there is no reason to suppose that it stems from some former language community often revealingly labelled

---

16 His prime example here is the place name *"Osca" > "Huesca", although he does concede that other etymologies are possible, in particular those that trace the toponym back to the Hispanian tribe of the Volsciani (Menéndez Pidal 1954, 194).

17 Rohlfs (1955a) is entirely devoted to pointing out such problematic aspects of the Colonisation Hypothesis.

"pre–"something; linguistic isolation of a remote community may lead to innovation, as well as and perhaps even rather than, conservation. Finally, a number of linguists, e.g., Poucet (1966, 145) and Jones (2004, 149), have expressed concerns about the scientific strength of the argument of substrate influences in the presence of almost complete lack of knowledge of the languages adduced as a means of explanation for retroflexion and other sound changes.

The problems presented by substrate-based explanations have been discussed in depth by Cravens (2002, 36-39), whose argumentation relies mainly on Popperian considerations of scientific methods. As others have repeatedly done, he, too, stresses the problem of lack of falsifiability of a substrate hypothesis for lack of adequate data on the substrate itself. This becomes especially clear when we consider hypotheses such as Millardet's X-substrate. In short, without evidence, one way or the other, the argument cannot be disproved. For instance, if a substrate language has a certain phonetic feature, say, retroflexion, and the superstratum language (the language under investigation) has this feature, too, we cannot rule out an independent evolution in the two languages. What could be shown in principle, Cravens claims, are cases where a sound change was not substrate-induced, namely when the substrate did not have the feature in question.

This is, of course, not to say that substrate languages cannot cause sound change, but simply that it is scientifically nearly impossible for us to tell whether this is the case or not, especially so for sound changes that occurred in such a distant past that its beginnings themselves are not documented in any written evidence.[18] In this sense, Menéndez Pidal's Colonisation Hypothesis has the methodological merit of advancing very precise predictions which can, in theory, be falsified. For instance, he observed a great prevalence of toponyms and anthroponyms of Southern Italian/Roman origin in the epigraphic record of Spain, to the exclusion of similar names from Northern Italy. If archeologists were now to discover a large amount of evidence for tight connections of Hispania Citerior with Northern Italy, such a finding would disprove Menéndez Pidal's claim of an exclusively Southern Italian colonisation of the Iberian Peninsula.

Since substrate theories are essentially about bilingual speech communities, the kind of studies we would need to carry out in order to tease apart the question of mutual influences vs. independent developments are such investigations as proposed by Simonet (2010b) for the fine phonetic details of the laterals of Catalan-Spanish bilinguals in Majorca. But as one would need actual speakers to conduct such studies, all hypotheses projected into the often very distant past have no option but to remain speculative to varying degrees.

---

18 This reasoning applies more to Gascon, where the sound change is thought to have been under way before the 6th century CE than to Southern Italian and Sardinian, where it started only towards the end of the Middle Ages and is therefore much better documented.

5.2.2 *Structuralist approaches*

In the 1950s and 1960s, in the heyday of structuralism, three authors tackled the evolution of Latin geminate /l:/ from a perspective of oppositions, push chains, gap-filling, and phonological inventories. Their goal was to provide an explanation of the developments of the Latin geminate lateral from within the system of the particular language. This led one of the scholars, Politzer (1954), to reject substrate accounts of the phenomenon, while Martinet (1952) and Blaylock (1968) still make use of the notion of substrate influences in Western Romance.

Indeed, Martinet (1952) assumes the Celtic tendency of consonant lenition to be at the origin of developments in Western Romance affecting mainly the stop consonant system, and so he mentions the laterals only in passing. Nevertheless, his account of an opposition between long/strong and short/weak consonants, where one change would entail an entire chain of further changes in order to rebalance the system, inspired Politzer (1954) and Blaylock (1968) to try and see the developments of Latin /l:/ in the light of structural oppositions.

Thus, Politzer (1954) tries to integrate the developments of /l:/ within the Latin/Romance stop consonant system. He observes that there is an opposition between the voiced geminate stops /b:, d:, g:/ and the spirantised voiced former stops /β, ð, γ/. Given this, the geminate lateral would be attracted, by system-internal pressure, to a stop-like realisation as well, thus /ɖ:/, while the singleton lateral would remain unaffected since it already was a continuant sound. Politzer's account provoked immediate critique: in the same year of publication, Catalán (1954, 28, footnote 1) remarks that the voiced geminates were of relative unimportance to the overall consonant system of Latin and Romance; if they occurred at all, they did so across morphological boundaries, and therefore very rarely contrasted with voiced singleton stops in lexical roots. The oppositions that played a role for phonological contrasts were rather the voiceless geminate stops vs. voiced singleton stops vs. voiceless singleton stops.[19]

A decade later, Blaylock (1968) took up again the analysis outlined by Martinet (1952) and applied it to the laterals of Latin. He crucially assumes, like Martinet, a general mechanism of consonantal weakening, purportedly imported into Latin by speakers of Celtic languages; their lesser influence in the Pyrenees would then explain strengthening phenomena such as the preservation of the Latin voiceless stops, as well as retroflexion (Blaylock 1968, 407). He suggests that the former quantitative opposition of singleton and geminate laterals and rhotics in Gascon, Aragonese and Asturo-Leonese was replaced by an oppo-

---

19 Further points of critique were voiced by Menéndez Pidal (1954, 186-187), who points to the importance of taking into account the historical evolution of a language, and Rensch (1968, 601), who criticises that Politzer failed to note the fact that in the greater part of the Southern Italian dialects sound change affects either the singleton /l/ or the geminate /l:/ of Latin, but not both.

sition in quality, where former singleton laterals would be weak and the former geminate ones strong.[20] The fact that the singleton lateral is preserved and the geminate one strengthened by retroflexion would correspond to the simultaneous preservation of the Latin intervocalic stop system (Blaylock 1968, 408-409).

Needless to say, structuralist accounts rely heavily on the notion of relations between speech sounds and the way they are able to behave contrastively in a given language (cf. Janson 1979, 31, Ohala 2004). Blaylock himself points out that structuralist analyses have a teleological flavour to them when it comes to sound change, "with many shifts being interpreted as therapeutic devices to safeguard reputedly crucial oppositions menaced with collapse by other radical changes within the system" (Blaylock 1968, 406). This view takes for granted that asymmetric systems ought to be eschewed by the linguistic mind and are subject to reëquilibration. Moreover, it overestimates the role of phonemic oppositions in contrasting words in a language, at the expense of the role played by all the other domains of language, from pragmatic context to fine phonetic detail. Lastly, and most importantly, a long debate in linguistics about what counts as strengthening and what counts as weakening has never come to a conclusive end: the very concept has proven to be unwieldy. With regard to retroflexion, one could argue that loss of the sonorant status of the lateral would constitute an acoustic weakening, but that the firmer tongue tip contact in the retroflex stop would be an instance of articulatory strengthening (see also 5.3.2 below).

Let us not forget, however, that retroflexion itself was not always considered a step in the sound changes as they occurred in Gascon; in the sections to follow, I will trace the evolution of this idea over time and compare it to the minority view, that of palatalisation having led to the results of Lat. /l:/ in Gascon.

5.2.3 *How Latin /l:/ evolved in Gascon: the retroflexion hypothesis*

The idea that Lat. /l:/ went through a retroflexion stage in Gascon is almost as old as the discussion of the phenomenon itself. Indeed, Meyer-Lübke (1890, 456, §545) seems to be the first researcher to think of retroflexion as an element in the evolution of the Gascon word-final /l:/; although he admits to not being able to explain the rhoticisation of word-internal /l:/, he considers it not to be a trivial case of rhoticisation, for were it so, he assumes that it should have affected the singleton lateral rather than the geminate. In a later publication from 1934, he proposes, however, that the intervocalic

---

20 Precursors to this idea are Haudricourt and Juilland (1970, 62). They see rhoticisation of Lat. /l:/ in Gascon as a way to maintain the singleton – geminate contrast of Latin, but they completely ignore the concomitant issue of retroflexion.

rhotic is the outcome of a reduced and shortened retroflex stop (Meyer-Lübke 1934, 42).

A few years later, Foerster (1898*b*) explicitly assumes retroflexion for Gascon, Upper Aragonese and Western Asturian in light of the developments found in Southern Italy (see above 5.2.1). Retroflexion, however, would have occurred only in those parts of Gascony where the final outcome of word-final Lat. /lː/ is /t/; the affricated results are, in his view, imputable to palatalisation of the lateral (Foerster 1898*b*, 512) (I will come back to palatalisation in 5.2.4). Paul Passy (1904, 74-75) objects to this by adducing evidence from Lorraine et Franche-Comté French dialects where the formerly retroflex stops */ʈ, ɖ/ (where retroflexion had been conditioned by a preceding rhotic) had evolved into /t, d/ in Lorraine dialects, but to the palatal sounds /c, ɟ/ > /t͡ʃ, d͡ʒ/ > /ʃ, ʒ/ in Franche-Comté dialects. In light of these dialectal data, Passy claims that a similar evolution was likely to have taken place in Gascon and elsewhere in the Pyrenees as well. Unlike Meyer-Lübke, Foerster proposes an articulatory mechanism for the evolution of intervocalic rhoticisation of Lat. /lː/ out of the retroflex stop: he thinks that the stream of air rushing out of the oral cavity during the release phase of /ɖː/ would have induced vibration of the tongue tip, if and only if a vowel followed the retroflex. This would then naturally have led to the emergence of a rhotic sound, and Foerster was presumably thinking of a trill (Foerster 1898*b*, 512). As will be discussed below, flapping rather than trilling is more likely to have been at the origin of rhoticisation of intervocalic Lat. /lː/ in Gascon and elsewhere. It is also true, however, that the fundamental articulatory and aerodynamic distinction between rhotic taps and trills was rarely if ever made in the days of the early Romance dialectologists.

A similar, but not identical, mixture of retroflexion and palatalisation processes assumed to explain the different outcomes of Latin /lː/ in Gascon is put forth by Sarrieu (1904). He follows Foerster (1898*b*) in his description of the alleged articulatory mechanism behind the rhoticisation of Latin intervocalic /lː/, while palatalisation would have led to the variants found in word-final position (Sarrieu 1904, 109-110). Paul Passy (1904, 73-75), pace his brother Jean (see below), also subscribes to the retroflexion hypothesis proposed by his colleagues, and this point of view also found its way into the textbook on Romance linguistics by Bourciez 1967 (first edition 1910), for whom the origin of retroflexion, at least in Southern Italy and the Tyrrhenian Islands, stems from an articulatory strengthening needed to produce a full-length geminate (Bourciez 1967, 494, §408).[21]

---

21 Where Foerster and Sarrieu insisted on palatalisation processes for word-final /lː/, Bourciez (1967, 306, §271) unfortunately only tells his readers that the sound in question was 'being transformed' at the time of loss of the Latin word-final vowels.

Retroflexion in the case of word-final Lat. /lː/, but not of intervocalic Lat. /lː/, is the solution adopted by Ronjat (1932, 316-317, §398). He thinks that the frication period accompanying /ɖː/ (or /ʈː/, given word-final devoicing) in word-final position would have led to reinterpretation of the sound as an alveolo-palatal affricate, while in the regions of Gascony which nowadays have /t/ in word-final position, such an evolution would constitute a simplification of retroflex /ʈ/ in line with the language having no other retroflex sounds, or else be analogical to the plural */ʈs/ > /ts/. The origin of retroflexion in Gascon is sought by Ronjat in an obscure aerodynamic mechanism which he calls 'economy of breath'; it is, however, unclear to me in which way this would provoke the articulatory or acoustic characteristics associated with a retroflex tongue gesture. Rhoticisation of intervocalic Lat. /lː/, on the other hand, seems for him to be a trivial case of tongue tip contact loss;[22] note that he assumes Lat. /lː/ to be a succession of two distinct laterals, /ll/, which rhoticise into a rhotic whose description corresponds either to /ɾɾ/ or to a trill with two closure periods. As with Foerster (1898b) above, this interpretation betrays the lack of distinction between taps and trills among the dialectologists of the early 20th century.

Millardet, to close the ranks of early-20th-century scholarship, objected to retroflexion in Gascon on the grounds that no modern variety retains such an articulation (he probably wasn't aware of the facts of Western Asturian). For him, then, Lat. /lː/ in Gascon and the Southern Italian regions, under the influence of a putative Iberian substrate, evolved into /dː/, while the allegedly subsequent retroflexion would be a feature restricted to the Southern Italian peninsula and the Tyrrhenian Islands where, as Millardet points out, it appears in a wider set of consonants due to, he claims, another, equally unknown, substrate (Millardet 1933, 368-369, see also pp. 365-366) (see above 5.2.1).[23]

The following generation of Romance philologists-dialectologists fully embraced retroflexion as the departure point of the developments of Lat. /lː/ in both the Pyrenean-Cantabrian area and the Southern Italian regions (including the islands and parts of Tuscany). Gerhard Rohlfs stands out as probably the one scholar who made the hypothesis popular in the field through several articles and book paragraphs devoted to the question, from 1929 onwards. For him as for Bourciez

---

22 Interestingly enough, he doesn't seem to consider this a case of weakening, but rather of strengthening under the assumption that an articulation has to be stronger in order to induce trilling. This double-trilled rhotic would then be reduced in certain dialectal areas to a single-trilled rhotic, i.e., a tap. Already Bec (1968, 91) criticises this interpretation on the grounds that a double tap has never been observed in Gascon and that the two rhotics in this dialect, as in other Romance languages, are really /r/ and /ɾ/. A strong articulation of the lateral in Gascon is for Ronjat also the reason why it wasn't otherwise affected in intervocalic position (Ronjat 1932, 150, §303).

23 Politzer (1954, 329, footnote 18) notes the alternative possibility that retroflex articulations in the speech of Southern Italy and the Tyrrhenian Islands may have spread from the original geminate laterals to other sounds in the system.

before him, retroflexion is a strengthening process with an acoustic effect comparable, he says, to the emphatic consonants of Arabic (Rohlfs 1977*b*, 153-154, §469).[24] Rhoticisation in intervocalic position would have come about through the perceptual similarity of /ɖ/ and /ɽ/ (Rohlfs 1929, 391).

This way of interpreting the dialectal facts became widely accepted in the linguistic community, despite minor disagreements on details, and Rohlfs was followed by scholars such as Rodríguez-Castellano (1953, 234-237) in his investigation of the Western Asturian retroflex affricates (similarly Catalán 1954, 26), Politzer (1954, 327), Menéndez Pidal (1954, 179),[25] Blaylock (1968), and Bec (1968, 92-96).

While Bec (1968, 90) explicitly endorses retroflexion as the original evolution of Lat. /lː/ in Gascon, thus following Rohlfs, he also points to the importance of the fact that palatalisation of Latin intervocalic /t/ (/d/ through intervocalic voicing) – which came to be in word-final position after the loss of the Latin word-final vowels and became, he thinks, partially devoiced ("sourde douce") in medieval times (see above 5.1.1) – occupies the same geographical space as the developments attributed to retroflexion of Lat. /lː/. In this sense, he proposes that word-final retroflex /ɖ/, having already undergone degemination, evolved in Gascon to a partially devoiced /ɖ̥/ and merged with the outcome of Latin intervocalic /t/. From this point onwards, two different dialectal pathways could be discerned: The mountain varieties of Gascon went on to palatalise this assumed /ɖ̥/ to /tʲ, t͡ʃ/, whereas the varieties spoken in the plains continued devoicing to a voiceless /t/ (Bec 1968, 93-94). Interestingly enough, for Bec (1968, 96), the same outcomes in Upper Aragonese, but in intervocalic position, are the result of intervocalic devoicing brought about by a greater articulatory effort in producing a geminate sound, i.e. /ɖː/ > /ʈː/, which then palatalised to /t͡ʃ/ or, when the articulation was less strong, reduced to /t/. As far as the Latin intervocalic /lː/ in Gascon is concerned, Bec follows Rohlfs' proposal outlined above.

Although retroflexion as an essential step in the evolution of Lat. /lː/ in Gascon and elsewhere formed the communis opinio in the field of philology and dialectology, some voices proposed an alternative evolution, and to these I turn now.

---

24 As is well-known, the emphatic consonants of Arabic are pharyngealised rather than retroflex; both kinds of consonant have, however, in common an acoustic effect of flatness (see Petráček (1952) on the emphatic lateral of Arabic and Ohala (1985) on flatness).

25 Nevertheless, Menéndez Pidal seems to propose (1954, 203) that the /lː/ at the origin of the evolution must have been particularly clear, and such clearness would have been, in his view, a trait of Oscan pronunciation.

5.2.4   *How Latin /l:/ evolved in Gascon: the palatalisation hypothesis*

Apart from the retroflex developments still attested in Southern Italy, the Tyrrhenian Islands and Western Asturian, where Latin geminate /l:/ in Romance wasn't maintained as such or was shortened to a singleton lateral, it palatalised, so e.g. in Spanish and Catalan. It is only natural then that researchers turned to this phenomenon when looking for explanations of the developments of Lat. /l:/ in Gascon and Upper Aragonese, where no retroflex articulations are directly attested and which stand in close geographical contact with languages and dialects palatalising Lat. /l:/. So for Foerster (1898*b*, 512) and Sarrieu (1904, 109-110), the palatalised results of word-final Lat. /l:/ in Gascon would be attributable to palatalisation (but see above in 5.2.3 Paul Passy's objection to Foerster's account); similarly, Jean Passy (1904, 148-158) explains the evolution of Gascon word-final /l:/ in terms of palatalisation. For him, while keeping clear of substrate assumptions, the presence of palatalisation of Lat. /l:/ in neighbouring Catalan and Spanish is a strong indicator of a similar evolution in Gascon. The peculiar outcomes in Gascon would stem from the putative plural forms /-l:os/ > /ʎs/, which would have developed an anaptyctic stop element (/ʎts/). This stop is then thought to have merged with the palatal lateral to /cs~c̪ʲs/, and the palatal(ised) stop thus formed would have been taken into the singular forms by analogy with the plural paradigm. Analogy would also have operated on words which lacked a plural form, but nevertheless underwent the sound change, such as "devath" from Lat. DĒ VALLEM. One major drawback of this account is certainly the fact that, if it were correct, we would expect to find at least some remnants of a morphological alternation between an alleged singular ending /-ʎ/ and a plural ending /-cs/, but we do not see this in any Gascon variety. A further point of critique of the palatalisation hypothesis in general is the different evolution of Lat. /l:/ vs. intervocalic Lat. /tl, kl/ and /lj/, which underwent palatalisation very early on, not only in Gascon, but also in the languages and dialects present on the Iberian Peninsula. Passy (1904, 154) assumes here two different qualities of palatal articulation, with stronger palatalisation on /tl, kl, lj/ than on /l:/.

The presence of palatalised /c̪ʲ, t͡ʃ/ in Gascon as the outcomes of Lat. /l:/ in word-final position and the absence of retroflex articulations also convinced Martinet (1952, 205) to vote for a palatalisation process whereby /ʎ/ would become delateralised and occluded (/ɟʲ, d̪ʲ/ > /t͡ʃ, c̪ʲ/), and a similar position is entertained by Hock (1986, 79) (also de Kolovrat 1923*a*, 72 and Nandris 1965, 934; Hock goes further in suggesting that retroflex articulations in Southern Italy also developed out of palatalisation, a hypothesis I will discuss in 5.2.5 below).

5.2.5 *The mixed hypotheses: palatalisatio-ex-retroflexione and retroflexio-ex-palatalisatione*

As mentioned above, some researchers have sought to connect the palatal outcomes of Lat. /lː/ in Spanish and Catalan to the retroflex developments found in Southern Italy and the Pyrenean-Cantabrian regions by claiming that one developed out of the other. One is often under the impression that in the earlier part of the last century, a somewhat sloppy distinction of tongue tip and predorsum led to confusion as to the similarity of articulation of retroflex and palatal sounds among non-experts. As is well-known, retroflex and palatal articulations are antagonistic movements and lead to quite different acoustic effects (Bec 1968, 92, Hamann 2003, 78), which is why palatalised retroflex sounds do not seem to exist in the languages of the world (see Hamann 2003, 42-49, 77 with an extensive discussion of apparent counterexamples).

That palatalisation to /ʎ/ of Lat. /lː/ has its origin in a retroflex sound has been proposed by Rohlfs (1929, 400), Rohlfs (1977*b*, 154, §469) on the grounds of a shared articulation in the prepalatal region;[26] although Menéndez Pidal traces back the retroflex and the palatal outcomes of Lat. /lː/ to two different groups of settlers, he seems perfectly happy with the idea that retroflex sounds, being foreign to the sound inventory of Latin, can develop into palatals, while the commonplace occurrence of palatals in Romance would prevent the opposite evolution, and for him, this line of reasoning leads to the necessity of a foreign, i.e., extra-Latin, provenance of the retroflex sounds (1960, 122). On the contrary, but still in a somewhat similar vein, Ettmayer (1906*b*, 659), discussing the quality of the Latin 'exilis' lateral (for the laterals of Latin, see Chapter A), suggests that it should have been such that both retroflexion and palatalisation would evolve naturally from it – a view difficult to reconcile with what we know about palatals and retroflexes. For a critique of Rohlfs' proposal, see also Celata (2006, 125, 128).

