

Yorkshire assimilation

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ABSTRACT: ‘Yorkshire assimilation’ is a phonetic phenomenon that has been known to occur in Central Northern (British) English. In this paper I make an attempt to phonologically analyze this phonetic phenomenon within the framework of functional phonology (being practised in the Functional School associated with André Martinet) and conclude that this phonetic phenomenon is interpretable in terms of neutralization and the archiphoneme. In addition, remarks are offered about phonological analyses of Yorkshire assimilation that were conducted by researchers working in theoretical frameworks different from mine.

KEYWORDS: Yorkshire assimilation, neutralization, archiphoneme, relevant feature, common base, exclusive / non-exclusive opposition, defective / limited distribution, ‘once a phoneme, always a phoneme’, instability of English alveolar articulation, ‘principle of least effort’.

One interesting phonetic peculiarity witnessed in Central Northern (British) English pronunciation is what is known as ‘Yorkshire assimilation’. The phenomenon of Yorkshire assimilation, which is found in North Yorkshire, Cleveland and Humberside as well as West Yorkshire and South Yorkshire, is well known to scholars of English phonetics but perhaps little known to ‘outsiders’.

In brief, Yorkshire assimilation is a phenomenon wherein voiced consonant sounds, when occurring in syllable-final position and being followed by voiceless consonant sounds, are assimilated (i.e. through regressive assimilation) by the following voiceless consonant sounds and change into the corresponding voiceless consonant sounds. Thus, [b], [d], [v], [ð], [z], [dʒ], [ʒ] and [g] change into [p], [t], [f], [θ], [s], [tʃ], [ʃ] and [k], respectively. (A convenient technical term, employed in phonetics, to designate as a group the sounds that are traditionally called stops, fricatives and affricates is ‘obstruent’; all the consonant sounds listed above are therefore some of the obstruents of English.) Various phoneticians adduce examples of Yorkshire assimilation. Wells¹ cites *subcommittee* pronounced with [p], *headquarters* with [t], *a big piece* with [k], and *live performance* with [f]. He goes on to cite the phrase *wide trousers* pronounced with [t], so that this phrase is homophonous with *white trousers*, and the word *frogspawn* pronounced with [k], so that this word is homophonous with

¹ Wells (1982: 367).

a hypothetical word **frock-spawn*. Another example, more generally adduced by phoneticians, is *Bradford*, a city in West Yorkshire, pronounced with [t]. Curiously, the same phoneticians do not say what happens to the final consonant sound of *Bradford* if followed by a voiceless consonant sound, as in *Bradford City* where the word *City* begins with [s], a voiceless fricative, or if followed by a pause. However, I understand from another phonetician, Windsor Lewis, that the last segment of *Bradford* is also pronounced [t] if followed by *city* or any other word beginning with a voiceless consonant sound.² (I will, from this point on, employ the term ‘consonant’ instead of ‘consonant sound’ except when specifying ‘consonant *phoneme*’ is deemed necessary.) The example of *Bradford* is specifically mentioned in a pronouncing dictionary, *LPD*,³ which first gives the ‘non-dialectal’ pronunciation [ˈbrædfəd] and then expressly appends the note which reads ‘–in WYks locally also ˈbræt-’.

Although phoneticians who describe Yorkshire assimilation do not specifically mention it, it may be assumed that, in the context relevant to Yorkshire assimilation, voiceless consonants ([p], [f], [t], [θ], [s], [tʃ], [ʃ] and [k]) and non-obstruents ([m], [n], [ŋ] and [l]) in English remain unaffected and can be completely left out of account. However, as we shall see later, it is necessary to take into consideration [m], [n], [ŋ] and [l] when we determine the phonological status of the voiceless consonants occurring as a result of Yorkshire assimilation.

There are two phonetic features of Yorkshire assimilation that may be worth noting.