The opposite idea, already mentioned above in 5.2.4, namely that retroflexion proceeds from a stage of earlier palatalisation, is entertained by Hock (1986, 79), who cautions however that his interpretation is "somewhat speculative" (see also Rodríguez-Castellano 1953, 234-237), on the grounds of a possible perceptual similarity between a palato-alveolar affricated /d͡z/ and a retroflex affricated /ɖ͡ʐ/. Jones (2004, 150-151, 153-154) remarks that the intervocalic position is not a favourable context for loss of affrication. One could argue that Hock's hypothesis is supported by Southern Italian dialects which present /ɟ/ as the outcome of both palatalisation of Lat. /lj/ and retroflexion

---

26 What led Rohlfs to his hypothesis in the first place is the fact that in some parts of Southern Italy and the Tyrrhenian Islands, both /lː/ and /ʎ/ can become retroflex; see Rohlfs (1929, 396-397), Rohlfs (1966, 328-332, §234).

of Lat. /lː/; however, it is easily conceivable that /ʝ/ developed from /ɖ/, on the basis of acoustic similarity, and that /ʝ/ as outcome of both Lat. /lj/ and Lat. /lː/ is due to convergent evolution. Additionally, the fact that Western Asturian has different outcomes for Lat. /lː/ and /lj/, namely /t͡ʂ/ and /t͡ʃ/, respectively (see 5.1.2 above) strongly suggests that the retroflex sounds do not come from earlier palatals.

With this, I close the historical part of this chapter and turn to recent approaches taken to the question of retroflexion of Lat. /lː/.

5.3 PHONETIC VIEWS ON ROMANCE RETROFLEXION OF LATIN /ʟː/

Within the last decade, the question of how retroflexion of Lat. /lː/ evolved in Romance has been opened up again with perspectives not only from articulatory phonetics, as has traditionally been done, but explicitly from an acoustic-perceptual perspective, too. But before I present the work undertaken in this vein in 5.3.2, let me remind readers of the principal characteristics of retroflex consonants, especially the retroflex laterals and stops, in 5.3.1 immediately below.

5.3.1 *Articulatory and acoustic characteristics of retroflex consonants*

Our knowledge of the characteristics of retroflex consonants, both from an articulatory and an acoustic perspective, has been assembled in an excellent 2003 dissertation on the topic by Silke Hamann, who provides the state-of-the-art up to the point of publication of her thesis. This subsection will therefore draw heavily on her work in presenting the main features of retroflexes.

As suggested by their name, the most important articulatory feature of retroflex consonants is a retroflex, or bent-back, movement of the tongue tip, whereby the coronal part of the tongue bends back, then touches in a rapid forward-flapping movement a point somewhere in the post-alveolar to prepalatal region either with the tip of the tongue (apical articulation, sometimes called 'cacuminal') or with the underside of the tongue tip (subapical articulation, for which some like to reserve the term 'retroflex'), and finally finishes its movement in a position reminiscent of plain alveolar consonants (Hamann 2003, 19-20, 33-34, 56). Flapping as a rapid passing movement of the tongue tip may, however, only be present in singleton instances of retroflex consonants (thus the Tamil singleton /ɭ/ is shorter than singleton /l/ (Hamann 2003, 69), and this is also true for the same sounds in Swedish (Livijn 2002, 27)), whereas the longer duration of a geminate /ɭː/, as in Tamil, allows the curled-back tongue tip to make a firm contact in the post-alveolar region (Balasubramanian 1982, 100).

When the tongue tip bends back, it effects a widening of the sublingual cavity. Acoustically, this leads to a lowering of the third formant and often of the fourth formant as well, sometimes to the point of a

marked narrowing of the distance between these two formants, conveying 'flatness' to the sound. While it is true that F3 and F4 also tend to lower and decrease the distance between them in apico-alveolar consonants, this is a much smaller effect in line with the smaller sublingual cavity present in these sounds (Stevens and Blumstein 1975, 218, Stevens 1989, 19, Hamann 2003, 34, 53, 56-59, 63-64). This point of similarity, however, may prove important for understanding the further evolution of the retroflex stop in the languages and dialects of Romance (see 5.3.2 below). In this context, one may also note that a back vowel in the immediate vicinity of a retroflex consonant leads to a greater widening of the sublingual cavity because, for reasons of coarticulation, the point of transition of the tongue tip on the roof of the mouth is farther back in the context of a back vowel than of a front vowel (Hamann 2003, 16, 34, 57, 59-60, 69). Such formant lowering and contextually-conditioned variability has been found for Corsican and Sicilian in spontaneous speech samples by Celata (2006, 89, 111) and for the Southern Italian dialect of Lecce by Costagliola (2007, 66), who also showed that a stressed vowel preceding the retroflex consonant favours a more marked and longer lowering of F3 since VC transitions are generally longer when the vowel is stressed. In addition, the larger compliant surface area present in retroflex stops as compared to alveolo-dental stops, as well as the dynamic cavity enlargement during the backwards movement of the tongue tip, allow for a longer maintenance of voicing than is possible in alveolo-dental stops (Sprouse et al. 2008 with experimental evidence from phonetically-trained American English and Catalan speakers).

Findings from Celata's 2006 acoustic investigation of the retroflex stops of Corsican and Sicilian show that the release of the retroflex is significantly longer than that of the corresponding unaspirated alveolo-dental stop and that it is accompanied by frication noise; a similar finding is reported by Romito and Sorianello (1999) for the retroflex stop of the Catanzaro dialect in Calabria. Moreover, a correlation seems to exist between stop duration and retroflexion in Corsican and Sicilian. Thus she found that the retroflex stop was produced predominantly as a geminate, while degemination (especially in unstressed contexts) often led to its becoming an alveolo-dental singleton /d/, a finding which suggests that the retroflexion gesture of the tongue tip may need a certain amount of time in order to be realised in such a way that it is both produced and perceived as a retroflex. Her study also shows that the duration of the geminate retroflex /ɖː/ was significantly longer than that of the geminate alveolo-dental /dː/; this fact may be attributed to the longer release phase of the retroflex stop. In the singleton instances of the two sounds, on the other hand, the difference in duration tended to disappear (Celata 2006, 77-79, 98-101).

While the tongue tip executes the flapping movement of retroflexion, the tongue body retracts towards the soft palate and the simultaneous

lowering of the predorsum leads to a widening of the oral cavity behind the primary constriction in the post-alveolar region. Such a widening contributes, together with the widening of the sublingual cavity, to a lowering of the higher formants (F2,[27] F3, F4) and gives an impression of darkness (Ohala 1983b, 200, Hamann 2003, 36). Not unexpectedly, in a number of languages of the world with retroflex consonants, one can find the same anticipatory coarticulatory effects from the consonant on the vowel as seen for dark /ɫ/, including darkening through tongue body retraction and/or lowering and/or lip rounding, as well as vowel breaking (Hamann 2003, 94) (see Section 2.1). Although this articulatory configuration has been researched primarily for retroflex stops, there is evidence to suppose that it is no different in retroflex laterals (Hamann 2003, 24-25). For Hamann (2003, 36), tongue body retraction is a direct consequence of the retroflexion movement of the tongue tip.

As already mentioned briefly above in 5.2.5 on page 168, the tongue body retraction in retroflex sounds makes them fundamentally incompatible with palatal and palatalised articulations, for it seems quite impossible to have a simultaneous raising of the predorsum and retraction of the tongue body. Acoustically, palatalisation would induce a raising of the second and third formants, leading to an impression of a laminal palato-alveolar sound. Languages such as Polish and Russian, which do have palatalised retroflexes, resort to additional lip rounding in order to keep F3 down and preserve the acoustic cues of retroflexion (Hamann 2003, 38, 78).

As far as the interaction of the retroflex sounds with their vocalic context is concerned, it is noteworthy that their most important acoustic feature, namely the lowering of F3, is more perceptible in the transition from the vowel into the consonant than vice versa, and this fact stands against a general tendency among consonants, which normally display better acoustic cues in the CV transition, i.e., at syllable onset. The reason for this is rather clear: during the transition from vowel to consonant, the tongue tip bends back, thereby creating, as noted above, a widening of the sublingual cavity and, acoustically, a progressive lowering of the third formant. When the tongue tip approaches the alveolar ridge and the brief closure created during the flapping-out movement of the tongue tip is released, i.e., at the CV transition, the sublingual cavity decreases with respect to its size at the moment of the VC transition, which means that when the retroflex consonant is released into the following vowel, the lowering of F3 is less marked or even absent, rendering the retroflex release phase more similar to that of apico-alveolars. Given the prominent formant transitions involved in retroflex sounds, it comes then as no surprise, as evidenced by a perceptual test of Norwegian retroflex vs. dental

---

27 The height of F2 in retroflex consonants depends largely on the vocalic context (Hamann 2003, 58-60).

stops reported in Hamann (2003), that cues to retroflexion are in general perceptually stronger than those to alveolo-dental consonants; while it is true that retroflexes are cross-linguistically much rarer than apico-alveolo-dentals, their complex articulatory configuration may be held responsible for this fact (Ladefoged and Maddieson 1996, 28, Livijn 2002, 27, Hamann 2003, 56, 72, 76).

It should be kept in mind, as with most sounds which allow a similar acoustic effect to be achieved via a certain range of possible articulations, that there is a large inter-speaker variability in the use of the active and passive articulators during retroflexion (cf. Hamann 2003, 15, Celata 2006, 2). Some of the possible variants in Corsican have been listed above in 5.1.3; and not surprisingly, we find a similar situation in Sicilian (Celata 2006, 113-122) and in the Italian varieties spoken in south-central Calabria (Romito and Milelli 1999, 21).[28] The parameter which varies primarily is the extent to which an occlusion or frication phase is present throughout the consonant, making the retroflex oscillate somewhere between stop, affricate, and fricative. Similarly, the retroflex lateral of Swedish may vary between a flap and a stop; often, a plosive release is perceptible (Livijn 2002, 25). In other languages, such as Pashto, the retroflex lateral alternates with a retroflex approximant rhotic /ɻ/ (Sommer and Trumpp 2006, 14), and in Bramhin Tamil, the two sounds, /ɭ/ and /ɻ/, originally distinct but acoustically close to each other, are undergoing merger (Narayanan and Kaun 1999, 2097, fig. 1, 2100). Such variability is, of course, what creates a language's propensity to change and will prove to be an essential part in the explanation of the evolution of Lat. /l:/ in Gascon and elsewhere.

5.3.2   *Phonetic approaches to the evolution of retroflexion of Latin /l:/ in Gascon and the other Romance languages and dialects*

Recent accounts of the phenomenon of /l:/-retroflexion in Romance have both taken a perceptual perspective, pointing mainly to the acoustic similarities between, on the one hand, dark /ɫ/ and retroflex /ɭ/, both produced with tongue body retraction, and, on the other hand, the retroflex consonants among themselves (Jones 2004, Celata 2006), and this is also the evolutionary pathway I will argue for in this section. The hypothesis presupposes that Latin geminate /l:/, in the dialects which underwent retroflexion, had had a dark quality, i.e., /ɫ:/. While such a dark pronunciation of the geminate lateral is observed for 5th century CE Latin spoken in the Roman provinces of North Africa by the grammarian Pompeius Maurus in his *Commentum Artis Donati* and denounced there as erroneous (Keil 1961*d*, 286-287), the geminate lateral of Latin is unanimously described as 'exilis', i.e., clear or even

---

28 See already Millardet (1933) with static palatographical evidence from Western Sicilian, Sardinian, and Corsican; for Sardinian see also Contini (1987).

palatalised, by the Roman grammarians (see Chapter A). With the current hypothesis, we thus need to make the assumption that dialects of Latin, and later Romance, could develop a dark geminate lateral. That such a dialectal feature isn't mentioned by the grammarians whose texts are still available to us may be due to history's imponderabilities; it cannot firmly be deduced from the absence of its mention in the grammatical treatises that it did not exist in at least some varieties of spoken Latin. Moreover, if such a dark geminate lateral is assumed, we cannot tell for lack of supporting material whether its emergence is due to language contact of some kind or whether it is a spontaneous evolution in several parts of the Latin/Romance-speaking world. That dark laterals may dialectally alternate with retroflex laterals has already been noted for the Bahia and São João de Barra dialects of Brazilian Portuguese, Western Cretan Greek, Eastern Norwegian dialects, and a number of Philippine languages in 5.1.4 above.

While tongue body retraction of some kind – the exact position won't matter as long as its acoustic effect is flatness or darkness of the sound – is shared by both dark and retroflex laterals, their tongue tip movements are rather dissimilar. Dark laterals show a cross-linguistic tendency toward tongue tip fronting with respect to clear laterals and thus a dental point of articulation. This is thought to favour the establishment of lateral side channels since it contributes to elongation of the tongue; it may also be a consequence of tongue body retraction which may 'push' the tongue tip along the palate towards the teeth, in which case the tongue tip would be relatively unconstrained (see Chapter 1). But if the tongue tip would not yield to fronting, Straka (1979, 373, footnote 51) reasons, if, in other words, it would be resistant to the effects of tongue body retraction and thus have a high degree of articulatory constraint, it would end up in a vertical or 'cacuminal' position: the result would be a retroflex sound. Once this articulatory configuration has been established in the course of sound change, one can hypothesise that the tongue body, originally highly constrained in dark /ɫ/, loses some of its degree of constraint (as indicated by increased susceptibility to co-articulatory effects from surrounding vowels, translated by variability in F2 height, with respect to the more constrained dark /ɫ/) and serves mainly to allow tongue tip retroflexion to happen and to foster the flat acoustic quality of the sound.

If one assumes that the above hypotheses will turn out to be right, then one is entitled to ask why the tongue tip would increase its degree of constraint in the first place. The answer to this question may be sought in duration, as retroflexion in Romance exclusively affects the geminate laterals of Latin.[29] As observed in Chapter 1, the tongue

---

29 Of course, in non-Romance languages the possibility of retroflexion in singleton laterals (where perhaps no geminate counterpart exists) is not ruled out by this assumption. So, for instance, the Greek dialects spoken in the southern part of Italy

tip closure phase in dark laterals is longer than in clear laterals, and we may hypothesise that this difference will be more marked when geminate laterals are compared, although such a study has not been carried out yet. Moreover, even in geminate retroflex laterals, such as in Tamil (see 5.3.1 above), the tongue tip makes a firm contact with the roof of the mouth and, by doing so, it can be thought to be rather constrained. In this sense, I suggest, retroflexion may have arisen through the simultaneous presence of both tongue body retraction and gemination. While this explanation is articulatory, it should be kept in mind that such a change in articulatory configurations would not be possible if the two sounds, dark /ɫ/ and retroflex /ɭ/, did not resemble each other on the acoustic-perceptual level.

On a side-note, it may be necessary to distinguish two different degrees of articulatory constraint in the tongue tip during retroflexion. When it bends back, it is possibly highly constrained (and this may be why retroflex consonants can exert prominent coarticulatory effects in Norwegian (Recasens 2006, 629)), but the flapping-out movement in which retroflexion terminates indicates a small degree of articulatory constraint of the tongue tip, the degree of constraint moving thus from highly constrained to practically unconstrained in a slingshot-like fashion. In this sense, retroflexes resemble both stops and flaps on an articulatory level.

In an earlier paper on retroflexion of Lat. /lː/ in Gascon (Müller in press), I wondered why a geminate sound should develop flapping, which is an inherently short movement (the question has also been raised by Celata 2006, 126-127). But when we look closely at the data from Romance, we find that true retroflex flapping (as opposed to post-alveolar closure phase + flapped-out release) only occurs in prosodically weak positions: in unstressed contexts such as in personal or demonstrative pronouns and definite articles in Southern Italian varieties (Rohlfs 1938, 556-557, see above 5.1.3) and Upper Aragonese (Catalán 1954, 10, see above 5.1.2) and systematically in intervocalic post-stress position in Gascon, where the retroflex quality of the flap has been lost.[30]

It has rightly been remarked that the evidence for geminate retroflex laterals, as opposed to geminate retroflex stops, in Romance dialectal varieties is very scarce (Celata 2006, 126); this may be indicative of the fact that the geminate retroflex lateral develops very easily into a retroflex stop, in other words, that lateralisation may be difficult to maintain in conjunction with retroflexion, especially when the sound

---

may have retroflexion with the singleton laterals as well as with the geminate ones (Kontossopoulos 2006a, 18), see above 5.1.3.

30 Jones (2004, 153) supposes that the retroflex lateral first changed into the retroflex rhotic on the grounds of acoustic similarity, as exposed above, and that the flapping movement was then "reinterpreted over time as a plosive articulation." This assumption is, however, not necessary, as geminate /ɭː/ may develop directly into the geminate retroflex stop /ɖː/.

has a long duration. Why this is so exactly will need to be answered by experimental investigation; at this point I will offer some hypotheses which await testing. As seen in Chapter 1, the side channels of a lateral sound need to be of a certain length and area function in order to produce a zero in the frequency region where the lateral's formants (in essence F1-F5) occur. If the combined length (of both side channels if present and also taking into account the effects of non-uniform area functions) is too small, the zero will be far above the linguistically relevant frequency spectrum (see Narayanan and Kaun 1999, Zhang and Espy-Wilson 2004). Given moreover that the shape of the lateral side channel(s) is liable to change during the backward-bending and forward-flapping-out movement of the tongue tip, it is possible that at one point or the other the side channel(s) may be too small or too short in order to produce a zero in the transfer function. In this context, it is interesting to note that Celata (2006, 119-120) observed in her acoustic recordings of Sicilian spontaneous speech a realisation of Lat. /l:/ which she describes as either a laterally-released stop or a pre-occluded lateral. If, due to the marked closure phase of a geminate retroflex lateral, laterality may be heard only at the release, as suggested by these observations, then it may not be salient enough to be preserved over time; all the more so because friction on laterals, as would occur at the release, is acoustically similar to the noise in palatal or post-alveolar fricatives (see 3.3.4 for a discussion of this claim). To sum up this admittedly speculative discussion of loss of laterality in the geminate retroflex lateral of Romance, there still remain a number of blank spots on the map of our understanding of the process (see also the account of Celata (2006, 132-136), who stresses the role of the post-stress position and the concomitant loss of formant structure in the evolution of retroflexion, but which seems difficult to reconcile with retroflexion in word-initial position such as in Western Asturian). Further investigation into this question will require more and abundant funding.

Once the sound change has attained the stage of a retroflex stop, further evolution to an affricate or fricative is likely and already exists, as noted above for Corsican and Sicilian, in synchronic variation. In fact, it seems that all retroflex stops of Romance, especially when geminate, have a rather long release phase compared to the plain alveolar stops (see 5.3.1 above for details). Given this long fricated release, reinterpretation as an affricate can be supposed. For Gascon where the presumed retroflex stop came to be in word-final position, this frication noise could be lost due to a following silence or to the onset of a following consonant which would have masked it. Also, prosodic positions favourable to shortening of the sound such as unstressed positions may reduce the frication phase of the retroflex stop. As far as the loss of retroflexion in the affricates or stops is concerned, recall that the release phase of retroflexes resembles closely

that of alveolars. There is thus reason to believe that this similarity, together with word-final devoicing, led from /ɖ(ː), ɖ͡ʐ/ to the variants found in contemporary Gascon, namely /t͡ʃ, tʰ, tʲ, t/, and that in this sense, palato-aveolars and alveolars could develop out of a retroflex articulation. The sound evolved from the voicing of Latin intervocalic /t/ which came eventually to be in word-final position through loss of the Latin final vowels and which is represented graphically as <d> in medieval manuscripts (see above 5.1.1) may also have been a retroflex stop whose emergence may have been due to the contribution of retroflexion to voicing maintenance. As seen above, it subsequently followed the same evolutionary path as the outcome of Latin geminate /lː/.[31]

A quick word on questions of weakening and strengthening, which, as we have seen in Section 5.2, often constituted and still constitute today an important part of the core technical vocabulary used in analysing the sound change. For Celata (2006, 135-136), the loss of laterality in the evolution of Lat. /lː/ is both an articulatory and acoustic weakening (even though one could consider the development to a stop as an articulatory strengthening of the tongue tip gesture). Since laterals are generally more constrained than retroflexes, such an interpretation could be reasonable, at least as far as the tongue body is concerned. Whether the gradual disappearance of the formant structure on the spectrogram in the development from lateral to stop corresponds to a loss of information depends on one's vantage point: a number of phoneticians consider the rapid transitions between sounds as the real carriers of acoustic information (Stevens 1989, Ohala 1992*a*, 172, Carlson 2007). On the other hand, both laterality and retroflexion are slow transitions, and their information content would be comparable from this point of view.

Turning back to Gascon, it is remarkable that the ubiquitous diminutive suffix –ELLUS, -A, -UM of Latin presents several of the phonetic conditions favourable to the perception of retroflexion, as discussed above in 5.3.1: the geminate lateral is in post-stress position which makes the VC transitions from the front vowel into the lateral particularly long and leads to a prominent F3 falling movement; moreover, the following back rounded vowel (in the masculine and neuter forms), through anticipatory lip rounding and tongue body backing, renders the geminate lateral still darker. According to Bybee (2001, 11-12, 94-95), regular phonetic sound change of the kind assumed here progresses more rapidly in forms of high token frequency. While it is impossible to determine the token frequency of the diminutive suffix in spoken Proto-Romance, or even Latin, for lack of appropriate

---

31 Bearnés Gascon constitutes a possible counterexample to this explanation: in medieval times the sound resulting from Latin word-final /lː/ was spelled <g>, while voiced former intervocalic-now-word-final /t/ > /d/ had the spelling <d> (sometimes <t>). The modern varieties have generally /tʲ/ for Lat. /lː/, but /t/ for former <d>, thus keeping both distinct (Thomas Field, p.c., July 2011).

Table 20: Number of etyma in the FEW ending in one of the suffixes -ELLUS, -A, -UM, -ILLUS, -A, -UM, -ALLUS, -A, -UM, -OLLUS, -A, -UM, -ULLUS, -A, -UM. Note that in Gallo-Romance, the neuter and masculine forms eventually merged. The high type frequency of the diminutive suffix -ELLUS, -A, -UM is obvious from the figures. * -ILLUS, -A, -UM also has diminutive meaning.

	masculine	neuter	feminine
-ELLUS, -A, -UM	49	22	51
-ILLUS, -A, -UM*	16	9	29
-ALLUS, -A, -UM	10	3	5
-OLLUS, -A, -UM	0	2	6
-ULLUS, -A, -UM	4	1	9

corpora, a sound change occurring in forms of high token frequency which also have high type frequency may then serve as a role model for similar forms to undergo the sound change as well. Recall that the most stable productions of retroflexion in Corsican, as evidenced by acoustic investigation of spontaneous speech, occurred precisely in this suffix (Celata 2006, 71-72, 74, see 5.1.3 above). A look at the list of etyma in the *Französisches Etymologisches Wörterbuch* (FEW) (von Wartburg 1928-2003), which, contrary to what its title insinuates, covers the entire Gallo-Romance area, gives an idea of the type frequencies of the diminutive suffix –ELLUS, -A, -UM in relation to similar sound sequences (Table 20 on page 177).

As Table 20 on page 177 plainly demonstrates, the masculine/neuter suffix -ELLUM (acc.) has a much greater type frequency (71 etyma) than all the comparable sequences taken together (45 etyma); in the feminine form, the advantage of the diminutive suffix is smaller: -ELLAM (acc.) occurs in 51 etyma, against 49 etyma containing comparable forms with other vowels. The fact that –ELLUS, -A, -UM had once before in the history of Latin assimilated another suffix, -ĒLUS, -A, -UM, is attested to us by the Roman grammarian Papirianus, who writes, as quoted by Cassiodorus in his *De Orthographia*: "Querella apud antiquos per unum l scribebatur, sicut suadela tutela candela corruptela, quamvis usus sibi etiam apud eos vindicaret, ut aliqua in figura deminutivorum per duo l scriberentur, ut capella fabella tabella. Nunc autem etiam querella per duo l scribitur." (Keil 1961*f*, 159) ("The ancients used to write 'querella' with only one l, as in 'suadela', 'tutela', 'candela', 'corruptela', even though usage also required them to write some words in the diminutive form with two l's, as in 'capella', 'fabella', 'tabella'. But now even 'querella' is written with two l's.").

Thus, the high type frequency of the diminutive suffix may have helped in the spread of the sound change. It may also explain another

question raised by Sauzet (2006) in discussing the phenomenon of retroflexion in Gascon, namely why the masculine – feminine alternation of the type "aqueth" – "aquera" ('that one'), "bèth" – "bèra" ('pretty'), "navèth" – "navèra" ('new') has not led to analogical levelling inside the paradigm. While it is always very difficult to provide good reasons for something not taking place, I'd like to point to Bybee's (2001, 11-12) observation that forms with high token frequency (assuming, in the absence of any available corpus, that this alternation in Gascon still has such a high token frequency) are particularly resistant to analogical change.[32]

5.4   CONCLUSION

In this chapter, I have described in Section 5.1 developments of the Latin geminate lateral in Gascon and other Romance varieties both in the Pyrenean-Cantabrian area and in the region of Southern Italy and the Tyrrhenian Islands that have kept philologists and dialectologists on their toes since the late 19th century. The lively debate that accompanied the emergence of the communis opinio of a retroflexion process being at the origin of all these different, yet similar, developments has been traced and narrated in some detail in Section 5.2. Recent approaches from phonetics to the sound changes, including my own tentative proposal of the process, have been the subject of Section 5.3.

It is likely that the present chapter will not have been the last one in the grand epic of explaining the developments of Latin geminate /l:/. Most importantly, none of the explanations up to the present point has been backed up by experimental evidence investigating any of the hypotheses proposed in the history of the debate on the sound change. It would not be surprising if any of the hypotheses would then turn out to be contradicted, as has happened, for instance, in the field of /l/-palatalisation in onset clusters where articulatory investigations found that the velar stop in the velar + lateral cluster does not undergo closure fronting, as common sense had assumed before (see Chapter 3). Specifically, the question whether the geminate lateral had had to be dark, as suggested by Jones (2004), Celata (2006), and myself, will need to be subject to experimental investigation, for it is still unclear how the alleged change of place of articulation of the tongue tip could have come about. Moreover, future research shall try to elucidate the role, if any, played by the interdental lateral which shares with dark /ɫ/ the characteristic tongue body retraction but has advanced the point of articulation of the tongue tip to the teeth until frication ensued. In the Lengadocian varieties of Upper Arièja, in direct contact with Gascon, it is precisely Latin geminate /l:/ which developed into the lateral interdental fricative.

---

32 The foregoing analysis has been inspired by Bybee's (2001, section 6.3.3 (pp. 148-153)) analysis of /d/ deletion in the Spanish suffix /-ado, -ido/.

CONCLUSIONS AND PERSPECTIVES

In this thesis I discuss sound changes pertaining to the lateral in Occitan dialects and in other languages. I begin the discussion in chapter 1 by presenting information about the lateral's articulation, its acoustics and the way it could be represented on a theoretical level. A review of the available literature on the sound reveals a relatively unconstrained tongue tip in both types of lateral, with differences, however, in tongue tip contact location and its coördination with voicing. Results from studies of the coördination of tongue body and tongue tip gestures across syllable positions for both clear and dark laterals are synthesised. With respect to the tongue body, one of the most important differences between clear /l/ and dark /ɫ/ is shown to be the greater degree of constraint in /ɫ/ as compared to /l/, which accounts for a great deal of the behaviour observed for these two types of laterals in their phonetic environment. I also discuss the possible origins (coarticulation and prosodic position) of the so-called 'extrinsic allophones', i.e. languages such as English where dark and clear laterals stand in complementary distribution. On the acoustic side, I present the typical formant structure of lateral along the darkness/clearness-continuum as well as some questions relating to intensity. The zero in the transfer function of the lateral which arises through the formation of lateral side channels is also discussed at length. In the following subsection, I present the two theoretical frameworks whose ideas underlie my analysis of the sound changes under investigation, namely Articulatory Phonology and the Degree of Articulatory Constraint Model. In relation to this, I discuss the possible make-up of laterals within these frameworks. I argue that a lateral consists of at least two, possibly three gestures, the tongue tip gesture (except perhaps for palatal and velar laterals, where the tongue tip is lowered behind the lower incisors), the tongue body gesture, and most probably a gesture producing the lateral side channels. In the last subsection, I finally give an overview of the treatment of the lateral in phonological frameworks such as Feature Geometry and Optimality Theory.

The following chapters deal with sound changes affecting the lateral in a large number of Occitan dialects, sometimes in almost all of them. In chapter 2, I describe the phenomenon of /ɫ/-vocalisation to a back rounded semivowel across Occitan dialects and across the other Romance languages, as well as in a large number of other, mostly European, languages and put it, wherever possible, into its chronological context. Under the heading of /ɫ/-vocalisation, I also group coarticulatory effects which the dark lateral exerts on its preceding (front) vowel

in a number of different dialects and languages. In the first part of this chapter, I consider /ɫ/-vocalisation in preconsonantal and word-final position, while in the second part, I turn to the phenomenon as it occurred in intervocalic position. The phonetic conditions of the sound change have received great attention from scholarship, at least for /ɫ/-vocalisation in preconsonantal and word-final position. The focus of attention is on the behaviour of the tongue tip, which oftentimes still performs some reduced movement in vocalising /ɫ/. Labialisation, a further step towards /w/, only seems to occur when tongue tip reduction is firmly entrenched in the speech habits. Moreover, a small handful of perception studies are discussed, but it is concluded that more studies need to be conducted in order to obtain firm and consistent results. Finally, phonetic studies which treat the coarticulatory influence of dark /ɫ/ on high front vowels are reviewed; these show how diphthongisation and backing of such vowels in contact with /ɫ/ could have come about. Taken together, all these studies suggest that /ɫ/-vocalisation occurs first before velar and labial consonants, followed by the word-final position, and only then spreads to the position before alveolo-dental consonants, where presumably homorganicity in the cluster prevents tongue tip contact loss from occurring. Compared to these findings, the Romance languages have taken an evolutionary path which is contrary to the one predicted from phonetic studies. After reviewing a number of available explanations of the phenomenon, I argue that this apparently paradoxical development of /ɫ/-vocalisation in Romance is ascribable to a large extent to the distribution of sound sequences already inside the Latin lexicon. Romance /ɫ/-vocalisation would thus illustrate the interplay of purely phonetic factors with frequency effects in the lexicon.

/ɫ/-vocalisation in intervocalic position, as discussed in the second part of chapter 2, is restricted to a subset of those dialects and languages which have /ɫ/-vocalisation in preconsonantal and word-final position. In Occitan, it is mainly found in Auvernhat varieties, whereas other Romance dialects where this occurs include Sardinian and the Italian dialect spoken in Calabria. Although no experimental phonetic study has yet looked specifically at /ɫ/-vocalisation in intervocalic position, I highlight several points which need to be answered. Assuming that the fundamental mechanism of /ɫ/-vocalisation is the same regardless of the position of the lateral within the syllable or word, on the articulatory side, we will need to be able to learn about tongue tip behaviour of intervocalic dark laterals across languages, while on the perceptual side, we will need to test whether tongue tip contact loss is a prerequisite in the perception of a vocalised dark lateral. Moreover, it will be of interest to learn to which degree listeners are able to perceive differences in tongue body position along the velarisation–pharyngealisation continuum, and whether the onset of lip rounding follows a similar path as in /ɫ/-vocalisation in preconsonantal and

word-final position, namely when recategorisation of the vocalised lateral to a back semi-vowel seems to take place.

Chapter 3 is devoted to /l/-palatalisation in onset clusters of the type obstruent + lateral. This type of palatalisation occurs not only in the Occitan dialects situated at the northern fringe of the Occitan-speaking area, it is part of a larger zone covering French and Franco-Provençal dialects as well. Furthermore, it is a rather recent development in Gallo-Romance whose expansion can be traced from its beginnings in the 15th century until its completion in the 18th century. In Italian, where most dialects underwent the development, the evolution dates back to the Middle Ages, whereas in Spanish and Portuguese, where only the voiceless obstruent + lateral clusters were affected, it seems to go back to the earliest stages of these Ibero-Romance languages. It is pointed out that both the chronological and the geographical facts suggest that palatalisation in the onset cluster started in the velar + lateral cluster and only then spread onto the remaining, i.e., labial + lateral clusters. Furthermore, it is noted that the opposite evolution, namely lateralisation of /j/ occurred historically in the Slavic languages in labial + yod clusters, but not in velar + yod clusters. A review of the literature on stop + lateral clusters shows the possibility of the velar stop being released laterally in velar + lateral clusters without being fronted articulatorily. Moreover, the lateral is darker following a labial stop than following a velar stop, and this difference has been found to be significant for clear-/l/-languages. When discussing previous accounts and explanations of /l/-palatalisation in onset clusters, it is shown that the long-standing view that palatalisation originated in articulatory assimilation in velar + lateral clusters is not supported by phonetic research; moreover, the basis for analogical change in labial + lateral clusters is not firmly supported by evidence from frequency counts of stop + lateral onset clusters in the reconstructed Proto-Gallo-Romance lexicon. I suggest that the origin of palatalisation in these clusters is rather to be sought in acoustic similarities of the frication accompanying them, and that the sound change is due to (mis)perception. I adduce and discuss several facts to substantiate my point: The formant transitions between velar + clear /l/ and velar + yod clusters often are not significantly different or the difference reaches only marginal significance. Lateral fricatives – and by extension the laterally-coloured stop burst of the velar stop in the cluster – are acoustically very similar to palatal fricatives. A number of sound changes have occurred around the world and over the centuries in which a devoiced, fricated lateral evolved into a palatal or alveopalatal fricative or vice versa (e.g. the Italian "lisca" phenomenon), or in which an affricated velar acquired laterality. It is pointed out that lisping belongs to this set of articulatory variations. Moreover, I briefly discuss the relationship of /l/-palatalisation in onset clusters to velar-to-alveolar changes in place of articulation of

the stop in such clusters. The lateral fricative hypothesis will need to be tested thoroughly in the future. Finally, I leave open the question of the role of analogical pressure which would have made labial + lateral-clusters follow in the footsteps of velar + lateral-clusters.

Chapter 4 is concerned with rhoticisation of the lateral and its concomitant, but much rarer, opposite, lambdacisation of the rhotic. Especially in intervocalic position, /l/-rhoticisation occurs in a large number of Occitan dialects, but also in dialects of other Romance languages. In fact, alternation between /l/ and /ɾ/ of some sort is so widespread among the languages of the world that only an illustrative example is given. It seems, however, that liquid dissimilation can occur even in languages and dialects which otherwise do not have processes of rhoticisation and lambdacisation, for instance in Latin. This frequent interchange between these two sounds may be imputed to their phonetic similarities especially in tongue body position; moreover, they both allow for spontaneous voicing. However, the tongue tip gesture differentiates the lateral and the rhotic: while it serves to allow for side channel formation in the lateral, it is only a short ballistic movement of the tongue tip towards the alveolar ridge in the tap. Both gestures produce nevertheless an attenuation of intensity in an otherwise vocalic sound. I hypothesise that duration plays an important role in rhoticisation and lambdacisation and I report studies testing this claim. Experimental research into this topic continues at the time of writing. Specifically, the nature of liquid dissimilation has yet to be elucidated, and future research should also focus on finding out which degree of darkness is most favourable to rhoticisation occurring, since evidence seems to suggest that laterals ought to be moderately dark in order to give rise to this sound change.

The final chapter then discusses developments of the Latin geminate lateral in Gascon and other Romance dialects, which have already attracted the curiosity of our field for a long time. In Gascon, the Latin geminate lateral evolved to an alveolopalatal stop or affricate in word-final position and to an alveolar tap in intervocalic position at a very early point in the history of the dialect. Similar developments are also found in Upper Aragonese and Western Asturian. In the dialects of Southern Italy and the Tyrrhenian Islands, the Latin geminate lateral is today a retroflex sound, most commonly a geminate retroflex stop, although other variants are also encountered; this sound change seems to have occurred toward the end of the Middle Ages or later. I then trace the developments of the accounts and proposals put forth by linguists and philologists over more than a century. According to the prevailing fashion of each period, we find among them discussions of substrates which could have provoked or hindered retroflexion, analyses of the structure of phonological systems and the pressure they allegedly exert onto sound situated within them, as well as phonetic approaches one of which is presented in this thesis. I also

critically evaluate the claim that the developments of Latin /l:/ are due to a retroflexion process as opposed to a palatalisation process, and conclude that this hypothesis is quite likely. This is why I give an overview of the phonetic characteristics of retroflex sounds, regarding both their articulation and acoustics, before proceeding to my own interpretation of what happened in the evolution of Latin /l:/. Like other recent researchers, I assume that the geminate lateral, in the dialects concerned, became dark. It is then the fact that dark laterals and retroflex laterals are acoustically very similar to each other which suggests that perceptual confusion may be responsible for the sound change. Moreover, it is hypothesised that the Latin diminutive suffix -ELLUM, which is of high type frequency in Romance, has contributed to the stabilisation and spread of the sound change.

It goes without saying that perspectives for future research are manifold. Language being the complex system that it is, the articulatory and acoustic conditions for sound change, as well as frequency of sounds and sound sequences in the lexicon and in actually occurring speech, are but one aspect in the process. For sound changes having taken place a long time ago, it is sometimes difficult to establish their sociophonetic factors, but effects on morphology and perhaps syntax can be investigated, if possible from an experimental perspective. Likewise, semantic change may take advantage of sound change, in assigning slightly different meanings or contexts of usage to evolved vs. more conservative or even archaic pronunciations. Finally, spread of sound change, not only through the lexicon, but also from community to community is a worthwile topic for further investigations. Whereas in former times, spread often occurred along some communication road – railway, roads, coastlines –, in today's world where everyone potentially communicates with everyone else, traditional geolinguistics may have to change.

Finally, despite the important advances made by researchers such as John Ohala or Joan Bybee in our understanding of sound change, many points still remain vague or unanswered. What is the relationship of sound change to other self-organising systems? How can we study the role of variation, stressed so many times in this thesis, and is there a way to analyse it, beyond the merely descriptive? In which way is sound change different or similar to other kinds of language change, for instance, grammaticisation? To other kinds of change in general, such as changing fashions or biological evolution? How did our scientific outlook on sound change itself change over the centuries? Such are the many and myriad questions which will keep us busy for a while to come.

In conclusion, let Sir Karl Popper have the last word:

> "Mit jedem Schritt, den wir vorwärts machen, mit jedem Problem, das wir lösen, entdecken wir nicht nur neue und ungelöste Probleme, sondern wir entdecken auch, daß dort,

wo wir auf festem und sicherem Boden zu stehen glaubten, in Wahrheit alles unsicher und im Schwanken begriffen ist."

("With each step forward, with each problem which we solve, we not only discover new and unsolved problems, but we also discover that where we believed that we were standing on a firm and safe ground, all things are, in truth, insecure and in a state of flux.") (Popper 1989, 103)

APPENDIX

THE LATERAL OF LATIN

Describing the quality of the sounds of a language which has been lacking native speakers for millennia is usually not an easy task. In the case of Latin, however, we are unusually lucky to have a variety of evidence to substantiate our knowledge of the different pronunciations of the lateral. This evidence consists of direct sources, namely grammatical treatises from the Late Latin period, and indirect sources such as word plays, sound changes which occurred not only in the transition into Romance but already during earlier periods of the Latin language, and loanword adaptations, especially with borrowings from Greek. But before I list the evidence, I shall summarise the opinions held by scholarship about the quality of the Latin lateral, according to its position within the word or syllable and its phonetic context.

The fundamental distinction within types of lateral made by the Ancient grammarians concerns two qualities for which they used the terms 'exilis' or 'tenuis' and 'pinguis' or 'plenus', respectively. What was meant by these technical terms has been subject to interpretation for at least a century and a half, but an overall consensus seems to have been reached.

EXILIS/TENUIS/SUBTILIS. The lateral with this quality occurs as an intervocalic geminate and in the sequences /lj, li/, as well as, according to one 5th-century-CE grammarian, in word-initial position. The different interpretations for this term run as follows:

1. 'exilis' as slightly palatalised /l^j/. So de Kolovrat (1923a, 60), especially for the geminate lateral of Late Latin, Meillet and Vendryes (1924, 75, §110), Meillet (2004, 138), Sommer (1948, 166-168, §97), Safarewicz (1953), Belardi (1984a, 73, 109) ("diesizzato"), De Martino (2000, 216, footnote 4), but only for the /lj/-sequence; Meillet (1905-1906, 239-240) thinks that, although the singleton lateral was dark before low and back vowels in Early Latin, it became 'exilis' in all intervocalic contexts during the Classical period. For Herbig (1913, 251), the /lj/-sequence is already a palatal lateral, judging from inscriptions on Celtic-Roman coins from 1st or 2nd century BCE Provincia Narbonensis (e.g., "iailkovesi"~"ialikovesi" 'of Ialikovesus' – Herbig points to similar spellings for the palatal lateral in French) and of Faliscan funeral inscriptions on clay bricks from the 3rd century BCE (e.g., "fio" = Lat. "filius").

2. 'exilis' as clear /l/. So Torreblanca (1988, 293), De Martino (2000, 218) for /lː/; de Kolovrat (1923a, 71-72) (pace Belardi 1984a,

82) thinks that 'exilis' /l/ was clear as opposed to palatalised in Early and Classical Latin and points out that a strongly palatalised geminate /lː/ would probably have had an influence on the quality of its preceding vowel, just like dark /ɫ/, but it didn't; similarly, Nandris (1965, 928-929) reminds scholars that if 'exilis' /l/ was palatalised, it would generally have undergone the same developments as the /lj/ cluster, but this was not the case.

3. 'exilis' as 'tense'. Arguing that the Late Latin opposition of short and long /i(ː)/ involved a tense/lax distinction, Ettmayer (1906b, 652) takes 'exilis' to stand for 'tense'.[1]

The formation of 'exilis' /lː/ from regressive or anticipatory assimilation in /ln, ls, ld, dl, nl, rl/-clusters (Osthoff 1893, 58)[2] is dated by Belardi (1984a, 66) to the proto-historic period of Latin (pace others who would like to locate it in more remote prehistory) (Belardi 1984a, 79, footnote 20). One wonders in this respect whether the Latin geminate lateral acquired its clear quality from assimilating to alveolar consonants.

PINGUIS/PLENUS/LARGUS. Such is the term used by the Latin grammarians to describe the quality of the lateral in preconsonantal and word-final position, in onset clusters, and before low and back vowels. For this term, philologists have unanimously interpreted 'pinguis' as dark /ɫ/. So de Kolovrat (1923a, 60), Meillet and Vendryes (1924, 75, §110), Sommer (1948, 166-168, §97), Meillet (2004, 138). Belardi (1984a) suggests that the word-initial lateral of Early and Classical Latin was also dark well into Late Latin times (4th century CE), except before /i/ (1984a, 85-86, 90); he also proposes that during the course of the 1st century CE, the word-final lateral became clear (1984a, 89).