(1) To judge from the descriptions of Yorkshire assimilation as given by phoneticians, the voiceless consonants resulting from Yorkshire assimilation are not the so-called (partially or completely) ‘devoiced’ version of the voiced consonants, i.e. [b̥] [d̥], [g̥], etc. which would remain ‘lenis’ consonants, but consonants which are completely voiceless *and* ‘fortis’ just as are the voiceless consonants that trigger Yorkshire assimilation. In other words, Yorkshire assimilation does not produce ‘devoiced’ variants of the voiced ‘lenis’ consonants which occur normally in various types of (British) English pronunciation as in *obtain* [əb̥ˈteɪn], *Hudson* [ˈhʌd̥s(ə)n] and *eggshell* [ˈeɡ̥ʃel]. These words are pronounced [əpˈteɪn], [ˈhʌts(ə)n] and [ˈekʃel] as a result of Yorkshire assimilation. This fact is unmistakably implied when, for example, Brook writes, in an implicit reference to Yorkshire assimilation, that ‘The assimilation of consonants is carried further than in Standard English.’⁴ The type of assimilation known as Yorkshire assimilation is a unique phenomenon indeed among various types of speech in British English.

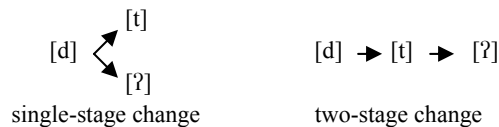
² I have had confirmation on this point from Jack Windsor Lewis (personal communication, January 2007), a Welsh phonetician who resides in West Yorkshire.

³ *LPD*, 89.

⁴ Brook (1963: 97).

(2) In addition to the occurrence of voiceless fortis consonants (and not de-voiced lenis consonants) mentioned just above, another interesting phonetic feature to be noted about Yorkshire assimilation is the fact that the type of assimilation involved is what is known as ‘regressive assimilation’ (as opposed to ‘progressive assimilation’). It is often remarked that progressive assimilation is more characteristic of English (cf. *shut this* [ʃʌt 'θɪs]) rather than regressive assimilation which predominantly characterizes, for example, French (cf. *une tasse de thé* [yn taʒ də te]), not that regressive assimilation is unknown in English (cf. *disband* ([dɪs'bænd]⁵) or progressive assimilation is unknown in, for example, French (cf. *cheval* [ʃval]).

Whilst it is true that most phoneticians mention [t] as occurring instead of [d] as a result of Yorkshire assimilation in an example like *Bradford*, some phoneticians mention the glottal stop [ʔ] as well. Wells thus admits the occurrence of both [t] and [ʔ].⁶ However, Ward, in giving the example of *Bradford* (my boldface), mentions [ʔ] only.⁷ I suspect that the occurrence of [t] and [ʔ] in connection with Yorkshire assimilation involves, not a single phonetic process producing two equally possible alternatives, but a two-stage phonetic process producing [t] first and then changing [t] to [ʔ]. (I will give the reason on p. 151 why this two-stage process can be explained to occur.) In other words, the two types of different phonetic change can be schematically indicated as follows.



It is not difficult for a listener to perceive the difference between the occurrence of [t] and that of [ʔ] in the course of Yorkshire assimilation. If [ʔ] occurs, the duration of the vowel [a] before [ʔ] in ['braʔfɒd] will be clearly shorter than it is when [t] is produced in ['bratfɒd]. In addition, the apico-alveolar release of [t] before [f] will be perceptible to the listener whereas such a release does not occur if [ʔ] (instead of [t]) occurs before [f], as the glottal release of [ʔ] will most likely largely be masked by [f] which follows [ʔ] and which is articulated in the oral cavity.

⁵ This is one of the examples I adduced in Akamatsu (1987: 130) along with a few others. The word *disband* is ‘normally’ pronounced [dɪs'bænd] (the pronunciation implied by the notation [dɪs'bænd] in pronouncing dictionaries) in which progressive assimilation results in the occurrence of [b]. However, regressive assimilation occasionally occurs in this word ([dɪs'bænd]) and a number of other words and should not be ignored, even though pronouncing dictionaries do not enter such pronunciations. Another example, this time a phrase, that I can adduce here is *black dog* ['blæk 'dɒg] in which regressive assimilation takes place. Examples of this sort could be multiplied.

⁶ Wells (1982: 367).

⁷ Ward (1945⁴: 135). Ida Caroline Ward was born in Bradford itself, not an uninteresting fact in the context of my present paper.

It should be noted that in phoneticians' descriptions of Yorkshire assimilation, only [t], and no other voiceless consonants, changes into [ʔ], when Yorkshire assimilation takes place.

The above is a brief account of what Yorkshire assimilation is, as presented in *phonetic* terms.

To judge from descriptions of Yorkshire assimilation as given mainly by phoneticians, it seems reasonable to understand that the phoneticians consider [t] occurring as a result of Yorkshire assimilation to be what they call an 'allophone' of the phoneme /t/. As for the occurrence of [ʔ], some of them may conceivably talk about 'replacement of /t/ by [ʔ]'. However, this does not tell us exactly what *phoneme* these researchers think occurs in syllable-final context followed by voiceless consonants as a result of Yorkshire assimilation. It is highly unlikely that they have in mind something like the *phoneme* /ʔ/. To the best of my knowledge, no one has postulated the phoneme /ʔ/ in English even in connection with Yorkshire assimilation. Other researchers talk about [ʔ] as an allophone, along with [t], of the phoneme /t/. If so, these researchers need to justify their assignment of both [t] and [ʔ] to the phoneme /t/. It seems to me that researchers (who mostly happen to be phoneticians), operating as they do with the criterion of 'phonetic similarity', assign both [t] and [ʔ] to the phoneme /t/. The criterion of 'complementary distribution' does not work in this case as, in Yorkshire assimilation, [t] and [ʔ] occur not in complementary distribution but in parallel distribution. Are these researchers then to talk about 'free variants' (of the phoneme /t/)? Incidentally, it is presumed that [p], [f], [t], [θ], [s], [tʃ], [ʃ], and [k] occurring as a result of Yorkshire assimilation in syllable-final context followed by voiceless consonants are assigned by the same researchers to /p/, /f/, /t/, /θ/, /s/, /tʃ/, /ʃ/ and /k/, respectively.

What interests me personally in connection with Yorkshire assimilation is, in addition to the bare phonetic facts such as have been presented above, the *phonological* implication of this assimilation, in particular the identification of the distinctive units of the second articulation⁸ of which the voiceless consonants that occur as a result of Yorkshire assimilation are realizations.⁹ To the best of my knowledge, this is-

⁸ The second articulation of a language is the second analytical stage at which the signifier (F. *signifiant*) of a moneme (F. *monème*) is analyzed into distinctive units, i.e. phonemes and archiphonemes. The first articulation, which precedes the second articulation, is the first analytical stage at which a vocal linguistic message is analyzed into a sequence of monemes each of which is an association between the signified (F. *signifié*) and the signifier (F. *signifiant*). These two articulations relate to the theory of 'double articulation' expounded by André Martinet. Interested readers may wish to consult e.g. Martinet (1955: § 5.6), Martinet (1960: § 1-8), Martinet (1962: 21-6), Martinet (1965: 1-35) and Martinet (1985: § 2.17).

⁹ Twaddell (1935: 58) rightly says as follows: 'The phonetician, in so far as he is anything more than a laboratory technician, must also be a phonologist; the phonologist, in so far as he is any-

sue does not seem to have been generally addressed so far by anyone, including those colleagues who work in the same theoretical framework as mine, i.e. the functionalist framework intimately associated with Martinet. This is the task I propose to undertake in the present paper.

What is the phonological status of [t] in *Bradford* ['brɑtʃəd] when followed by [f], a voiceless consonant? I only cite *Bradford* for convenience sake, but what I say in connection with the phonological status of [t] in such a case applies equally to [t]'s in all those other English words that similarly result from Yorkshire assimilation.

It would seem legitimate for me to assume that the type of spoken English in which Yorkshire assimilation takes place has the same system of consonant phonemes as the system of a number of other types of spoken English as well, including R.P. (Received Pronunciation).

At any rate, I will attempt to establish below through the commutation test the identities of the consonantal distinctive units, be they phonemes or archiphonemes, whose realizations are always voiceless (never voiced) consonants and which occur in syllable-final context before voiceless consonants in connection with Yorkshire assimilation. The commutation test will be performed, on the basis of the phonic substance of 'Yorkshire English', in terms of commutative series associated with contexts of maximum or near-maximum differentiation. To this end I will provide further below (see next page) three commutative series which I will call Commutative series 1, Commutative series 2, and Commutative series 3, which are, respectively, associated with three different phonetic contexts.

Commutative series 1 consists of minimal or near-minimal multiplets¹⁰ that demonstrate the occurrence of the consonants in the phonetic context [hæ – ə] with which Commutative series 1 is associated. This phonetic context may be generically described as 'word-medial intervocalic' context.