The technical terms 'exilis' and 'plenus/pinguis' were also used to characterise the quality of the vowels /i/ and /u/, respectively, by the grammarians Velius Longus (2nd c. CE) and Consentius (5th c. CE) (Allen 1970, 34, Belardi 1984a, 74, Belardi 1984b, 159, Torreblanca 1990, 321). Moreover, it has been shown that the Latin terms 'exilis/subtilis/tenuis' correspond to 'λεπτός' ('thin') and 'ὀξύς' ('sharp') of the Greek grammaticographical tradition (Belardi 1984b, 162-163).

---

1 A small number of researchers have tried to apply Martinet's (1952) structuralist distinction of 'strong' and 'weak' to the Latin dichotomy of 'exilis' and 'pinguis'. Among them, we count Nandris (1965, 941-942), Valle (1977, 10-11), and De Martino (2000), De Martino (2001) in a two-part book-length article. Unfortunately, all of them completely ignore the state-of-the-art in phonetics at their respective moment of writing, and also otherwise their research is of little value to science; see also an extensive and not exactly positive review of Nandris' article by Belardi (1984a, 95-97).
2 The assumption of articulatory assimilation in /ln, ls, ld/-clusters is questionable (Daniel Recasens, p.c., July 2011).

MEDIUS. The lateral described as 'medius' by some grammarians always occurs word-initially and usually in front of the mid-high front vowel /e/. The quality described by the term is understood by scholarship as clear /l/. So de Kolovrat (1923*a*, 60), arguing that laterals generally tend to be clear(er) in syllable onsets and that therefore, dark laterals in this position are rather rare. The emergence of the 'medius' quality would be an innovation of 5th-century Late Latin and broadens the earlier 'exilis'–'pinguis' dichotomy (de Kolovrat 1923*a*, 74-75, Belardi 1984*a*, 87, 92, 94). As for the intervocalic singleton /l/, which is never explicitly mentioned by the grammarians, Sletsjøe (1959, 145) thinks that it had lost its dark quality by Late Latin (see above Meillet's (1905-1906) position that it had become 'exilis'), which is why, as says Meyer-Lübke (1934, 10) (also Sletsjøe 1959, 149), the Romance languages have consistently one quality for the intervocalic lateral, apart from, of course, the inevitable small variations due to co-articulation.

The sources.

TERENTIANUS MAURUS (2nd-3rd c. CE, from Mauretania (RE (=Pauly and Wissowa 1893-1978) V A,1: 587-591)), *De litteris, de syllabis, de metris libri tres*, v. 230-234 (Keil 1961*e*, 332):

> Adversa palati supera premendo parte / obstansque sono quem ciet ipsa lingua nitens / validum penitus nescio quid sonare cogit, / quo littera ad aures veniat secunda nostras, / ex ordine fulgens cui dat locum sinopis.
> ("By pressing the opposite parts of the palate with its upper surface and vigorously opposing the sound of which it is itself the cause, the tongue produces a powerful sound far back in the mouth, wherefore comes to our ears the brilliant letter, second in order, to which our list assigns that place." (translation by Sturtevant 1920, 78, footnote 2)).

MARIUS VICTORINUS (4th c. CE, from North Africa (RE XIV,2: 1840-1848)), *Ars Grammatica* I, 6, 10f (Keil 1961*e*, 34:

> Sequetur l, quae validum nescio quid partem palati, qua primordium dentibus superis est, lingua trudente, diducto ore personabit.
> ("Next will come l, which, with the tongue pressing the part of the palate where the roots of the upper teeth are, will send a powerful sound through the open mouth." (translation by Sturtevant 1920, 79, footnote 1))

DIOMEDES GRAMMATICUS (2nd half of the 4th c. CE (RE V,1: 827-829)), *Ars Grammatica, liber II* (Keil 1961*a*, 453):

labdacismi [sunt], si 'lucem' prima syllaba uel 'almam' nimium plene pronuntiemus.

("It is a lambdacism when we pronounce the first syllable of 'lux' or 'alma' too 'plene'.")[3]

MARTIANUS FELIX CAPELLA (end of 4th c. CE, from North Africa (Carthage) (RE XIV,2: 2003-2016)), *De Grammatica*, III, 241 (Dick and Préaux 1978, 90):

L vero littera tripliciter sonat. Nam exilem sonum reddit cum geminatur, ut sollers, Sallustius, medium autem cum terminat nomina, ut sol sal, item leniter sonat cum vocales antevenit, ut lapis, lepus, liber, locus, lucerna; plenum vero sonum habet, cum ei praeferuntur litterae p g c f, ut in Plauto, glebis, Claudio, Flavo. L autem numquam ulli semivocali vel mutae praeponitur.

("The letter l has three types of realisation. For it is 'exilis' when geminated, as in 'sollers', 'Sallustius', but 'medius' when it is word-final, as in 'sol', 'sal', moreover, it is weak when it precedes a vowel as in 'lapis', 'lepus', 'liber', 'locus', 'lucerna'; it is 'plenus' when it is preceded by the letters p g c f as in 'Plautus', 'gleba', 'Claudius', 'Flavus'. But l never occurs before a semivowel or a voiceless obstruent.");

De Grammatica, III, 261 (Dick and Préaux 1978, 96):

L lingua palatoque dulcescit.[4]
("L, through tongue and palate, has a sweet sound").

SERVIUS HONORATUS (end of 4th c. CE - 1st half of 5th c. CE, lived in Rome (RE II A,2: 1834-1848)), *Commentarius in Artem Donati* (Keil 1961c, 445):

labdacismi fiunt, si aut unum l tenuius dicis [solocismum], ut 'Lucius', aut geminum pinguius, ut 'Metellus'.[5]

("Lambdacisms arise when one either pronounces a singleton l too 'tenuis', as in 'Lucius', or a geminate l too 'pinguis', as in 'Metellus'.")

POMPEIUS MAURUS (5th c. CE, of African origin (RE XXI,2: 2313-2315)), *Commentum Artis Donati* 445,12 (Keil 1961d, 286-287):

---

3 I leave the technical terms in the original language. For a discussion of their meanings, see above.

4 This characterisation needs to be understood in contrast to that of the rhotic: "R spiritum lingua crispante corraditur" ("R, when the tongue makes the air vibrate, has a raucous sound.") (Dick and Préaux 1978, 96).

5 Sletsjøe (1959, 150) takes the testimonies of Servius and Diomedes to mean that word-initial /l/ had become unstable in Late Latin. Another interpretation would be that the two grammarians refer to different regional accents of Latin, but it is difficult to know which ones.

Labdacismus est ille, qui aut per unum l fit aut per duo; sed per unum, si tenuius sonet, per duo, si pinguius sonet. Puta 'llargus'; debemus dicere 'largus', ut pingue sonet; et si dicas 'llex' [. . .], non 'lex' [. . .]: uitiosa sunt per labdacismum. item in gemino l, si volueris pinguius sonare, si dicamus 'Metelus' 'Catulus'. in his etiam agnoscimus gentium uitia; labdacismis scatent Afri, raro est ut aliquis dicat l: per geminum l sic [sc. ut nunc uobis effero] locuntur Romani, omnes Latini sic locuntur: 'Catullus' 'Metellus'.

("Lambdacism occurs with both singleton and geminate l: in the singleton when it sounds too 'tenuis', and in the geminate when it sounds too 'pinguis'. Consider 'llargus'; we need to say 'largus' so that it sounds 'pingue'; and if one should say 'llex' [. . .], not 'lex' [. . .]: it's incorrect because of the lambdacisms. The same holds for geminate l, if one would want to pronounce it too 'pinguis' and say 'Metelus', 'Catulus'. In such habits we can recognise peoples' incorrect usages; lambdacisms abound with the Afri (inhabitants of Carthage), and it is rare that someone pronounces l: for geminate l, the Romans pronounce it thus, and thus all Latins speak: 'Catullus', 'Metellus'.")

CONSENTIUS (5th c. CE, of Gallo-Roman origin (RE IV,1: 911-912)), *Ars. De barbarismis et metaplasmis* (Keil 1961*d*, 392, 394):

Per detractionem fiunt barbarismi sic: litterae ut siquis dicat vilam pro villam, mile pro mille [. . .]. labdacismum uitium in eo esse dicunt, quod eadem littera uel subtilius a quibusdam uel pinguius ecfertur. et re uera alterutrum uitium quibusdam gentibus est. nam ecce Graeci subtiliter hunc sonum efferunt. ubi enim dicunt 'ille mihi dixit', sic sonant duae l primae syllabae, quasi per unum l sermo ipse consistat. contra alii sic pronuntiant 'ille meum comitatus est iter' et 'illum ego per flammas eripui', ut aliquid illic soni etiam consonantis ammiscere videantur, quod pinguissimae prolationis est. Romana lingua emendationem habet in hac quoque distinctione. nam alicubi pinguius, alicubi debet exilius proferri; pinguius, cum uel b sequitur ut in 'albo', vel c ut in 'pulchro', uel f ut in 'adelfis', vel g ut in 'alga', uel m ut in 'pulmone', uel p ut in 'scalpro'; exilius autem proferenda est, ubicumque ab ea uerbum incipit, ut in 'lepore' 'lana' 'lupo', uel ubi in eodem uerbo et prior syllaba in hac finitur, et sequens ab ea incipit, ut 'ille' et 'Allia'.

("Barbarisms arise through subtractions in the following way: subtraction of letters, so when one says 'vila' for 'villa' or 'mile' for 'mille'. [. . .] The error called lambdacism is said to lie in the fact that some people pronounce the same

letter either too 'subtilis' or too 'pinguis'. And indeed, one
or the other of these errors can be found with some peoples.
The Greek, for instance, pronounce this sound 'subtiliter'.
For when they say 'ille mihi dixit', the two laterals of the
first syllable sound as if there would be but one lateral.
Conversely, others pronounce 'ille meum comitatus est iter'
and 'illum ego per flammas eripui' in a way that they seem
to mix it with a consonantal sound which is a very 'pinguis'
pronunciation. The Roman speech makes this distinction
better. For it must be pronounced in some places more
'pinguis' and in other places more 'exilis'; more 'pinguis'
when b follows as in 'albus', or c as in 'pulcher', or f as
in 'adelfi', or g as in 'alga', or m as in 'pulmo', or p as
in 'scalper'; but it needs to be pronounced more 'exilis'
whenever it is word-initial as in 'lepus', 'lana', 'lupus', or
when within the same word also the preceding syllable
finishes in it and the following one starts with it as in 'ille'
and 'Allia'.")

Flavius Magnus Aurelius Cassiodorus Senator (ca. 490 – ca. 580 CE,
from Scylacium (today Squillace), Calabria (RE III,2: 1671-1676)) (draw-
ing on Papirianus (4ᵗʰ-5ᵗʰ c. CE (RE XVIII,3: 1001-1002)), *De Or-
thographia*, IV (Keil 1961*f*, 159):

> Querella apud antiquos per unum l scribebatur, sicut
> suadela tutela candela corruptela, quamvis usus sibi etiam
> apud eos vindicaret, ut aliqua in figura deminutivorum per
> duo l scriberentur, ut capella fabella tabella. Nunc autem
> etiam querella per duo l scribitur.
>
> ("The ancients used to write 'querella' with only one l, as
> in 'suadela', 'tutela', 'candela', 'corruptela', even though us-
> age also required them to write some words in the diminu-
> tive form with two l's, as in 'capella', 'fabella', 'tabella'. But
> now even 'querella' is written with two l's.")

Priscianus (1ˢᵗ half of the 6ᵗʰ c. CE, from Caesarea (Mauritania),
lived in Constantinople (RE XXII,2: 2328-2346)) (drawing on Gaius
Plinius Secundus Maior (ca. 23/24 – 79 CE, from Novum Comum
(today Como), Lombardy), *Dubii Sermonis libri VIII* (RE XXI,1: 271-439)),
Institutiones grammaticares, I, 38 (Keil 1961*b*, 29):

> L triplicem, ut Plinio uidetur, sonum habet: exilem, quando
> geminatur secundo loco posita ut ‚ille' ‚Metellus';[6] plenum,
> quando finit nomina vel syllabas et quando aliquam ha-
> bet ante se in eadem syllaba consonantem, ut ‚sol', ‚silva',
> ‚flavus', ‚clarus', medium in aliis, ut ‚lectum', ‚lectus'.

---

6 Sletsjøe (1959, 146) and De Martino (2000, 226, footnote 22) note that, if taken literally,
the first element of the geminate lateral would be dark, and the second one clear.

("L, according to Plinius, has three varieties: 'exilis',
when it is the second part of a geminate, as in 'ille', 'Metel-
lus'; 'plenus', when it is word-final or syllable-final and
when it is preceded by another consonant in the same syl-
lable, as in 'sol', 'silva', 'flavus', 'clarus', 'medius' in the
remaining positions, as in 'lectum', 'lectus'.")

Isidorus Hispalensis (ca. 570 – 636 CE, bishop of Sevilla (RE IX,9:
2069-2080), *Etymologiae sive Origines*, I, 32, 8 (Linday 1911):

Labdacismus est, si pro una l duo pronuntientur, ut Afri
faciunt, sicut 'colloquium' pro 'conloquium'; uel quotiens
unam l exilius, duo largius proferimus. Quod contra est;
nam unum largius, duo exilius proferre debemus.

("It is a lambdacism when one pronounces a geminate
l instead of a singleton, as the Afri do, as in 'colloquium'
for 'conloquium'; or every time we pronounce a singleton
l as too 'exilis' and a geminate one as too 'largus'. In fact,
it should be the reverse; for we ought to pronounce the
singleton rather 'largus' and the geminate rather 'exilis'.")

See also the discussion of all of the above texts in de Kolovrat (1923*a*,
56-58) and his discussion (with references) of Classicists' opinions
on the matter pp. 58-60. An additional author from after the Proto-
Romance period, writing on Latin, is of interest:

Remigius of Auxerre (9th c. CE), *De commentis Einsidlensibus in
Donati Artem Minorem maiorem barbarismum*, III (Keil 1961*g*, CXV):

Laptacismus est vitium sive scissio l littere, quae fit,
quando duo ll in medio posita asperum sonum reddunt, ut
sella, stella. Nam unum l in medio positum exilem sonum
facit, ut relinquo.

("Lambdacism is an error or split of the letter l which
occurs when a geminate l in word-internal position gives
a rough sound, as in 'sella', 'stella'. For the singleton l
in word-internal position gives an 'exilis' sound, as in
'relinquo'.")

Blaylock (1968, 395) thinks that the faulty pronunciation as an "aspe-
rum sonum" refers to palatalisation.

Original quality of the Latin lateral.

When reconstructing earlier periods of Latin pronunciation, scholars
have naturally wondered whether the two-way distinction of quality
in the laterals had arisen out of a single, original quality of the lateral,
and if this was the case, what was its nature. Opinions on this topic
diverge considerably.

Given the considerations from developments from Indo-European,
the relatively late emergence of the 'exilis' geminate /l:/ in Archaic

Latin only, given moreover that the lateral was dark even in word-initial position, in onset clusters, and the intervocalic environment (except before /i/), Osthoff (1893, 57) and Allen (1970, 33), whom I follow here, think that the original quality of the lateral had been dark, 'pinguis'. Leumann (1977, 141, §148b), on the other hand, supposes that the original quality of the Latin lateral must have been clear because vowel backing (/eł/ > /oł/) did not take place until the completion of the consonant-lateral assimilations which led to the appearance of 'exilis' geminate /lː/. He is followed by Safarewicz (1953, 97-98) who considers, given that Latin (perhaps Italic more generally) is the only language with different lateral qualities among the Indo-European languages of Antiquity, the original lateral should have been clear since the emergence of dark /ł/ in both Italic and, at a later date, Balto-Slavic can readily be understood as the result of assimilation to following low and back vowels. The original quality of the Latin lateral would then be preserved in the geminate. Finally, de Kolovrat (1923a, 65-66) thinks that the original lateral of Latin was plain alveolar ('medius'), rather than dark,[7] since, according to him, a plain alveolar clear /l/ would have been sufficient in order to provoke the change in vowel quality seen in the /eł/ > /oł/ sound change.

From Late Latin to Romance.

The Latin 'exilis' – 'pinguis' distinction survived to varying degrees into the Romance languages: the 'exilis' lateral has been observed to undergo sound changes which will have first required it to become 'pinguis', and vice versa (Straka 1979, 410-411), so, e.g., in the evolution from BELLITĀTEM with 'exilis' /lː/ > *BELTATE with 'pinguis' /ł/ > Occ. "beutat". Syllable position bleeds etymological pronunciation, so to speak. In general, the Romance languages have levelled their laterals to one quality or another (Meyer-Lübke 1934, 10, also Sletsjøe 1959, 149), not only in intervocalic position, but sometimes even in positions favourable to dark pronunciations, such as the syllable coda, e.g., in Friulian (Meyer-Lübke 1934, 67-68), or in modern French where all laterals have eventually become clear.

For Proto-Occitan, Ronjat (1932, 148, §303) suggests the following distribution of the Latin lateral: "l géminé toujours exilis ([. . .]) ; l simple exilis devant i [both long and short], pinguis ou medius devant les autres voy. ; ll devient l après voy. longue ([...]), tout en gardant sa prononciation exilis, [...]." This is more or less the distribution as described by the Late Latin grammarians above. But we have seen that in some regions such as Gascony, geminate /lː/ may have been dark, i.e., 'pinguis' during the formative period of the dialect (see 5.3.2); by

---

7 He concedes nevertheless that the lateral may have been dark in Early and Classical Latin and only later have become clearer, and reminds his readers of the analogous evolution observed in Czech (see 2.1.1.3) (de Kolovrat 1923a, 66-67).

and large, however, Ronjat's observations are justified for the rest of Occitania.

Word play.

It is possible that the first indirect attestation of /ɫ/-vocalisation in the most favourable of all contexts in Romance, namely /aɫd/, comes from a word play in Suetonius (1ˢᵗ c. CE), *De Vita Caesarum*, Book III: Tiberius 42: 1 who reports that Tiberius had been given the nickname "Caldius" (in the sense of 'mulled wine') instead of his real first name "Claudius".

Sound changes.

The fact that the Indo-European syllabic lateral evolved into Latin /ol, ul, laː/ (Leumann 1977, 140, §148a) seems to testify to its dark quality. Likewise, the vowel backing of original /e/ to /o/ before a lateral followed by a low or back vowel (Osthoff 1893, see also among others Juret 1921, 337-338, de Kolovrat 1923*a*, 64-66, 75, Allen 1970, 34, Leumann 1977, 47, §43c, 141-142, §148b,dγ, Meillet 2004, 138-139) suggests such a quality. A description of the sound change can be found in 2.1.1.2, and the reader is referred to the discussion there.

   At some point after the Early Latin period, the geminate lateral following a diphthong underwent reduction in duration, i.e., /awlː/ became /awl/. It is probable that this change in lateral duration was accompanied by a change in lateral quality, i.e., from 'exilis' geminate to 'pinguis' singleton (Leumann 1977, 141, §148d,α, see also Ettmayer 1906*a*). Similarly, in a number of Proto-Romance dialects and Romance languages, e.g., in Occitan, French, Catalan, Grishun Rhaeto-Romance and Piedmontese Italian, the Latin geminate lateral simplified after a Latin long vowel, for instance, in the descendents of Latin ōLLA, ANGUĪLLA, MĪLLE, VĪLLA, and NŪLLUS (Meyer-Lübke 1934, 42, Lausberg 1967, 68, §494; for a critical discussion of this evolution see Ettmayer 1906*a*). Belardi (1984*a*, 87) places the beginnings of this sound change in the 1ˢᵗ century BCE. In any event, it is attested to us in the 5ᵗʰ century CE by Consentius, writing from the Provincia Narbonensis (see above on page 191): "Per detractionem fiunt barbarismi sic: litterae ut siquis dicat vilam pro villam, mile pro mille [. . .]" (Keil 1961*d*, 392).

Loanword adaptations.

A handful of loanwords from Greek reveal useful indications as to the quality of the Latin lateral in preconsonantal position. The Ancient Greek words «σάγμα», «φλέγμα», «πῆγμα» were adopted into Latin as

SAUMA/SALMA[8], FLEGMA/FLEUMA and PĒGMA/PĒUMA[9], respectively. Likewise, the adaptation of the Greek word «σμάραγδος» into the Romance languages presupposes a Late Latin form *SMARALDUS (Classical Latin SMARAGDUS) and the Latin word FRĀGMENTUM has a popular form FRAUMENTUM. Given that the Greek voiced stops began to spirantise as early as the 2nd century BCE and that this sound change had been completed by the 4th century CE during the Koine period, which roughly coincides with Late Latin (Horrocks 1997, 112), we can surmise that what was heard by Late Latin listeners as a dark lateral was in fact not /g/, but /ɣ/ or perhaps even /ɰ/. Of course, such a mishearing is only possible if the Latin dark lateral itself was on the verge of vocalisation. An alternative view (Daniel Recasens, p.c., July 2011) holds that preconsonantal /g/ vocalised to /w/ in Latin, and that this outcome was misidentified as a vocalised /ɫ/ and the lateral reëstablished by way of hypercorrection (a similar process occurred in Catalan, see 2.1.1.2). Moreover, the Greek word «καῦμα» has given forms such as "calme, carme, calma, calima" and its derivatives such as "caumàs, calimàs" in Occitan dialects and the other Romance languages; this fact also suggests a perceptual merger of vocalised /ɫ/ and original /w/ in Late Latin (Leumann 1977, 199, §200a).

---

8 See Isidorus Hispalensis, *Etymologiae sive Origines*, XX, 15, 5 (Guillaumin 2010, 121): "Sagma, quae corrupte vulgo salma dicitur, [...]." ("Sagma ('packsaddle') which is 'salma' in popular usage, ... ").