Commutative series 2 consists of minimal or near-minimal multiplets that demonstrate the occurrence of the consonants in the phonetic context [– i:] with which Commutative series 2 is associated. This phonetic context may be generically described as 'word-initial' context.

Commutative series 3 consists of minimal or near-minimal multiplets that demonstrate the occurrence of the consonants in the phonetic context [rəʊ – #] with which Commutative series 3 is associated. The symbol # stands for 'pause'. This phonetic context may be generically described as 'word-final pre-pausal' context.

thing more than an artist, must be a phonetician. It is the phonetician's failure to finish his job which the phonologist rightly protests against, not the part of the job he has done.'

¹⁰ For what I call 'minimal multiplet' and 'near-minimal multiplet' see Akamatsu (2000: 42-5).

The column of phonetic symbols for various voiceless consonants, placed to the right of Commutative series 3, is not a commutative series. It shows the occurrence of the consonants, all being voiceless, in ‘word-medial’ or ‘word-final’ context when voiceless consonants follow. I have put the symbol C to stand for the voiceless consonants. This is precisely the context where Yorkshire assimilation happens. The voiced consonants [m], [n], [ŋ] and [l] occur in that context without being relevant to Yorkshire assimilation, as the change from voiced consonants to voiceless consonants does not take place. Both the terms ‘word-medial’ and ‘word-final’ are necessary in characterizing the context where Yorkshire assimilation takes place in order that ‘word-medial’ [t] of *Bradford* and ‘word-final’ [t] of *Bradford (City [s...]...)*, to cite just one example, are accommodated. The dashes in the indication of the phonetic contexts below correspond to the point where the consonants we are focusing our attention on occur. I indicate conveniently in boldface the occurrence of each consonant in the spelling of the multiplerts which each commutative series consists of.

Commutative series 1 ‘word-medial intervocalic’	Commutative series 2 ‘word-initial’	Commutative series 3 ‘word-final pre-pausal’	Yorks assimilation ‘word-medial’ or ‘word-final’, when C follows
[‘hæ – ə]	[- i:]	[rəʊ – #]	
<i>happy</i>	<i>pea</i>	<i>rope</i>	[p]
<i>habi(t)</i>	<i>bee</i>	<i>robe</i>	[p]
<i>Haifa</i>	<i>fee</i>	<i>roof</i>	[f]
<i>haver</i>	<i>v</i> (the letter)	<i>rove</i>	[f]
<i>hatter</i>	<i>tea</i>	<i>rote</i>	[t]
<i>haddo(ck)</i>	<i>Dee</i>	<i>road</i>	[t]
<i>hatha</i>	<i>thie(f)</i>	<i>wroth</i>	[θ]
<i>hither</i>	<i>thee</i>	<i>writh</i>	[θ]
<i>hissi(ng)</i>	<i>sea</i>	<i>gross</i>	[s]
<i>Hosey</i>	<i>zea(l)</i>	<i>rose</i>	[s]
<i>Hatcher</i>	<i>chee(se)</i>	<i>roach</i>	[tʃ]
<i>Hajji</i>	<i>jee(p)</i>	<i>rage</i>	[tʃ]
<i>Hashi(sh)</i>	<i>she</i>	<i>rush</i>	[ʃ]
<i>azure</i>	<i>gi(gue)</i>	<i>rouge</i>	[ʃ]
<i>hacker</i>	<i>key</i>	<i>rock</i>	[k]
<i>haggar(d)</i>	<i>gee(se)</i>	<i>rogue</i>	[k]
<i>hammer</i>	<i>me</i>	<i>roam</i>	[m]
<i>Hannah</i>	<i>knee</i>	<i>roan</i>	[n]
<i>hanger</i>	—	<i>wrong</i>	[ŋ]
<i>holler</i>	<i>lea</i>	<i>roll</i>	[l]
<i>Harry</i>	<i>re</i> (prep.)	—	—
<i>Haughey</i>	<i>he</i>	—	—

It will be seen from Commutative series 1 that all consonants (22 in all) occur, basically, in the context [ʰæ – ə], which may appropriately be understood as word-medial intervocalic context in general. The first vowel (occurring in an accented syllable) of the two vowels in the context need only be any of the English vowels except [ə], not necessarily [æ]. The first vowel may or may not be preceded by a consonant and can be some other consonant than [h]. The second vowel, occurring in an unaccented syllable, is basically [ə] or [ɪ] but could be one of some other vowels. The second vowel may or may not be followed by a consonant. It will have been noted that all three commutative series I have provided contain near-minimal multiplets (as well as minimal multiplets), which are perfectly valid and acceptable in any commutative series. The commutation test does not suffer from the inclusion of near-minimal multiplets where necessary in case suitable minimal multiplets cannot be found. All 22 consonants in English are susceptible of occurring in Commutative series 1. Consequently ‘word-medial intervocalic’ context with the ‘accented – unaccented’ pattern can be regarded as the *context of maximum differentiation*.

In Commutative series 2, there occur 21 consonants, i.e. all consonants with the exception of [ŋ]. Consequently, word-initial context, associated with Commutative series 2, can be regarded as a *context of near-maximum differentiation*, i.e. the context in which a near-maximum number of consonants are susceptible of occurring.

It is seen from Commutative series 3 that 20 consonants, i.e. all the consonants with the exception of [r] and [h], occur in word-final pre-pausal context, with which Commutative series 3 is associated. Word-final pre-pausal context can be regarded as another context of *near-maximum differentiation*, though a lesser degree of near-maximum differentiation than the context associated with Commutative series 2. To the best of my knowledge, phoneticians do not refer to pre-pausal context in connection with Yorkshire assimilation. It seems that Yorkshire assimilation does not occur in pre-pausal context. Windsor Lewis emphasizes that Yorkshire assimilation takes place only when voiceless consonants follow.¹¹ This means that Commutative series 3 which I provided above can be considered as valid.

Let us take a look now at Commutative series 1, 2 and 3, and the column of various consonants placed to the right of Commutative series 3.

In Commutative series 1, 2 and 3, different numbers of consonants (the maximum being 22) are listed vertically. Commutative series 1 has 22 consonants, Commutative series 2 has 21 ([ŋ] is non-occurrent) and Commutative series 3 has 20 ([r] and [h] are non-occurrent). The consonants that are listed in different numbers in Commutative series 1, 2 and 3 are those which occur in the different phonetic contexts with which the three commutative series are associated, respectively. The listed consonants (i.e. the occurrent consonants) are placed in a fixed order so that there is parallelism across the three commutative series. It is easy to identify the non-oc-

¹¹ Windsor Lewis (personal communication, 14 February 2009).

current consonant or consonants in Commutative series 2 or Commutative series 3. The fixed order in which the consonants are placed is also observed in principle in the list of 20 (in reality 12) consonants in the fourth column. Eight consonants, all voiceless, viz. [p], [f], [t], [θ], [s], [tʃ], [ʃ] and [k], are each listed twice over, and the remainder are 4 consonants, all voiced consonants, viz. [m], [n], [ŋ] and [l]. Therefore, we only need to reckon with the total of 12 consonants in the fourth column.

What we need to do is to perform the phonological analysis of the consonants occurring in Commutative series 1, 2 and 3, to be precise, in the different phonetic contexts with which the three commutative series are associated. Our aim is to elicit the relevant features in terms of which the different distinctive units of the second articulation are to be characterized and thereby simultaneously establish the respective distinctive units themselves whose phonological contents in terms of relevant features are identified. These distinctive units are different phonemes, whose realizations are the different consonants that we see occur in the different phonetic contexts mentioned above.

The phonetic context [ʰæ – ə] (word-medial intervocalic) with which Commutative series 1 is associated is the context of maximum differentiation, the context in which all 22 consonants concerned occur. This is the context where we phonologically analyze the consonants by examining how they are differentiated from each other. It is best to differentially compare those (two or more) consonants that are distinguished from each other through the opposition between two phonetic properties (e.g. plosivity of [p] vs. fricativity of [f]), or the opposition among more than two phonetic properties (e.g. labiality of [p] vs. apicality of [t] vs. hush of [tʃ] vs. dorsality of [k]). These are instances of direct minimal differentiation between the consonants. Our examination, briefly illustrated above, yields the relevant features the opposition between which distinguishes two or more (as the case may be) phonemes. The comparison between [p] and [b] yields the relevant features “voiceless” (attributable to /p/) and “voiced” (/b/). The comparison between [p] and [f] elicits the relevant features “plosive” (/p/) and “fricative” (/f/). The comparison between [p], [t], [tʃ] and [k] yields the relevant features “labial” (attributable to /p/), “apical” (/t/), “hush” (/tʃ/) and “dorsal” (/k/). The comparison between [p] and [m], and between [b] and [m], yields the relevant features “non-nasal” (attributable to /p/, and to /b/) and “nasal” (/m/). We are therefore led to characterize the phoneme /p/ as “voiceless labial non-nasal plosive” which is the phonological content of this phoneme. We have already elicited, for example, the relevant feature “voiced” attributable to /b/ – and we shall find that this relevant feature is attributable to some other phonemes as well – but the relevant feature “voiced” alone is not sufficient to characterize /b/. The rest of the relevant features necessary to characterize /b/ are elicited as our phonological analysis is carried on further when we compare [b] with [d], [dʒ], [g] and [m] as well and thus elicit the relevant features “labial” and “non-nasal” as well. /b/ will thus be characterized as “voiced labial non-nasal plosive”. Further phonological analysis will be conducted