9 See *Appendix Probi* (Baehrens 1967, 6): "pegma non peuma" ("'pegma' not 'peuma'").

Akagi, Masato, Noriko Suzuki, Katsumi Hayashi, Hiroto Saito and Ken ichi Michi (2001), 'Perception of lateral misarticulation and its physical correlates', *Folia Phoniatrica et Logopaedica* **53**, 291–307.

Al-Azraqi, Munira (2010), 'The ancient Ḍād in Southwest Saudi Arabia', *Arabica* **57**, 57–67.

Alfaraz, Gabriela G. (2008), The lateral variant of (r) in Cuban Spanish, *in* M.Westmoreland and J. A.Thomas, eds, 'Selected proceedings of the 4th Workshop on Spanish Sociolinguistics', Cascadilla Proceedings Project, pp. 36–42.

Allen, W. Sidney (1970), *Vox Latina. A guide to the pronunciation of Classical Latin*, 2. edn, Cambridge University Press. First edition 1965.

Allen, W. Sidney (1974), *Vox Graeca. A guide to the pronunciation of Classical Greek*, 2. edn, Cambridge University Press.

Alvar, Manuel and Antonio Llorente Maldonada De Guevara, eds (1961-1973), *Atlas Lingüístico y Etnográfico de Andalucía*.

Amman, Johann Conrad (1694), *The talking deaf man: or, A method proposed, whereby he who is born deaf, may learn to speak. By the studious invention and industry of John Conrade Amman, an Helvetian of Shafhuis, Dr. of Physick. Imprinted at Amsterdam, by Henry Westein, 1692. And now done out of Latin into English, by D.F. M.D. 1693.*, Tho. Howkins.

Andrade, Amália (1999), On /l/ velarization in European Portuguese, *in* 'Proceedings of the 14th International Congress of Phonetic Sciences, San Francisco', pp. 543–546.

Applegate, Joseph R. (1958), *An outline of the structure of Shilḥa*, American Council of Learned Societies.

Arnaud, François and Gabriel Morin (1920), *Le langage de la vallée de Barcelonnette*, Champion, Paris.

Ash, Sharon (1986), The vocalization of intervocalic /l/ in Philadelphia, *in* H. B.Allen and M. D.Linn, eds, 'Dialect and Language Variation', Academic Press, pp. 330–343.

Bacinschi, I. (1924), 'Zur Geschichte der l-Verbindungen im Romanischen', *Zeitschrift für romanische Philologie* **44**, 257–264.

Baehrens, Wilhelm Adolf (1967), *Sprachlicher Kommentar zur vulgärlateinischen Appendix Probi*, Bouma's Boekhuis. First published 1922.

Baker, Adam (2008), A biomechanical model of the human tongue for understanding speech production and other lingual behaviors, PhD thesis, University of Arizona.

Balasubramanian, T. (1982), 'Intervocalic double nasal and lateral consonant articulations in Tamil', *Journal of Phonetics* **10**, 99–104.

Baldinger, Kurt (1968), 'Yakov Malkiel, The interlocking of narrow sound change, broad phonological pattern, level of transmission, areal configuration, sound symbolism, Sep. aus Archivum Linguisticum 15, 1963, 144 bis 173; 16, 1964, 1-33 (Sep. 62 S.)', *Zeitschrift für romanische Philologie* **84**, 512–516.

Barbato, Marcello (2005), 'Turpiter barbarizant. Gli esiti di cons. + l nei dialetti italiani meriodionali e in napoletano antico', *Revue de linguistique romane* **69**, 405–435.

Barry, Martin C. (2000), 'A phonetic and phonological investigation of English clear and dark syllabic /l/', *Bulletin de la Communication Parlée* **5**, 77–87.

Barry, William (1997), 'Another R-tickle', *Journal of the International Phonetic Association* **27**, 35–45.

Bartoli, Matteo Giulio (2000), *Il Dalmatico. Resti di un'antica lingua romanza parlata da Veglia a Ragusa e sua collocazione nella Romània appennino-balcanica*, Istituto della Enciclopedia Italiana.

Bec, Pierre (1963), *La langue occitane*, Que sais-je?, Presses Universitaires de France, Paris.

Bec, Pierre (1968), *Les interférences linguistiques entre gascon et languedocien dans les parlers du Comminges et du Couserans*, Presses Universitaires de France.

Belardi, Walter (1984*a*), Gli allofoni di l latino dalla protostoria alla fase romanza, *in* W.Belardi, P.Cipriano, P.Di Giovine and M.Mancini, eds, 'Studi latini e romanzi in memoria di Antonino Pagliaro', Dipartimento di Studi Glottoantropologici, Università "La Sapienza", pp. 63–110.

Belardi, Walter (1984*b*), I termini tecnici tenuis/exilis, plenus/pinguis e i loro antecedenti greci, *in* W.Belardi, P.Cipriano, P.Di Giovine and M.Mancini, eds, 'Studi latini e romanzi in memoria di Antonino Pagliaro', Dipartimento di Studi Glottoantropologici, Università "La Sapienza", pp. 157–165.

Berg, Thomas (1998), *Linguistic Structure and Change. An Explanation from Language Processing*, Clarendon Press, Oxford.

Best, Catherine T., Gerald W. McRoberts and Elizabeth Goodell (2001), 'Discrimination of non-native consonant contrasts varying in perceptual assimilation to the listener's native phonological system', *Journal of the Acoustical Society of America* **109**(2), 775–794.

Best, Catherine T. and Pierre A. Hallé (2010), 'Perception of initial obstruent voicing is influenced by gestural organization', *Journal of Phonetics* **38**, 109–126.

Bianco, Emilio (1981), Gli sviluppi di LL in Calabria, *in* M.Cortelazzo, ed., 'La ricerca dialettale III', Pacini, pp. 121–137.

Bladon, R. A. W. (1979), The production of laterals: Some acoustic properties and their physiological implications, *in* H.Hollien and P.Hollien, eds, 'Current issues in the phonetic sciences', John Benjamins, pp. 501–508.

Bladon, R. A. W. and Ameen Al-Bamerni (1976), 'Coarticulation resistance in English /l/', *Journal of Phonetics* **4**, 137–150.

Bladon, R. A. W. and Emanuela Carbonaro (1978), 'Lateral consonants in Italian', *Journal of Italian Linguistics* **3**, 43–55.

Blasco Ferrer, Eduardo (1984), *Storia linguistica della Sardegna*, Max Niemeyer.

Blaylock, Curtis (1968), 'Latin l-, -ll- in the Hispanic dialects: retroflexion and lenition', *Romance Philology* **21**(4), 392–409.

Blevins, Juliette (1994), 'A place for lateral in the feature geometry', *Journal of Linguistics* **30**(2), 301–348.

Blevins, Juliette and Andrew Garrett (2007), 'The rise and fall of l sandhi in California Algic', *International Journal of American Linguistics* **73**(1), 72–93.

Blevins, Juliette and Sven Grawunder (2009), '*KL > TL sound change in Germanic and elsewhere: Descriptions, explanations, and implications', *Linguistic Typology* **13**, 267–303.

Blinkenberg, Andreas (1939), *Le patois d'Entraunes. I. Matériaux phonétiques, morphologiques et syntactiques*, Universitetsforlaget and Einar Munksgaard, Aarhus and København.

Blinkenberg, Andreas (1948), *Le patois de Beuil. Documents et notes. Avec un appendice sur le parler de Péone*, Ejnar Munksgaard and Universitetsforlaget, København and Aarhus.

Bombien, Lasse, Christine Mooshammer, Phil Hoole, Barbara Kühnert and Jennifer Schneeberg (2006), An EPG study of initial /kl/ clusters in varying prosodic positions in German, *in* H. C.Yehia, D.Demolin and R.Laboissière, eds, 'Proceedings of ISSP 2006, 7th International Seminar on Speech Production'.

Borowsky, Toni (2001), The vocalisation of dark l in Australian English, *in* D.Blair and P.Collins, eds, 'English in Australia', John Benjamins, pp. 69–87.

Borowsky, Toni and Barbara Horvath (1997), L-vocalization in Australian English, *in* F.Hinskens, R.Van Hout and W. L.Wetzels, eds, 'Variation, Change, and Phonological Theory', John Benjamins, pp. 101–123.

Bothorel, André (1967), Etude descriptive du son l dans les langues européennes, PhD thesis, Université de Montpellier 3, Paul Valéry.

Bothorel, André (1969-1970), 'Contribution à l'étude descriptive des latérales de l'albanais', *Travaux de l'Institut de Phonétique de Strasbourg* **2**, 133–144.

Bothorel, André, Simon Pela, François Wioland and Jean-Pierre Zerling (1986), *Cinéradiographie des voyelles et consonnes du français*, Institut Phonétique de Strasbourg.

Botma, Bert, Koen Sebregts and Dick Smakman (2010), 'Pre-lateral mid-vowel colouring and the dutch tense – lax contrast'.

Bouda, Karl (1947), 'Lateral und Sibilant. Eine ungewöhnliche, verbreitete Lautvertretung', *Zeitschrift für Phonetik und allgemeine Sprachwissenschaft* **1**(1-2), 48–53.

Bourciez, Edouard (1930), *Eléments de linguistique romane. Troisième édition révisée*, Klincksieck.

Bourciez, Edouard (1967), *Eléments de linguistique romane. Cinquième édition révisée par l'auteur et par les soins de Jean Bourciez*, 5e édition edn, Klincksieck.

Bouvier, Jean-Claude (1976), *Les parlers provençaux de la Drôme. Etude de géographie phonétique*, Klincksieck.

Bouvier, Jean-Claude and Claude Martel (1975-1986), *Atlas linguistique et ethnographique de la Provence*, CNRS.

Brasseur, Patrice (2009), 'La palatalisation de gl en Normandie', *Dialectologia et Geolinguistica* **17**(1), 97–117.

Brixhe, Claude (1976), *Le dialecte grec de Pamphylie. Documents et grammaire*, Adrien-Maisonneuve.

Browman, Catherine P. and Louis Goldstein (1989), 'Articulatory gestures as phonological units', *Phonology* **6**, 201–251.

Browman, Catherine P. and Louis Goldstein (1992), 'Articulatory phonology: an overview', *Phonetica* **49**, 155–180.

Browman, Catherine P. and Louis Goldstein (1995), Gestural syllable position effects in American English, *in* F.Bell-Berti and L. J.Raphael, eds, 'A Festschrift for Katherine Safford Harris', American Institute of Physics, pp. 19–34.

Brown, Cindy (1995), The feature geometry of lateral approximants and lateral fricatives, *in* H.van der Hulst and J.van de Weijer, eds, 'Leiden in Last: HIL Phonology Papers 1', Holland Academic Graphics, pp. 41–88.

Buckenmaier, August (1934), *Die Mundart von Camarès (Aveyron). Laut- und Formenlehre*, Göbel.

Bybee, Joan (2001), *Phonology and Language Use*, Cambridge University Press.

Cabrera Morales, Carlos Luis (1991), 'Reconsideraciones sobre el problema de –LY-, -K'L-, -G'L- y –T'L- en el antiguo leonés', *Anuario de Estudios Filológicos* **14**, 51–62.

Caffee, Nathaniel M. (1940), 'Southern 'l' plus a consonant', *American Speech* **15**(3), 259–261.

Camproux, Charles (1962), *Essai de géographie linguistique du Gévaudan. Tome I. Phonétique*, Presses Universitaires de France.

Carlson, Eric (2007), 'Toward a modulation phonology'.

Carlton, Terence R. (1991), *Introduction to the phonological history of the Slavic languages*, Slavica Publishers.

Carré, René, François Pellegrino and Pierre Divenyi (2007), Speech dynamics: Epistemological aspects, *in* 'Proceedings of the 16th International Congress on Phonetic Sciences, Saarbrücken, 6-10 August 2007', pp. 569–572.

Catalán, Diego (1954), 'Resultados ápico-palatales y dorso-palatales de –ll-, -nn- y de ll- (< l-), nn- (< n-)', *Revista de Filología Española* **38**, 1–44.

Celata, Chiara (2006), Analisi dei processi di retroflessione delle liquide in area romanza, con dati sperimentali dal còrso e dal siciliano, PhD thesis, Scuola Normale Superiore di Pisa.

Chabrand, Jean-Armand and Eugène Auguste Albert de Rochas d'Aiglun (s. d.), *Patois du Queyras*. extrait du Bulletin de la Société de Statistique de l'Isère, 3e série, tom. VII (tirage à part).

Chafcouloff, Michel (1972), 'Recherches sur la structure acoustique du /l/ et ses corrélations articulatoires', *Travaux de l'Institut de Phonétique d'Aix* **1**, 101–111.

Chafcouloff, Michel (1985), 'The spectral characteristics of the lateral /l/ in French', *Travaux de l'Institut de Phonétique d'Aix* **10**, 63–98.

Chambon, Jean-Pierre and Yan Greub (2002), 'Note sur l'âge du (proto)gascon', *Revue de linguistique romane* **66**, 473–495.

Chomsky, Noam and Morris Halle (1968), *The Sound Pattern of English*, Harper & Row, New York.

Classe, André (1935), 'A propos de l et l', *Le Maître phonétique* pp. 5–7.

Clements, George Nicolas (1985), 'The geometry of phonological features', *Phonology Yearbook* **2**, 225–252.

Cohn, Abigail C. (1992), 'The consequences of dissimilation in Sundanese', *Phonology* **9**, 199–220.

Collitz, Hermann and F. Bechtel, eds (1905), *Sammlung der griechischen Dialekt-Inschriften. Dritter Band, zweite Hälfte. Die Inschriften von Lakonien, Tarent, Herakleia am Siris, Messenien. Thera und Melos. Sicilien und Abu-Simbel. Die ionischen Inschriften*, Vandenhoeck & Ruprecht, Göttingen.

Colton, Molton Avery (1909), *La phonétique castillane. Traité de phonétique descriptive et comparative.*

Compan, André (1965), *Grammaire niçoise*, Tiranty, Niça.

Companys, Manuel (1953), 'L vélaire au Port (Ariège)', *Le Français Moderne* **21**, 194–198.

Companys, Manuel (1957), Le "l" interdental ariégeois, *in* 'Actes et mémoires du 1er Congrès International de Langue et Littérature du Midi de la France', Institut Méditerranéen du Palais du Roure/Fondation Flandreysy-Espérandieu, pp. 226–233.

Contini, Michel (1974), 'Un phénomène de réaction à la frontière du campidanien: le passage –l- > -ll- et –n- > -nn-', *Revue de linguistique romane* **38**, 106–112.

Contini, Michel (1982), 'Les latérales « sifflantes » du sarde septentrional', *Bulletin de l'Institut de Phonétique de Grenoble* **10-11**, 127–168.

Contini, Michel (1987), *Etude de géographie phonétique et de phonétique instrumentale du sarde. Texte*, Edizioni dell'Orso.

Corriente, Federico (1978), 'ḍ-l doublets in Classical Arabic as evidence of the process of de-lateralisation of ḍād and development of its standard reflex', *Journal of Semitic Studies* **23**(1), 50–55.

Costagliola, Angelica V. (2007), Une étude acoustique des consonnes « rétroflexes/cacuminales » salentines (Pouilles, Italie du Sud), *in* 'Actes des Septièmes Rencontres Jeunes Chercheurs en Parole, ILPGA, Paris, 5 et 6 juillet 2007', pp. 64–68.

Costagliola, Angelica V. and Rajesh Khatiwada (forthcoming), 'Salentinian cacuminals/retroflexes (apulia, southern italy): a preliminary articulatory study', *Language Design* .

Cravens, Thomas D. (2002), *Comparative historical dialectology. Italo-Romance clues to Ibero-Romance sound change*, John Benjamins.

da Hora, Dermeval (2006), 'Vocalização da lateral /l/: correlação entre restrições sociais e estruturais', *Scripta* **9**, 29–44.

Damasio, Antonio (1999), *The Feeling of What Happens. Body and Emotion in the Making of Consciousness*, Harcourt Brace & Co, New York and San Diego and London.

Dauzat, Albert (1906), *Géographie phonétique d'une région de la Basse-Auvergne*, Champion.

Dauzat, Albert (1938), *Essais de géographie linguistique. Nouvelle série*, Publications de la Société des Langues Romanes 30; Bibliothèque du Français Moderne.

Dauzat, Albert (1953), 'A propos de l'l vélaire de Chanat', *Le Français Moderne* **21**, 100.

Dauzat, Albert and Pierre Fouché (1953), 'Découvertes phonétiques en Auvergne, Gascogne et Limousin', *Le Français Moderne* **21**, 1–6.

Davis, Glanmor (1934), 'Welsh ll, icelandic hl, french l in peuple', *Le Maître phonétique* pp. 13–14.

de Kolovrat, Georges (1923*a*), *Etude sur la vocalisation de la consonne l dans les langues romanes*, Jouve & Co.

de Kolovrat, Georges (1923*b*), *Suppléments à l'Etude sur la vocalisation de la consonne l dans les langues romanes*, Idéale.

De Martino, Marcello (2000), 'I suoni di L ed LL latine secondo i grammatici d'età imperiale: un tentativo di "revisione"', *Indogermanische Forschungen* **105**, 213–254.

De Martino, Marcello (2001), 'I suoni di L ed LL latine secondo i grammatici d'età imperiale: un tentativo di "revisione", II', *Indogermanische Forschungen* **106**, 164–203.

Dick, Adolf and Jean Préaux, eds (1978), *Martianus Capella*, 2 edn, Teubner. Erste Auflage 1925.

do Socorro Demasi, Maria (1995), -l pós-vocálico na fala culta do Rio de Janeiro, *in* C.da Cunha Pereira and P. R.Dias Pereira, eds, 'Miscelânea de Estudos Lingüísticos, Filológicos e Literários in Memoriam Celso Cunha', Nova Fronteira, pp. 115–143.

Dubois, Pierre (1958), *Position des parlers de Cagnes et de Vence par rapport au provençal et au niçard*, La Pensée Universitaire, Aix-en-Provence.

Elcock, William Dennis (1938), *De quelques affinités phonétiques entre l'aragonais et le béarnais. I.- La conservation des occlusives sourdes entre voyelles. II. – La sonorisation des occlusives sourdes après nasale ou liquide*, Droz.

Elcock, William Dennis (1952), The evolution of –ll- in the Aragonese dialect, *in* 'Actas del primer congreso internacional de estudios pirenáicos', pp. 9–21.

Entwistle, William J. (1962), *The Spanish language together with Portuguese, Catalan and Basque*, 2 edn, Faber & Faber. First edition 1936.

Ščerba, Lev Vladimirovič (1910-1911), 'Notes de phonétique générale. i. sur l dure', *Mémoires de la Société de Linguistique de Paris* **16**, 280–284.

Espiga, Jorge (2002), 'A lateral posvocálica na fronteira dos Campos Neutrais: estudo sociolingüístico da regra telescópica nos dialetos de Chuí e Santa Vitória do Palmar', *Letras de Hoje* **37**(1), 49–68.

Ettmayer, Karl (1906*a*), 'Intervokalisches l für lat. ll im Romanischen', *Zeitschrift für romanische Philologie* **30**, 522–531.

Ettmayer, Karl (1906*b*), 'Zur Aussprache des lateinischen l', *Zeitschrift für romanische Philologie* **30**, 648–659.

Fallon, Paul D. (1993), Liquid dissimilation in Georgian, *in* A.Kathol and M.Bernstein, eds, 'ESCOL 93. Proceedings of the Tenth Eastern States Conference on Linguistics', pp. 105–116.

Farnetani, Edda (1990), V-C-V coarticulation and its spatiotemporal domain, *in* W. J.Hardcastle and A.Marchal, eds, 'Speech Production and Speech Modelling', Kluwer, pp. 93–130.

Faure, Georges (1972), Analyse acoustique de deux allophones du l final anglais, *in* A.Valdman, ed., 'Papers in linguistics and phonetics to the memory of Pierre Delattre', Mouton de Gruyter, pp. 117–127.

Feldman, David (1972), On utterance-final [l] and [u] in Portuguese, *in* A.Valdman, ed., 'Papers in linguistics and phonetics to the memory of Pierre Delattre', Mouton de Gruyter, pp. 129–141.

Ferguson, Charles A. (1956), 'The emphatic l in Arabic', *Language* **32**(3), 446–452.

Field, Thomas (in press), Langue et société au 13e siècle à la lumière du Corpus électronique du gascon médiéval, *in* A.Rieger, ed., 'L'Occitanie invitée de l'Euregio. Liège 1981 - Aix-la-Chapelle 2008. Bilan et perspectives/ Occitània convidada d'Euregio. Lièja 1981 –

Aquisgran 2008. Bilanç e amiras/ Okzitanien zu Gast in der Euregio. Lüttich 1981 – Aachen 2008. Bilanz und Perspektiven. Actes du neuvième Congrès International de l'AIEO, Aix-la-Chapelle, 24-31 août 2008', Shaker.

Fleischer, Fritz (1912), Studien zur Sprachgeographie der Gascogne, PhD thesis, Vereinigte Friedrichs-Universität Halle-Wittenberg.

Flemming, Edward (2007), Stop place contrasts before liquids, *in* 'Proceedings of the 16th International Congress on Phonetic Sciences, Saarbrücken, 6-10 August 2007', pp. 233–236.

Flemming, Edward S. (2002), *Auditory representations in phonology*, Routledge.

Flom, George T. (1937), 'Breaking in Old norse and Old English: With special reference to the relations between them". in language 13:2; 123-136.', *Language* **13**(2), 123–136.

Foerster, Wendelin (1898*a*), 'Causerie philologique faite à la Société Ramond', *Bulletin de la Société Ramond* **33**(2), 158–171.

Foerster, Wendelin (1898*b*), 'Nachträge zum bibelot-Aufsatz', *Zeitschrift für romanische Philologie* **22**, 509–520.

Folena, Gianfranco (1959), 'L da r preconsonantico nel pisano antico', *Lingua Nostra* **20**(1), 5–7.

Ford, Jeremiah Denis Mathias (1911), *Old Spanish readings selected on the basis of critically edited texts*, Ginn and Co.

Fougeron, Cécile (1998), Variations articulatoires en début de constituants prosodiques de différents niveaux en français, PhD thesis, Université de Paris 3 - Sorbonne Nouvelle.

Fowler, Carol A. (1986), 'An event approach to the study of speech perception from a direct-realist perspective', *Journal of Phonetics* **14**, 3–28.

Gamillscheg, Ernst (1950), *Romanen und Basken*, Akademie der Wissenschaften und der Literatur in Mainz & Franz Steiner Verlag.

Garcia, Ælfgar (1990), 'Divine unification grammar', *Linguist of Fortune* **1**(1).

Gartenberg, Robert D. (1984), 'An electropalatographic investigation of allophonic variation in English /l/ articulations', *Phonetics Laboratory University of Reading Work in Progress* **4**, 135–157.

Giacomelli, Gabriella (1970), 'Sviluppo di alcuni nessi consonantici nei dialetti italiani', *Abruzzo* **8**, 133–151.

Gibbon, Fiona, William Hardcastle and Katerina Nicolaidis (1993), 'Temporal and spatial aspects of lingual coarticulation in /kl/ sequences: a cross-linguistic investigation', *Language and Speech* **36**(2-3), 261–277.

Gick, Bryan (1999), 'A gesture-based account of intrusive consonants in English', *Phonology* **16**, 29–54.

Gick, Bryan (2002), 'The American intrusive l', *American Speech* **77**(2), 167–183.

Gick, Bryan (2003), Articulatory correlates of ambisyllabicity in English glides and liquids, *in* J.Local, R.Ogden and R.Temple, eds, 'Papers in Laboratory Phonology VI: Constraints on Phonetic Interpretation', Cambridge University Press, pp. 222–236.

Gick, Bryan, Fiona Campbell, Sunyoung Oh and Linda Tamburri-Watt (2006), 'Toward universals in the gestural organization of syllables: A cross-linguistic study of liquids', *Journal of Phonetics* **34**, 49–72.

Gick, Bryan and Ian Wilson (2001), Pre-liquid excrescent schwa: what happens when vocalic targets conflict, *in* P.Dalsgaard, B.Lindberg, H.Benner and Z.-H.Tan, eds, 'Eurospeech 2001 Scandinavia 7th European Conference on Speech Communication and Technology, 2nd Interspeech event, Aalborg, Denmark, September 3-7, 2001', pp. 273–276.

Giles, Stephen B. and Kenneth L. Moll (1975), 'Cinefluorographic study of selected allophones of English /l/', *Phonetica* **31**, 206–227.

Gili Fivela, Barbara, Sonia D'apolito, Antonio Stella and Francesco Sigona (2008), Domain initial strengthening in sentences and paragraphs: preliminary findings on the production of voiced bilabial plosives in two varieties of Italian, *in* R.Sock, S.Fuchs and Y.Laprie, eds, 'Proceedings of the 8th International Seminar on Speech Production 2008, December 8th to 12th 2008, Strasbourg, France', pp. 205–208.

Gilliéron, Jules (1890), 'CL, GL, PL, BL, FL, en Savoie', *Revue des patois gallo-romans* **9**, 214–215.

Gilliéron, Jules, ed. (1902-1920), *Atlas Linguistique de la France*, Champion.

Gordon, Matthew, Paul Barthmaier and Kathy Sands (2002), 'A cross-linguistic acoustic study of voiceless fricatives', *Journal of the International Phonetic Association* **32**(2), 141–174.

Grammont, Maurice (1933), *Traité de phonétique*, Delagrave.

Grandgent, C. H. (1907), *An introduction to Vulgar Latin*, D. C. Heath & Co.

Graur, Alexandru and Alexandru Rosetti (1936), 'Sur le traitement de lat. l double en roumain', *Bulletin linguistique* **4**, 46–52.

Grayden, Bruce (1979), 'The Southern Kalinga /l/', *Papers in Philippine Linguistics* **9**, 91–100.

Guerlin de Guer, Charles (1899), *Essai de dialectologie normande. La palatalisation des groupes initiaux gl, kl, fl, pl, bl étudiée dans les parlers de 300 communes du département du Calvados*, Emile Bouillon.

Guillaumin, Jean-Yves, ed. (2010), *Isidore de Séville. Etymologies. Livre XX. De penu et instrumentis domesticis et rusticis*, Les Belles Lettres.

Gussmann, Edmund (2007), *The Phonology of Polish*, Oxford University Press.

Haas, Josef (1889), *Zur Geschichte des l vor folgendem consonanten im nordfranzösischen*, Röhrl.

Haeberli, Lina (1908), 'Die Entwicklung der lateinischen Gruppen kl, gl, pl, bl, fl, im Franko-Provenzalischen', *Zeitschrift für französische Sprache und Literatur* **33**, 1–43.

Hallé, Pierre A. and Catherine T. Best (2007), 'Dental-to-velar perceptual assimilation: A cross-linguistic study of the perception of dental stop+/l/ clusters', *Journal of the Acoustical Society of America* **121**(5), 2899–2914.

Hallé, Pierre A., Juan Segui, Uli Frauenfelder and Christine Meunier (1998), 'Processing of illegal consonant clusters: a case of perceptual assimilation?', *Journal of Experimental Psychology: Human Perception and Performance* **24**(2), 592–608.

Hamann, Silke (2003), *The Phonetics and Phonology of Retroflexes*, Landelijke Onderzoekschool Taalwetenschap.

Hamlet, Sandra L. (1987), 'Handedness and articulatory asymmetries on /s/ and /l/', *Journal of Phonetics* **15**, 191–195.

Hardcastle, William J. (1985), 'Some phonetic and syntactic constraints on lingual coarticulation during /kl/ sequences', *Speech Communication* **4**, 247–263.

Hardcastle, William J., Béatrice Vaxelaire, Fiona Gibbon, Phil Hoole and Noël Nguyen (1996), EMA/EPG study of lingual coarticulation in /kl/ clusters, *in* 'First ETRW on Speech Production Modeling, Autrans, France, May 20-24, 1996', ISCA Archive, pp. 53–56.

Hardcastle, William J. and William Barry (1989), 'Articulatory and perceptual factors in /l/ vocalisation in English', *Journal of the International Phonetic Association* **15**, 3–17.

Haudricourt, André and Alphonse Juilland (1970), *Essai pour une histoire structurale du phonétisme français*, 2e édition edn, Mouton. Première édition 1949.

Hawkins, Sarah (2003), 'Roles and representations of systematic fine phonetic detail in speech understanding', *Journal of Phonetics* **31**, 373–405.

Heid, Sebastian and Sarah Hawkins (2000), An acoustical study of long domain /r/ and /l/ coarticulation, *in* 'Proceedings of the 5th Seminar on Speech Production: Models & Data, Kloster Seeon, Bavaria, Germany', pp. 77–80.

Hentrich, Konrad (1919), 'Zur Herkunft des velaren l im Westthüringischen', *Zeitschrift für deutsche Mundarten* pp. 72–74.

Herbig, Gustav (1913), 'Zur Mouillierung des l im Vulgärlateinischen', *Glotta. Zeitschrift für griechische und lateinische Sprache* **5**(1-2), 249–253.

Herzig, Gudrun (1959), *Beitrag zur Kenntnis der Mundart der Auvergne. Vergleichende Darstellung des gegenwärtigen Lautstandes dreier Orte (Vertaizon - Picherande - Bégut Les Vabres)*, Aschendorff, Münster.

Hewitt, Steve (1978), 'Breton (Treger dialect)', *Journal of the International Phonetic Association* **8**(1-2), 80.

Hock, Hans Henrich (1986), *Principles of Historical Linguistics*, Mouton de Gruyter.

Holt, Eric (1997), 'The role of the listener in the historical phonology of Spanish and Portuguese: An Optimality-Theoretic account', *Rutgers Optimality Archive* **ROA-278**.

Honorof, Douglas N., Jeffrey Weihing and Carol A. Fowler (2011), 'Articulatory events are imitated under rapid shadowing', *Journal of Phonetics* **39**, 18–38.

Hoole, Philip, Kevin Munhall and Christine Mooshammer (1998), 'Do airstream mechanisms influence tongue movement paths?', *Phonetica* **55**, 131–146.

Horrocks, Geoffrey (1997), *Greek: A History of the Language and its Speakers*, Longman.

Horvath, Barbara M. and Ronald J. Horvath (1997), The geolinguistics of a sound change in progress: /l/ vocalization in Australia, *in* C.Boberg, M.Meyerhoff and S. M.Strassel, eds, 'University of Pennsylvania Working Papers in Linguistics 4:1: A selection of papers from NWAVE 25', University of Pennsylvania Press, pp. 109–124.

Horvath, Barbara M. and Ronald J. Horvath (2001), 'A multilocality study of a sound change in progress: The case of /l/ vocalization in New Zealand and Australian English', *Language Variation and Change* **13**, 37–57.

Horvath, Barbara M. and Ronald J. Horvath (2002), 'The geolinguistics of /l/ vocalization in Australia and New Zealand', *Journal of Sociolinguistics* **6**(3), 319–346.

Hualde, José Ignacio (2005), *The Sounds of Spanish*, Cambridge University Press.

Huback da Silva, Ana Paula (2007), Efeitos de freqüência nas representaçoẽs mentais, PhD thesis, Universidade Federal de Minas Gerais.

Huback da Silva, Ana Paula (n.d.), "troféus" ou "troféis"? – variação nos plurais terminados em ditongo em –u do português brasileiro. manuscript.

Huffman, Marie K. (1997), 'Phonetic variation in intervocalic onset /l/'s in English', *Journal of Phonetics* **25**, 115–141.

Jacques, Guillaume (2004), The laterals in Tibetan, *in* 'Himalayan Language Symposium, Thimphu (Butan)'.

Janson, Tore (1979), *Mechanisms of Language Change in Latin*, Almquist & Wiksell International, Stockholm.

Javkin, Hector P. (1978), Phonetic Universals and Phonological Change, PhD thesis, University of California at Berkeley. UMI Dissertation Services (facsimile from microfilm).

Jiménez Sabater, Max. Arturo (1986), 'La neutralización de /-r/ y /-l/ en el dialecto dominicano. puesta al día sobre un tema en debate', *Anuario de Lingüística Hispánica* **2**, 119–150.

Jänicke, Otto (1997), *Studien zur Palatalisierung des Nexus Kons. + [l] in der Galloromania*, Kovač.

Johnson, Wyn and David Britain (2007), 'L-vocalisation as a natural phenomenon: explorations in sociophonology', *Language Sciences* **29**, 294–315.

Johnstone, T. M. (1977), *Ḥarsūsi lexicon and English-Ḥarsūsi word-list*, Oxford University Press.

Jonasson, Jan (1971), 'Perceptual similarity and articulatory reinterpretation as a source of phonological innovation', *Speech Transmission Laboratory – Quarterly Progress and Status Report (STL-QPSR)* **1**, 30–41. Department of Speech Communication, Royal Institute of Technology, Stockholm.

Jones, Mark J. (2004), 'The origin of retroflex plosives in Italian, Sardinian, and Corsican dialects', *Cambridge Occasional Papers in Linguistics* **1**, 147–156.

Jungemann, Fredrick H. (1955), *La teoria del sustrato y los dialectos hispano-romances y gascones*, Gredos.

Juret, A.-C. (1921), *Manuel de phonétique latine*, Hachette.

Keil, Heinrich, ed. (1961*a*), *Grammatici Latini I. Flavii Sosipatri Charisii Artis Grammaticae Libri V. Diomedis Artis Grammaticae Libri III ex Charisii Arte Grammatica excerpta*, 2 edn, Georg Olms. Erste Auflage 1857.

Keil, Heinrich, ed. (1961*b*), *Grammatici Latini II. Prisciani grammatici caesariensis Institutionum Grammaticarum Libri XVIII (Martin Hertz, ed.)*, 2 edn, Georg Olms. erste Auflage 1885.

Keil, Heinrich, ed. (1961*c*), *Grammatici Latini IV. Probi Donati Servii qui feruntur de Arte Grammatica Libri. Notarum Laterculi (Theodor Mommsen, ed.)*, 2 edn, Georg Olms. Erste Auflage 1864.

Keil, Heinrich, ed. (1961*d*), *Grammatici Latini V. Artium scriptores minores*, 2 edn, Georg Olms. Erste Auflage 1868.

Keil, Heinrich, ed. (1961*e*), *Grammatici Latini VI. Scriptores Artis Metricae. Marius Victorinus Maximus Victorinus. Caesius Bassus Atilius Fortunatianus. Terentianus Maurus. Marius Plotius Sacerdos. Rufinus. Mallius Theodorus. Fragmenta et excerpta metrica*, 2 edn, Georg Olms. Erste Auflage 1874.

Keil, Heinrich, ed. (1961*f*), *Grammatici Latini VII. Scriptores de orthographia. Terentius Scaurus Velius Longus Caper Agroecius Cassiodorius Martyrius Beda Albinus. Audacis excerpta Dosithei Ars Grammatica Arusiani Messii Exempla Elocutionum Cornelii Frontinus Liber de Differentiis fragmenta grammatica*, 2 edn, Georg Olms. Erste Auflage 1880.

Keil, Heinrich, ed. (1961*g*), *Grammatici Latini VIII. Anecdota Helvetica quae ad grammaticam latinam spectant ex bibliothecis Turicensi Einsidlensi Bernensi collecta*, 2 edn, Georg Olms. First edition 1870.

Kühnert, Barbara and Phil Hoole (2006), Cohésion temporelle dans les groupes C1 /l/ initiaux en français, *in* 'Actes des XXVIes journées d'études sur la parole, Dinard, Juin 2006', pp. 545–548.

Kümmel, Martin Joachim (2007), *Konsonantenwandel*, Reichert.

Kontossopoulos, Nikolaos G. (2006*a*), *Dialektoi kai idiwmata ths neas ellhnikhs*, 4 edn, Ekdoseis Grhgorh, Athens. First edition 2000.

Kontossopoulos, Nikolaos G. (2006*b*), *Glwssikos atlas ths Krhths. Genikh eisagwgh kai dialektologikoi xartes*, Panepisthmiakes Ekdoseis Krhths, Herakleion. First edition 1988.

Kraft, Charles H. (1971), 'A note on lateral fricatives in Chadic', *Studies in African Linguistics* **2**(3), 271–277.

Kuhn, Alwin (1939), 'Das aragonesische Perfekt. Arag. –ll- > -tš-', *Zeitschrift für romanische Philologie* **59**, 73–82.

Kunert, Hans Peter (2004), 'Vocabolario dell'Occitano di Guardia Piemontese', CD-ROM.

Kunert, Hans Peter (2007), 'La langue des Vaudois au moyen âge et sa continuation à Guardia Piemontese', *Revue des langues romanes* **111**(1), 157–194.

Ladefoged, Peter (1980), 'What are linguistic sounds made of?', *Language* **56**(3), 485–502.

Ladefoged, Peter (2003), Commentary: some thoughts on syllables - an old-fashioned interlude, *in* J.Local, R.Ogden and R.Temple, eds, 'Phonetic Interpretation. Papers in Laboratory Phonology VI', Cambridge University Press, pp. 269–275.

Ladefoged, Peter, Anne Cochran and Sandra Disner (1977), 'Laterals and trills', *Journal of the International Phonetic Association* **7**, 46–54.

Ladefoged, Peter and Ian Maddieson (1986), 'Some of the sounds of the world's languages', *UCLA Working Papers in Phonetics* **64**.

Ladefoged, Peter and Ian Maddieson (1996), *The Sounds of the World's Languages*, Blackwell.

Lafon, René (1963), 'Les problèmes concernant les consonnes latérales dans les langues caucasiques', *Bedi K'art'lisa: recueil historique, scientifique et littéraire géorgien* **43-44**, 19–24.

Lafon, René (1964), 'Compléments à un article sur les consonnes latérales dans les langues caucasiques', *Bedi K'art'lisa: recueil historique, scientifique et littéraire géorgien* **45-46**, 7–17.

Lathrop, Tom (2003), *The evolution of Spanish*, 4. edn, European Masterpieces. First edition 1980.

Latte, Kurt, ed. (1953), *Hesychii Alexandrini Lexicon. Volumen I. A-Δ*, Ejnar Munksgaard.

Latte, Kurt, ed. (1966), *Hesychii Alexandrini Lexicon. Volumen II. E-O*, Ejnar Munksgaard.

Laurent, Jean-Pierre (2002), *Le dialecte de la vallée de Massat. Grammaire, dictionnaire et méthode d'apprentissage*, 2 edn, self-published.

Lausberg, Heinrich (1967), *Romanische Sprachwissenschaft. II. Konsonantismus*, 2 edn, De Gruyter.

Lehiste, Ilse (1964), 'Acoustical characteristics of selected english consonants', *International Journal of American Linguistics* **30**(3).

Lehman, Mark E. and Bradford Swartz (2000), 'Electropalatographic and spectrographic descriptions of allophonic variants of /l/', *Perceptual and Motor Skills* **90**, 47–61.

Leidner, David R. (1973), 'An electromyographic study of the American English liquids', *Status Report on Speech Research, Haskins Laboratories* **SR-33**, 195–201.

Leidner, David R. (1976), 'The articulation of American English /l/: A study of gestural synergy and antagonism', *Journal of Phonetics* **4**, 327–335.

Leumann, Manu (1977), *Lateinische Laut- und Formenlehre*, Beck'sche Verlagsbuchhandlung. Fünfte Auflage (Erstauflage 1926-1928).

Lewis, Charlton T. and Charles Short (1879), *A Latin dictionary, founded on Andrew's edition of Freund's Latin dictionary, revised, enlarged, and in great part rewritten*, Clarendon Press.

Li, Fang Kuei (1954), 'Consonant clusters in Tai', *Language* **30**(3), 368–379.

Li, Fang Kuei (1977), *A Handbook of Comparative Tai*, University Press of Hawaii.

Linday, Wallace Martin, ed. (1911), *Isidori Hispalensis Episcopi Etymologiarum sive Originum libri XX. Tomus I libros I-X continens*, Clarendon Press.

Lindblad, Per and Sture Lundqvist (2003), [l] tends to be velarised, apical as opposed to laminal, and produced with a low jaw, and these features are connected, *in* M.-J.Solé, D.Recasens and J.Romero, eds, 'Proceedings of the 15th International Congress of Phonetic Sciences', Vol. 2, pp. 1899–1902.

Lipiński, Edward (2001), *Semitic Languages. Outline of a Comparative Grammar*, 2. edn, Uitgeverij Peeters en Departement Oosterse Studies.

Livijn, Peder (2002), 'Distribution of dental and retroflex l-sounds across some Swedish dialects', *TMH-QPSR – Fonetik* **44**, 25–28.

Loporcaro, Michele and Antonella Mancuso (1998), Interdentale ma anche laterale: /l/ prevocalica in alcuni dialetti della (Pre)Sila, *in* P. M.Bertinetto and L.Cioni, eds, 'Unità fonetiche e fonologiche: produzione e percezione. Atti delle 8e Giornate di Studio del Gruppo

di Fonetica Sperimentale (Associazione Italiana d'Acustica). Scuola Normale Superiore, Laboratorio di Linguistica, Pisa 17-19 dicembre 1977', pp. 77–90.

Loriot, Robert (1953), '„l > rl à Villar d'Arène (Hautes-Alpes)', *Le Français Moderne* **21**, 191–193.

Loukina, Anastassia (2010), Towards the acoustic analysis of lateral consonants in Modern Greek dialects: a preliminary study, *in* A.Ralli, B. D.Joseph, M.Janse and A.Karasimos, eds, 'Online Proceedings of the Forth International Conference on Modern Greek Dialects and Linguistic Theory, Chios, 11-14 June 2009', pp. 120–132.

Luchaire, Achille (1973), *Recueil de textes de l'ancien dialecte gascon d'après des documents antérieurs au XIVe siècle suivi d'un glossaire*, Slatkine. reprint; published originally in 1881.

Macpherson, Ian (1975), Delateralization and phonetic change: The Old Spanish palatals [], [], [], *in* 'Studies in Honor of Lloyd A. Kasten', Hispanic Seminary of Medieval Studies, pp. 155–164.

Maddieson, Ian (1980), 'A survey of liquids', *UCLA Working Papers in Phonetics* **50**, 93–112.

Maddieson, Ian (2011), Lateral consonants, *in* M. S.Dryer and M.Haspelmath, eds, 'The World Atlas of Language Structures Online', Max Planck Digital Library, Munich.
URL: *http://wals.info/chapter/8*

Maddieson, Ian and Karen Emmorey (1984), 'Is there a valid distinction between voiceless lateral approximants and fricatives?', *Phonetica* **41**, 181–190.

Malkiel, Yakov (1963), 'The interlocking of narrow sound change, broad phonological pattern, level of transmission, areal configuration, sound symbolism. Diachronic studies in the Hispano-Latin consonant clusters cl-, fl-, pl-', *Archivum Linguisticum* **15**(2), 144–173.

Malkiel, Yakov (1964), 'The interlocking of narrow sound change, broad phonological pattern, level of transmission, areal configuration, sound symbolism. Diachronic studies in the Hispano-Latin consonant clusters cl-, fl-, pl-', *Archivum Linguisticum* **16**(1), 1–33.

Maniet, Albert (1975), *La phonétique historique du latin dans le cadre des langues indo-européennes*, Klincksieck. 5e édition.

Marchal, Alain and Yohann Meynadier (1995), 'Contribution à l'analyse de la coarticulation linguale dans la séquence consonantique /kl/ en français', *Travaux de l'Institut de Phonétique d'Aix* **16**, 65–74.

Marotta, Giovanna and Nadia Nocchi (2001), 'La liquida laterale nel livornese', *Rivista di Dialettologia. Lingue dialetti società* **25**, 285–326.

Marshall, John H., ed. (1969), *The Donatz Proensals of Uc Faidit*, Oxford University Press.

Martinet, André (1952), 'Celtic lenition and Western Romance consonants', *Language* **28**(2), 192–217.

Martèl, Felip (1983), 'L'espandi dialectau occitan alpenc: assag de descripcion', *Novel Temp* **21**, 4–36.

Martín Mota, Sidney (2005), 'On the evolutionary path of l-vocalization in the Occitan spoken in Val d'Aran', *Lingüistica Occitana* **4**, 42–59.

Matisoff, James A. (2003), *Handbook of Proto-Tibeto-Burman: System and philosophy of Sino-Tibetan reconstruction*, University of California Press.

Matzke, John E. (1890), 'The development of cl into l in the Romance languages', *Modern Language Notes* **5**(6), 177–179.

Maurand, Georges (1974), Phonétique et phonologie du parler occitan d'Ambialet (Tarn), tèsi d'Estat, Universitat de Tolosa 2 - Lo Miralh.

McCarus, Ernest N. (1958), *A Kurdish Grammar. Descriptive analysis of the Kurdish of Sulaimaniya, Iraq*, American Council of Learned Societies.

McCarus, Ernest N. (1997), Kurdish phonology, *in* A. S.Kaye, ed., 'Phonologies of Asia and Africa (including the Caucasus)', Vol. 2, Eisenbrauns, Winona Lake, Indiana, pp. 691–706.

Meier, Harri (1968), 'Yakov Malkiel: The interlocking of narrow sound change, broad phonological pattern, level of transmission, areal configuration, sound symbolism. Diachronic studies in the Hispano-Latin consonant clusters cl-, fl-, cl-. Archivum Linguisticum 15, Glasgow 1963, 144-173; 16, 1964, 1-33', *Archiv für das Studium der neueren Sprachen und Literaturen* pp. 385–390.

Meillet, Antoine (1905-1906), 'Sur les conditions générales du développement de l vélaire', *Mémoires de la Société de Linguistique de Paris* **13**, 237–243.

Meillet, Antoine (1914-1915), 'Sur l'histoire des consonnes en grec', *Mémoires de la Société de Linguistique de Paris* **19**, 163–173.

Meillet, Antoine (1930), 'Sur la dissimilation de l en latin ancien', *Bulletin de la Société de Linguistique de Paris* **30**(2), 125–127.

Meillet, Antoine (1965), *Le slave commun*, Champion. First edition 1924.

Meillet, Antoine (2004), *Esquisse d'une histoire de la langue latine*, Klinck-sieck. First edition 1928.

Meillet, Antoine and J. Vendryes (1924), *Traité de grammaire comparée des langues classiques*, Champion.

Menéndez Pidal, Ramón (1954), 'A propósito de ll y l latinas. Colonización suditálica en España', *Boletín de la Real Academia Española* **34**, 165–216.

Menéndez Pidal, Ramón (1960), Introducción, *in* M.Alvar, A.Badía, R.De Balbín and L. F.Lindley Cintra, eds, 'Enciclopedia Lingüística Hispánica. Tomo I. Antecedentes. Onomástica', Consejo Superior de Investigaciones Científicas, pp. 25–138.

Meyer-Lübke, Wilhelm (1890), *Grammaire des langues romanes. Tome premier: Phonétique*, F. Welter.

Meyer-Lübke, Wilhelm (1934), *Die Schicksale des lateinischen l im Romanischen*, Berichte über die Verhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig. Philologisch-historische Klasse, 86: 2, S. Hirzel.

Meyerhoff, Miriam (2006), Topics from the Tropics (Hawai'i), *in* W.Wolfram and B.Ward, eds, 'American Voices. How dialects differ from coast to coast', Blackwell, pp. 165–171.

Michelena, Luís (1985), *Fonética histórica vasca*, 3 edn, Publicaciones del Seminario Julio de Urquijo de la Excma. Diputación Foral de Guipuzkoa. First edition 1960.

Michelly, Reinhold (1936), *Zur Lautlehre des Velay. Nach dem Dictionnaire topographique de la Haute-Loire*, Wilhelm Gronau, Jena and Leipzig.

Mielke, Jeff, Kenneth S. Olson, Adam Baker and Diana Archangeli (2011), 'Articulation of the Kagayanen interdental approximant: An ultrasound study', *Journal of Phonetics* **39**, 403–412.

Millardet, Georges (1933), 'Sur un ancien substrat commun à la Sicile, la Corse et la Sardaigne', *Revue de linguistique romane* **9**, 346–369.

Müller, Daniela (2010), Phonetic factors influencing /l/-rhoticisation in Greek, *in* A.Botinis, ed., 'Proceedings of the third ISCA Tutorial and Research Workshop on Experimental Linguistics', pp. 117–120.

Müller, Daniela (in press), Un estudi critic de l'evolucion /lː/ > /d/ > /d, dz, ts/ en gascon e en gardiòl, *in* 'Actes du colloque « Nouvelle recherche en domaine occitan : approches interdisciplinaires » Albi, 11.-12.06.2009'.

Müller, Daniela and Sidney Martín Mota (2009), Acoustic cues of palatalisation in plosive + lateral onset clusters, *in* 'Proceedings of Interspeech 2009, Brighton, 6-10 September 2009', Causal Productions, pp. 1695–1698.

Molinu, Lucia (2009), 'La latérale intervocalique non géminée en sarde méridional', *Vox Romanica* **68**, 129–155.

Morala, José R. (1988), Resultados de pl-, kl- y fl- en la documentación medieval leonesa, *in* M.Ariza, A.Salvador and A.Viudas, eds, 'Actas del I Congreso Internacional de Historia de la Lengua Española. Cáceres, 30 de marzo – 4 de abril de 1987', Vol. 1, Arco/Libros.

Morris, Jonathan (2011), 'Acoustic evidence for /l/ variation in the repertoire of Welsh-English bilinguals'.

Moutier, Louis (1882), *Grammaire dauphinoise. Dialecte de la vallée de la Drôme*, Bourron, Montélimar.

Mártony, J. and Gunnar Fant (1961), Pole-zero matching spectra of /l/, Technical report, Quarterly Progress and Status Report, Department for Speech, Music and Hearing, KTH.

Ní Chasaide, Ailbhe (1999), Irish, *in* 'Handbook of the International Phonetic Association. A guide to the use of the International Phonetic Alphabet', Cambridge University Press, pp. 111–116.

Nandris, Octave (1965), Le problème de l (ll) en latin et dans les langues romanes, *in* G.Straka, ed., 'Actes du Xe Congrès International de Linguistique et Philologie Romanes. Strasbourg, 1962', Vol. 3, Klincksieck, pp. 925–943.

Narayanan, Srikanth S., Abeer A. Alwan and Katherine Haker (1997), 'Toward articulatory-acoustic models for liquid approximants based on MRI and EPG data. Part I. The laterals', *Journal of the Acoustical Society of America* **101**(2), 1064–1077.

Narayanan, Srikanth S. and Abigail Kaun (1999), Acoustic modelling of Tamil retroflex liquids, *in* 'Proceedings of the 14th International Congress of Phonetic Sciences, San Francisco', Vol. 3, pp. 2097–2101.

Nauton, Pierre, ed. (1957-1963), *Atlas linguistique et ethnographique du Massif Central*, CNRS.

Navarro Tomás, Tomás (1917), 'Sobre la articulación de la l castellana', *Estudis fonètics* **1**, 265–275.

Newman, Paul (1977), Lateral fricatives ("hlaterals") in Chadic, *in* P.Newman and R. M.Newman, eds, 'Papers in Chadic Linguistics', Afrika-Studiecentrum, pp. 107–119.

Newton, Brian (1972), *The Generative Interpretation of Dialect. A Study of Modern Greek Phonology*, Cambridge University Press.

Newton, David E. (1996), 'The nature of resonance in English: an investigation into lateral articulations', *York Papers in Linguistics* **17**, 167–190.

Nicolaidis, Katerina (2001), 'An electropalatographic study of Greek spontaneous speech', *Journal of the International Phonetic Association* **31**(1), 67–85.

Nicolaidis, Katerina and Mary Baltazani (2011), An electropalatographic and acoustic study of the Greek rhotic in /Cr/ clusters, *in* 'Proceedings of the 17th International Congress of Phonetic Sciences, Hongkong'.

Niedermann, Max (1985), *Précis de phonétique historique du latin*, 4e édition edn, Klincksieck.

Nocchi, Nadia (2002), Varianti della laterale nell'italiano di Livorno, *in* A.Regnicoli, ed., 'La fonetica acustica come strumento di analisi della variazione linguistica in Italia: Atti delle XII Giornate di Studio del Gruppo di Fonetica Sperimentale (A.I.A.), Macerata, Università degli Studi, 13-14 dicembre 2001', Il Calamo, pp. 77–82.

Ohala, John J. (1974), Phonetic explanation in phonology, *in* A.Bruck, R. A.Fox and M. W.Lagaly, eds, 'Papers from the Parasession on Natural Phonology. April 18, 1974', Chicago Linguistic Society, pp. 251–274.

Ohala, John J. (1983*a*), Modern applied linguistics, *in* 'Proceedings of the Arab School on Science and Technology, First Fall Session: Applied Arabic Linguistics and Signal and Information Processing. Damascus, Syria', pp. 51–62.

Ohala, John J. (1983*b*), The origin of sound patterns in vocal tract constraints, *in* P. F.MacNeilage, ed., 'The production of speech', Springer, pp. 189–216.

Ohala, John J. (1985), Around flat, *in* V.Fromkin, ed., 'Phonetic linguistics. Essays in honor of Peter Ladefoged', Academic Press, pp. 223–241.

Ohala, John J. (1987*a*), Experimental phonology, *in* 'Proceedings of the Annual Meeting, Berkeley Linguistic Society', number 13, pp. 207–222.

Ohala, John J. (1987*b*), Explanation in phonology: opinions and examples, *in* W. U.Dressler, H. C.Luschützky, O. E.Pfeiffer and J. R.Rennison, eds, 'Phonologica 1984', Cambridge University Press, pp. 215–225.

Ohala, John J. (1988), Discussion of Björn Lindblom's 'Phonetic invariance and the adaptive nature of speech', *in* B. A. G.Elsendoorn and H.Bouma, eds, 'Working models of human perception', Academic Press, pp. 175–183.

Ohala, John J. (1989), Sound change is drawn from a pool of synchronic variation, *in* L. E.Breivik and E. H.Jahr, eds, 'Language change: Contributions to the study of its causes', Mouton de Gruyter, pp. 173–198.

Ohala, John J. (1992*a*), The segment: primitive or derived?, *in* G. J.Docherty and D. R.Ladd, eds, 'Papers in Laboratory Phonology II: Gesture, segment, prosody', Cambridge University Press, pp. 166–183.

Ohala, John J. (1992*b*), 'What is the input to the speech production mechanism?', *Speech Communication* **11**, 369–378.

Ohala, John J. (1992*c*), What's cognitive, what's not, in sound change, *in* G.Kellermann and M. D.Morrissey, eds, 'Diachrony within synchrony: language history and cognition', pp. 309–355.

Ohala, John J. (1993), The phonetics of sound change, *in* C.Jones, ed., 'Historical Linguistics: Problems and Perspectives', Longman, pp. 237–278.

Ohala, John J. (1995), Experimental phonology, *in* J. A.Goldsmith, ed., 'A Handbook of Phonological Theory', Blackwell, Oxford, pp. 713–722.

Ohala, John J. (1996), 'Speech perception is hearing sounds, not tongues', *Journal of the Acoustical Society of America* **99**(3), 1718–1725.

Ohala, John J. (1997), Phonetics in phonology, *in* 'Proceedings of the 4th Seoul International Conference on Linguistics (SICOL), 11-15 August 1997', pp. 45–50.

Ohala, John J. (2004), Phonetics and phonology then, and then, and now, *in* H.Quene and V.Van Heuven, eds, 'On speech and language: Studies for Sieb G. Nooteboom', Landelijke Onderzoekschool Taalwetenschap, pp. 133–140.

Ohala, John J. (2005*a*), 'The marriage of phonetics and phonology', *Journal of the Acoustical Society of Japan* **26**(5), 418–422.

Ohala, John J. (2005*b*), Phonetic explanations for sound patterns: Implications for grammars of competence, *in* W. J.Hardcastle and J. M.Beck, eds, 'A figure of speech. A festschrift for John Laver', Erlbaum, pp. 23–38.

Ohala, John J. and E. E. Shriberg (1990), Hypercorrection in speech perception, *in* 'Proceedings of the International Conference on Spoken Language Processing, Kobe, 18-22 November 1990', Vol. 1, pp. 405–408.

Ohala, John J. and Haruko Kawasaki (1984), 'Prosodic phonology and phonetics', *Phonology Yearbook* **1**, 113–127.

Ohala, John J. and Haruko Kawasaki-Fukumori (1997), Alternatives to the sonority hierarchy for explaining segmental sequential constraints, *in* S.Eliasson and E. H.Jahr, eds, 'Language And Its Ecology: Essays In Memory Of Einar Haugen', Mouton de Gruyter, pp. 343–365.

Oliveira, Catarina, António Teixeira and Paula Martins (2010), Towards an articulatory characterization of European Portuguese /l/, *in* A.Botinis, ed., 'Proceedings of the third ISCA Tutorial and Research Workshop on Experimental Linguistics', pp. 118–121.

Olson, Kenneth S., Jeff Mielke, Josephine Sanicas-Daguman, Carol Jean Pebley and III Paterson, Hugh J. (2010), 'The phonetic status of the (inter)dental approximant', *Journal of the International Phonetic Association* **40**(2), 199–215.

Orel, Vladimir (2000), *A concise historical grammar of the Albanian language: reconstruction of Proto-Albanian*, Brill.

Ortega-Llebaria, Marta, Pilar Prieto and Maria del Mar Vanrell (2007), Perceptual evidence for direct acoustic correlates of stress in Spanish, *in* 'Proceedings of the 16th International Congress on Phonetic Sciences, Saarbrücken, 6-10 August 2007', pp. 1121–1124.

Osthoff, Hermann (1893), 'Dunkles und helles l im lateinischen', *Transactions of the American Philological Association* **23**, 50–65.

Oxley, Judith, Hugh Buckingham, Nancye Roussel and Raymond Daniloff (2006), 'Metrical/syllabic factors in English allophony: Dark /l/', *Clinical Linguistics & Phonetics* **20**(2-3), 109–117.

Oxley, Judith, Nancye Roussel and Hugh Buckingham (2007), 'Contextual variability in American English dark-l', *Clinical Linguistics & Phonetics* **21**(7), 523–542.

Papazachariou, Dimitris (2003), Oi pragmatwseis ths fwnologikhs monadas /l/ ths patrinhs dialektou, *in* 'Proceedings of the 6th International Conference of Greek Linguistics. Rethymno, 18-21 September 2003', pp. 19–27.

Passy, Jean (1904), *L'origine des Ossalois*, Emile Bouillon.

Pauly, August and Georg Wissowa, eds (1893-1978), *Paulys Real-Encyclopädie der classischen Altertumswissenschaft*, Metzler, Druckenmüller.

Perrier, Pascal, Yohan Payan, Majid Zandipour and Joseph Perkell (2003), 'Influences of tongue biomechanics on speech movements during the production of velar stop consonants: A modelling study', *Journal of the Acoustical Society of America* **114**(3), 1582–1599.

Perseus Under Philologic Corpus Of Latin Texts, Under The Supervision Of Helma Dik (n.d.).
URL: *http://perseus.uchicago.edu/*

Petráček, Karel (1952), 'Zur Artikulation des sogenannten emphatischen l im Arabischen', *Archiv Orientální* **20**(3-4), 509–523.

Picard, Marc (2001), 'On the fricativisation of /r/ and the French-Cree connection', *Folia Linguistica Historica* **22**(1-2), 137–147.

Piel, Joseph M. (1932), 'Da vocalização do "l" em português', *Biblos. Revista da Faculdade de Letras da Universidade de Coimbra* **8**, 95–101.

Pitombo Teixeira, Eliana (1995), 'Variação fonológica na região de monte santo: a consoante /l/', *Estudos Lingüísticos e Literários* **17**, 59–68.

Politzer, Robert L. (1954), 'On the development of Latin –ll- to -dd- in Romance', *Modern Language Notes* **69**(5), 325–331.

Popper, Karl R. (1961), *The Logic of Scientific Discovery*, Science Editions, New York.

Popper, Karl R. (1989), Die Logik der Sozialwissenschaften, *in* T. W.Adorno, R.Dahrendorf, H.Pilot, H.Albert, J.Habermas and K. R.Popper, eds, 'Der Positivismusstreit in der deutschen Soziologie', 13. auflage edn, Luchterhand, Frankfurt am Main.

Potte, Jean-Claude (1973), Un trait phonétique original de la région de la chaîne des Puys, *in* G.Straka, ed., 'Les dialectes romans de France à la lumière des atlas régionaux. Strasbourg, 24-28 mai 1971', CNRS.

Poucet, Jacques (1966), 'L'origine sabine de la « commutatio » du –d- en –l-, un mythe linguistique ?', *Antiquité classique* **35**, 140–148.

Prahler, Adrienne (1998), Analysis and synthesis of the American English lateral consonant, Master's thesis, Massachusetts Institute of Technology.

Proctor, Michael Ian (2009), Gestural Characterization of a Phonological Class: the Liquids., PhD thesis, Yale University.

Quilis, Antonio, M. Esgueva, M. L. Gutiérrez Araus and M. Cantarero (1979), 'Características acústicas de las consonantes laterales españolas', *Lingüística Española Actual* **1**, 233–343.

Quilis-Sanz, Maria José (1998), 'Las consonantes [-r] y [-l] implosivas en andalucía', *Revista de Filología Española* **78**, 125–156.

Recasens, Daniel (1996), 'An articulatory-perceptual account of vocalization and elision of dark /l/ in the Romance languages', *Language and Speech* **39**(1), 63–89.

Recasens, Daniel (2004), 'Darkness in [l] as a scalar phonetic property: implications for phonology and articulatory control', *Clinical Linguistics & Phonetics* **18**(6-8), 593–603.

Recasens, Daniel (2006), Integrating coarticulation, assimilation, and blending into a model of articulatory constraints, *in* L. M.Goldstein, ed., 'Phonology and Phonetics 4,2', Mouton de Gruyter, pp. 611–634.

Recasens, Daniel (2007*a*), Flapping in unconstrained alveolars, *in* 'Proceedings of the 16th International Congress of Phonetic Sciences, Saarbrücken, 6-10 August 2007', pp. 389–392.

Recasens, Daniel (2007*b*), Patterns of VCV coarticulatory direction according to the DAC model, *in* P.Prieto, J.Mascaró and M.-J.Solé, eds, 'Segmental and prosodic issues in Romance phonology', John Benjamins, pp. 25–39.

Recasens, Daniel (2009), Articulatory and acoustic factors involved in the vocalization of dark /l/ and in /l/ elision in Romance, *in* F.Sánchez Miret, ed., 'Romanística sin complejos. Homenaje a Carmen Pensado', Peter Lang, pp. 455–482.

Recasens, Daniel (forthcoming), 'A cross-language acoustic study of initial and final allophones of /l/', *Speech Communication* .

Recasens, Daniel and Aina Espinosa (2005), 'Articulatory, positional and coarticulatory characteristics for clear /l/ and dark /l/: evidence from two Catalan dialects', *Journal of the International Phonetic Association* **35**(1), 1–25.

Recasens, Daniel and Aina Espinosa (2010*a*), A perceptual analysis of the articulatory and acoustic factors triggering dark /l/ vocalization, *in* D.Recasens, F.Sánchez Miret and K. J.Wireback, eds, 'Experimental phonetics and sound change', LINCOM, pp. 71–82.

Recasens, Daniel and Aina Espinosa (2010*b*), 'The role of the spectral and temporal cues in consonantal vocalization and glide insertion', *Phonetica* **67**, 1–24.

Recasens, Daniel and Edda Farnetani (1990), Articulatory and acoustic properties of different allophones of /l/ in American English, Catalan, and Italian, *in* 'Proceedings of the International Conference on Spoken Language Processing 90, Acoustical Society of Japan', Vol. 2, pp. 961–964.

Recasens, Daniel and Edda Farnetani (1994), Spatiotemporal properties of different allophones of /l/: phonological implications, *in* W. U.Dressler, M.Prinzhorn and J. R.Rennison, eds, 'Phonologica 92. Proceedings of the 7th International Phonology Meeting', Rosenberg & Sellier, pp. 195–204.

Recasens, Daniel, Jordi Fontdevila and Maria Dolors Pallarès (1995), 'Velarization degree and coarticulatory resistance for /l/ in Catalan and German', *Journal of Phonetics* **23**, 37–52.

Recasens, Daniel, Jordi Fontdevila and Maria Dolors Pallarès (1996), 'Linguopalatal coarticulation and alveolar-palatal correlations for velarized and non-velarized /l/', *Journal of Phonetics* **24**, 165–185.

Recasens, Daniel, Maria Dolors Pallarès and Jordi Fontdevila (1997), 'A model of lingual coarticulation based on articulatory constraints', *Journal of the Acoustical Society of America* **102**(1), 544–560.

Recasens, Daniel, Maria Dolors Pallarès and Jordi Fontdevila (1998), 'An electropalatographic and acoustic study of temporal coarticulation for Catalan dark /l/ and German clear /l/', *Phonetica* **55**, 53–79.

Reetz, Henning and Allard Jongman (2009), *Phonetics. Transcription, production, acoustics, and perception*, Wiley-Blackwell, Chichester.

Remez, Robert E. (2003), 'Establishing and maintaining perceptual coherence: unimodal and multimodal evidence', *Journal of Phonetics* **31**, 293–304.

Rensch, Karl H. (1968), 'Zur Entwicklung der lat. Lateralkonsonanz in Kalabrien und der Basilikata. Ein Beitrag zur diachronischen Phonologie', *Zeitschrift für romanische Philologie* **84**, 593–605.

Repetti, Lori and Edward F. Tuttle (1987), 'The evolution of Latin PL, BL, FL, and CL, GL in Western Romance', *Studi Mediolatini e Volgari* **33**, 53–115.

Robins, R. H. (1959), 'Nominal and verbal derivation in Sundanese', *Lingua* **8**, 337–369.

Rodríguez-Castellano, Lorenzo (1953), El sonido s (< l-, -ll-) del dialecto asturiano, *in* 'Estudios dedicados a Menéndez Pidal', Vol. 4, Consejo Superior de Investigaciones Científicas, pp. 201–238.

Rodríguez-Castellano, Lorenzo (1954), *Aspectos del bable occidental*, Instituto de Estudios Asturianos.

Rohlfs, Gerhard (1922), 'Ein Problem der vergleichenden Laut-geschichte', *Zeitschrift für romanische Philologie* **42**, 69–71.

Rohlfs, Gerhard (1929), Zur der Entwicklung von -ll- im Romanis-chen, *in* 'Philologisch-philosophische Studien. Festschrift für Eduard Wechssler zum 19. Oktober 1929', Wilhelm Gronau, pp. 388–401.

Rohlfs, Gerhard (1938), 'Zum Aragonesischen', *Zeitschrift für romanische Philologie* **58**, 552–559.

Rohlfs, Gerhard (1955*a*), 'Oskische Latinität im Spanischen?', *Revue de linguistique romane* **19**, 221–226.

Rohlfs, Gerhard (1955*b*), 'Vorrömische Lautsubstrate auf der Pyrenäen-halbinsel?', *Zeitschrift für romanische Philologie* **71**, 408–413.

Rohlfs, Gerhard (1966), *Grammatica storica della lingua italiana e dei suoi dialetti. Fonetica*, Giulio Einaudi. originally 1949.

Rohlfs, Gerhard (1974), *Scavi linguistici nella Magna Grecia. Nuova edi-zione interamente rielaborata ed aggiornata*, Congedo. First edition 1932.

Rohlfs, Gerhard (1977*a*), *Grammatica storica dei dialetti italogreci (Calabria, Salento). Nuova edizione interamente rielaborata ed aggiornata*, Beck.

Rohlfs, Gerhard (1977*b*), *Le gascon. Etudes de philologie pyrénéenne (avec 3 cartes)*, 3 edn, Max Niemeyer & Marrimpouey Jeune. First edition 1935.

Rohlfs, Gerhard (1981), Span. año (caballo): ein phonetisches Prob-lem, *in* H.Geckeler, B.Schlieben-Lange, J.Trabant and H.Weydt, eds, 'Logos Semantikos. Studia linguistica in honorem Eugenio Coseriu (1921-1981). V. Historia y arquitectura de las lenguas', Gredos & de Gruyter, pp. 359–364.

Romero, Joaquín and Sidney Martín (2003), Articulatory weakening as basis of historical rhotacism, *in* M.-J.Solé, D.Recasens and J.Romero, eds, 'Proceedings of the 15th International Congress of Phonetic Sciences, Barcelona, Spain', Causal Productions, pp. 2825–2828.

Romito, Luciano and Giovanni Maria Giacomo Belluscio (1996), Studio elettropalatografico dell'opposizione fonematica [ll], [dd], [] nel di-aletto di Catanzaro e [], [], [d], [] nella parlata albanese di San Basile, *in* 'Associazione Italiana di Acustica, XXIV Convegno Nazionale, Trento, 12-14 giugno 1996', pp. 141–144.

Romito, Luciano and Paola Antonietta Scuticchio (2009), La retrof-lessione in alcuni centri della provincia di Catanzaro: verso una mappa regionale, *in* L.Romito, R.Lio and V.Galatà, eds, 'Atti del 4° Convegno AISV, Cosenza – Università della Calabria, 3-5 dicembre 2007', Vol. 4, pp. 412–422.

Romito, Luciano and Patrizia Sorianello (1999), Ridefinizione delle consonanti retroflesse nei dialetti calabresi, *in* 'Atti del convegno "V Congresso Internazionale della Società Internazionale di Linguistica e Filologia Italiana", Catania, 15-17 ottobre, 1998, Università di Catania'.

Romito, Luciano and Rossella Milelli (1999), 'Analisi elettroacustica degli esiti di –LL- in alcuni dialetti della Calabria', *Quaderni del Dipartimento di Linguistica dell'Università della Calabria. Serie Linguistica* 7 **16**, 11–26.

Ronjat, Jules (1930), *Grammaire istorique des parlers provençaux modernes. Tome I : Introduction. Première partie : Fonétique : I. Voyelles et diftongues*, Société des langues romanes.

Ronjat, Jules (1932), *Grammaire istorique des parlers provençaux modernes. Tome II. Première partie: Fonétique. II. Consonnes et fénomènes généraux*, Société des langues romanes.

Rositzke, Harry A. (1939), 'A further note on Welsh ll and Icelandic hl', *Le Maître phonétique* **65**, 7–8.

Roussel, Nancye and Judith Oxley (2010), 'Perception of American English dark /l/ by normally hearing young adult women', *Clinical Linguistics & Phonetics* **24**(6), 451–472.

Rousselot, Pierre Jean (1892), 'Les modifications phonétiques du langage étudiées dans le patois d'une famille de Cellefrouin (Charente)', *Revue des patois gallo-romans* **5**, 209–420.

Ruffino, Giovanni (1997), Sicily, *in* M.Maiden and M.Parry, eds, 'The Dialects of Italy', Routledge, pp. 365–375.

Saeed, John Ibrahim (1992), Dialectal variation in Somali, *in* H. M.Adam and C. L.Geshekter, eds, 'Proceedings of the First International Congress of Somali Studies', Scholars Press, pp. 464–490.

Safarewicz, Jan (1953), 'Contributions à la grammaire latine', *Eos* **46**, 97–105.

Sands, Bonny (2007), The contribution of language documentation to historical phonology, *in* P. K.Austin, O.Bond and D.Nathan, eds, 'Proceedings of Conference on Language Documentation and Linguistic Theory', SOAS, pp. 209–219.

Sarrieu, Bernard (1904), 'Le parler de Bagnères-de-Luchon et de sa vallée (suite)', *Revue des langues romanes* **47**, 97–153.

Sauzet, Patric (2006), La spécificité phonétique du gascon, occitan extrême, *in* A.-B.Boyrie-Fenié and H.Goulaze, eds, 'Un pays dans sa langue. Le gascon dans l'ensemble d'oc (Actes du colloque de Sabres, Parc Naturel des Landes de Gascogne)', pp. 17–21.

Scheerer, Otto (1921), 'Über einen bemerkenswerten L-Stellvertreter im Dialekt von Aklán auf der Insel Panáy (Filipinen)', *Zeitschrift für Eingeborenen-Sprachen* **11**(1), 241–259.

Schönig, Reinhold (1913), *Rom. vorkonsonantisches l in den heutigen französischen Mundarten*, Max Niemeyer.

Schürr, Friedrich (1927), 'TALPA, MUS, RATTUS – l vor Kons. im Romanischen', *Zeitschrift für romanische Philologie* **47**, 492–513.

Schuchardt, Hugo (1867), *Der Vokalismus des Vulgärlateins. Zweiter Band*, Teubner.

Schumacher, Ron and Donna Schumacher (1978), 'Proto-Manobo *l in Agusan Manobo', *Studies in Philippine Linguistics* **2**(1), 183–190.

Scobbie, James M. and Alan A. Wrench (2003), An articulatory investigation of word final /l/ and /l/-sandhi in three dialects of English, *in* M.-J.Solé, D.Recasens and J.Romero, eds, 'Proceedings of the 15th International Congress of Phonetic Sciences', Vol. 2, Causal Productions, pp. 1871–1874.

Scobbie, James M. and Marianne Pouplier (2010), 'The role of syllable structure in external sandhi: An EPG study of vocalisation and retraction in word-final English /l/', *Journal of Phonetics* **38**, 240–259.

Scobbie, James M., Marianne Pouplier and Alan A. Wrench (2007), Conditioning factors in external sandhi: An EPG study of English /l/ vocalisation, *in* 'Proceedings of the 16th International Conference on Phonetic Sciences, Saarbrücken, 6-10 August 2007', pp. 441–444.

Seelmann, Emil (1885), *Die Aussprache des Latein nach physiologisch-historischen Grundsätzen*, Henninger.

Selmer, Carl (1933), 'Velarization and u-vocalization of l in German dialects', *Publications of the Modern Language Association* **48**(1), 220–244.

Séguy, Jean and Xavier Ravier, eds (1954-1973), *Atlas Linguistique de la Gascogne*, CNRS.

Silverman, Daniel (2006), *A Critical Introduction to Phonology. Of Sound, Mind, and Body*, Continuum, London, New York.

Simonet, Miquel (2010*a*), Alveolar laterals in Majorcan Spanish. Effects of contact with Catalan?, *in* S.Colina, A.Olarrea and A. M.Carvalho, eds, 'Romance Linguistics 2009. Selected papers from the 39th Linguistic Symposium on Romance Languages (LSRL), Tucson, Arizona, March 2009', pp. 81–94.

Simonet, Miquel (2010*b*), 'Dark and clear laterals in Catalan and Spanish: Interaction of phonetic categories in early bilinguals', *Journal of Phonetics* **38**, 663–678.

Sjögren, Albert (1928), 'La palatalisation de l des groupes pl, bl, fl, kl, gl dans les langues romanes', *Revue de phonétique* **5**, 201–205.

Sletsjøe, Leif (1959), 'La prononciation de l et n en latin', *Symbolae Osloenses* **35**, 144–155.

Smith, Pauline M., ed. (1980), *Henri Estienne. Deux dialogues du nouveau langage françois italianizé et autrement desguizé, principalement entre les courtisans de ce temps. De plusieurs nouveautez qui ont accompagné ceste nouveauté de langage. De quelques courtisanismes modernes, et de quelques singularitez courtisanesques*, Slatkine.

Sommer, Anton F. W. and Ernst Trumpp (2006), *Handbuch des Paschto-Afganischen*, self-published.

Sommer, Ferdinand (1948), *Handbuch der lateinischen Laut- und Formenlehre. Eine Einführung in das sprachwissenschaftliche Studium des Lateins*, Winter.

Spencer, Andrew (1984), 'Eliminating the feature [lateral]', *Journal of Linguistics* **20**, 23–43.

Sproat, Richard and Osamu Fujimura (1993), 'Allophonic variation in English /l/ and its implications for phonetic implementation', *Journal of Phonetics* **21**, 291–311.

Sprouse, Ronald L., Maria-Josep Solé and John J. Ohala (2008), Oral cavity enlargement in retroflex stops, *in* R.Sock, S.Fuchs and Y.Laprie, eds, 'Proceedings of the 8th International Seminar on Speech Production 2008, December 8th to 12th 2008, Strasbourg, France', pp. 425–428.

Starostin, Sergei (2007), *A North-Caucasian Etymological Dictionary: preface*, Caravan books. Print edition 1994 (online version: http://starling.rinet.ru/Texts/caucpref.pdf, accessed 12/01/2011).

Steiner, Richard C. (1977), *The Case for Fricative-Laterals in Proto-Semitic*, American Oriental Society.

Steiner, Richard C. (1991), Addenda to The case for fricative-laterals in Proto-Semitic, *in* A. S.Kaye, ed., 'Semitic studies in honor of Wolf Leslau on the occasion of his eighty-fifth birthday November 14th, 1991', Vol. 2, Harrassowitz, Wiesbaden, pp. 1499–1513.

Stevens, Kenneth N. (1989), 'On the quantal nature of speech', *Journal of Phonetics* **17**, 3–45.

Stevens, Kenneth N. (1998), *Acoustic Phonetics*, The MIT Press.

Stevens, Kenneth N. and Sheila E. Blumstein (1975), 'Quantal aspects of consonant production and perception: a study of retroflex stop consonants', *Journal of Phonetics* **3**, 215–233.

Stone, Maureen, Alice Faber, Lawrence J. Raphael and Thomas H. Shawker (1992), 'Cross-sectional tongue shape and linguopalatal contact patterns in [s], [s] and [l]', *Journal of Phonetics* **20**, 253–270.

Straka, Georges (1942), 'Notes sur la vocalisation de l'l', *Bulletin linguistique* **10**, 1–34.

Straka, Georges (1979), *Les sons et les mots. Choix d'études de phonétique et de linguistique.*, Klincksieck, chapter Contribution à la description et à l'histoire des consonnes L, pp. 363–422.

Straka, Georges and Pierre Nauton (1947), Le polymorphisme de l'r dans la Haute-Loire, *in* P.Alfaric, ed., 'Mélanges 1945. V Etudes Lingustiques', Publications de la Faculté des Lettres de Strasbourg 108, Les Belles Lettres, pp. 195–238.

Stürzinger, Jacob, ed. (1884), *Orthographia Gallica. Ältester Traktat über französische Aussprache und Orthographie*, Henninger.

Stuart-Smith, Jane, Claire Timmins and Fiona Tweedie (2006), 'Conservation and innovation in a traditional dialect. L-vocalization in Glaswegian', *English World-Wide* **27**(1), 71–87.

Sturtevant, Edgar Howard (1920), *The pronunciation of Greek and Latin. The sounds and accents*, The University of Chicago Press.

Suzuki, Noriko, M. Wakumoto, Ken ichi Michi, H. Dent, Fiona Gibbon and William J. Hardcastle (1995), 'Cross-linguistic study of lateral misarticulation using electropalatography', *European Journal of Disorders of Communication* **30**(2), 237–245.

Tausch, Arno (1954), *Die Lautentwicklung der Mundarten des Trièves (Dauphiné, dép. Isère)*, Akademie-Verlag, Berlin.

Torreblanca, Máximo (1988), La palatalización de l- inicial latina en catalán y leonés, *in* P.Peira, P.Jauralde, J.Sánchez Lobato and J.Urrutia, eds, 'Homenaje a Alonso Zamora Vicente I. Historia de la lengua : El español contemporáneo', Editorial Castalia, pp. 289–297.

Torreblanca, Máximo (1990), 'La evolución /kl-, pl-, fl/ > /l/ en español', *Revista de Filología Española* **70**, 317–327.

Trask, Robert Lawrence (1997), *The History of Basque*, Routledge.

Troubetzkoy, Nikolaj Sergevic (1922), 'Les consonnes latérales des langues caucasiques-septentrionales', *Bulletin de la Société de Linguistique de Paris* **23**, 184–204.

Trudgill, Peter (1989), 'The sociophonetics of /l/ in the Greek of Sphakiá', *Journal of the International Phonetic Association* **15**(2), 18–22.

Tuttle, Edward F. (1975), 'The development of PL, BL, and FL in Italo-Romance: distinctive features and geolinguistic patterns', *Revue de linguistique romane* **39**, 400–431.

Tuttle, Edward F. (1991), Considerazione pluristratica sociale degli esiti di AU e AL + alveodentale nell'Italia settentrionale", *in* D.Kremer, ed., 'Actes du XVIIIe Congrès International de Linguistique et de Philologie Romanes. Université de Trèves (Trier). Tome III. Section V Grammaire diachronique et histoire de la langue. Section VIII Dialectologie et géographie linguistique. Section XIII Textes non littéraires', Max Niemeyer, pp. 571–583.

Valle, Maria Vittoria (1977), 'Interpretazione storico-fonetica dell'evoluzione l > u nelle lingue romanze', *Euroasiatica. Journal of Neohistorical Linguistics* **4**(1), 7–16.

Van Hofwegen, Janneke (2009), 'Cross-generational change in /l/ in Chicano English', *English World-Wide* **30**(3), 302–325.

Van Hofwegen, Janneke (2011), 'Apparent-time evolution of /l/ in one African American community', *Language Variation and Change* **22**, 373–396.

Vigeland, Bjørn (1981), *Dialekter i Norge. Målmerker med språkhistoriske forklaringer*, Universitetsforlaget.

Viëtor, Wilhelm (1915), *Elemente der Phonetik des Deutschen, Englischen und Französischen*, Vol. 2, Reisland. Sechste Auflage (Erstauflage 1884).

Viudas Camarasa, Antonio (1979), 'Sobre la evolución de pl- a pll- y cl- a cll- en aragonés antiguo', *Anuario de Estudios Filológicos* **2**, 355–375.

Voelkel, Paul (1888), 'Sur le changement de l'l en u', *Programme du Collège Royal Français* **54**, 1–48.

von Essen, Otto (1964), An acoustic explanation of the sound shift [l] > [u] and [l] > [i], *in* D.Abercrombie, D. B.Fry, P. A. D.MacCarthy, N. C.Scott and J. L. M.Trim, eds, 'In Honour of Daniel Jones', Longmans, pp. 53–58.

von Wartburg, Walther (1928-2003), *Französisches Etymologisches Wörterbuch: eine Darstellung des galloromanischen Sprachschatzes*, Zbinden.

von Wartburg, Walther (1950), *Die Ausgliederung der romanischen Sprachräume*, Francke.

Vázquez Obrador, Jesús (1993), 'Soluciones romances de la geminada –ll- en la toponimía de Sobremonte, Ribera de Biescas y Sobrepuerto (Huesca). Intento de explicación fonético-fonológica', *Anuario de Estudios Filológicos* **16**, 391–415.

Wagner, Max L. (1941), *Historische Lautlehre des Sardischen*, Max Niemeyer.

Wakelin, Martyn F. (1986), *The Southwest of England*, John Benjamins.

Watson, Janet C. E. (2002), *The Phonology and Morphology of Arabic*, Oxford University Press.

Weigand, Gustav (1891), *Vlacho-Meglen. Eine ethnographisch-philologische Untersuchung. II. Teil. Das Verhältnis des Meglen zum Dako-, Makedo- und Istro-Romanischen*, Barth.

Wells, John C. (1982), *Accents of English*, Cambridge University Press.

Widdison, Kirk (1989), 'Some consequences of velarization on Catalan vowels'.

Williams, Edwin B. (1938), *From Latin to Portuguese. Historical phonology and morphology of the Portuguese language*, University of Philadelphia Press.

Willson, Heather (2003), A brief introduction to Marshallese phonology. ms., University of California at Los Angeles.

Wireback, Kenneth J. (1997*a*), 'On the palatalization of /kt/, /ks/, /k'l/, /g'l/; and /gn/ in Western Romance', *Romance Philology* **50**(3), 276–294.

Wireback, Kenneth J. (1997*b*), *The Role of Phonological Structure in Sound Change from Latin to Spanish and Portuguese*, Peter Lang.

Wrench, Alan A. and James M. Scobbie (2003), Categorising vocalisation of English /l/ using EPG, EMA and ultrasound, *in* S.Palethorpe and M.Tabain, eds, 'Proceedings of the 6th International Seminar on Speech Production, Sydney, 7-10 December, 2003', pp. 314–319.

Wright, Susan (1989), 'The effects of style and speaking rate on /l/-vocalisation in local Cambridge English', *York Papers in Linguistics* **13**, 355–365.

Yip, Moira (2004), 'Lateral survival: an OT account', *International Journal of English Studies* **4**(2), 25–51.

Yip, Moira (2005), Variability in feature affiliations through violable constraints: The case of [lateral], *in* M.van Oostendorp and J.van de Weijer, eds, 'The internal organization of phonological segments', Mouton de Gruyter, pp. 63–91.

Zaun, Otto (1917), *Die Mundart von Aniane (Hérault) in alter und neuer Zeit*, Max Niemeyer.

Zauner, Adolf (1898), Zur Lautgeschichte des Aquitanischen, *in* 'Siebenundreissigstes Programm der I. deutschen Staats-Realschule in Prag', sel, pp. 1–23.

Zhang, Zhaoyan, Carol Espy-Wilson and Mark Tiede (2003), Acoustic modelling of American English lateral approximants, *in* 'Proceedings of the 8th European Conference on Speech Communication and Technology (EUROSPEECH 2003 - INTERSPEECH 2003), Geneva, Switzerland, 1-4 September, 2003', pp. 2393–2396.

Zhang, Zhaoyan and Carol Y. Espy-Wilson (2004), 'A vocal-tract model of American English /l/', *Journal of the Acoustical Society of America* **115**(3), 1274–1280.

Zimmer, Karl and Orhan Orgun (1999), Turkish, *in* 'Handbook of the International Phonetic Association. A guide to the use of the International Phonetic Alphabet', Cambridge University Press, pp. 154–156.