with a view to eliciting all the relevant features in terms of which the rest of the distinctive units occurring in the context of maximum differentiation, in the present case ‘word-medial intervocalic context’, are defined.

A full description of the phonological analysis along the lines indicated above would be too lengthy for me to give here and is omitted.

My phonological analysis of the mutual difference among the consonants in Commutative series 1 (associated with the context of maximum differentiation), Commutative series 2 (the context of near-maximum differentiation) and Commutative series 3 (also the context of near-maximum differentiation) leads me to establish 22 consonant phonemes (viz., /p/, /b/, /f/, /v/, /t/, /d/, /θ/, /ð/, /s/, /z/, /tʃ/, /dʒ/, /ʃ/, /ʒ/, /k/, /g/, /m/, /n/, /ŋ/, /h/, /l/, and /r/) definable in terms of 22 mutually different phonological contents, i.e. 22 mutually different sums of relevant features.

The characterization of the 22 different consonant phonemes that I have elicited is as follows.

/p/:	“voiceless labial non-nasal plosive”
/b/:	“voiced labial non-nasal plosive”
/m/:	“labial nasal”
/t/:	“voiceless apical non-nasal plosive”
/d/:	“voiced apical non-nasal plosive”
/n/:	“apical nasal”
/f/:	“voiceless labial fricative”
/v/:	“voiced labial fricative”
/θ/:	“voiceless apical fricative”
/ð/:	“voiced apical fricative”
/s/:	“voiceless hiss”
/z/:	“voiced hiss”
/tʃ/:	“voiceless hush plosive”
/dʒ/:	“voiced hush plosive”
/ʃ/:	“voiceless hush fricative”
/ʒ/:	“voiced hush fricative”
/k/:	“voiceless dorsal non-nasal”
/g/:	“voiced dorsal non-nasal”
/ŋ/:	“dorsal nasal”
/l/:	“lateral”
/r/:	“spirant”
/h/:	“glottal”.

We now pay attention to the crux of the matter in the present paper, my phonological analysis of the consonants in the phonetic context where Yorkshire assimilation takes place. I will hereafter conveniently refer to this phonetic context as ‘Yorkshire assimilation context’, which is of course equivalent to ‘word-medial or word-

final, when C follows', a full but longish expression. We take a look at this context where there occur 12 consonants which I have already identified, viz. [p], [f], [t], [θ], [s], [tʃ], [ʃ], [k], [m], [n], [ŋ] and [l]. In Yorkshire assimilation context, the voiceless consonants (e.g. [p]) remain the same but the voiced consonants (e.g. [b]) change to their voiceless counterparts (i.e. [p]). I have indicated each voiceless consonant twice over, as, for example, [b] changes to [p] while [p] remains [p]. This is why each voiceless consonant appears twice in the vertical list. The four other consonants, i.e. [m], [n], [ŋ] and [l], are each shown just once, as they do not enter into a distinction between voicedness and voicelessness. These four consonants remain voiced in Yorkshire assimilation context.

Now we need to look at and compare with each other the occurrence of the 12 consonants in Yorkshire assimilation context on the one hand and the occurrence of the 22 consonants in Commutative series 1, that of the 21 consonants in Commutative series 2 and that of the 20 consonants in Commutative series 3.

We see that the distinction between voiced and voiceless consonants (i.e. [p] vs. [b], [t] vs. [d], etc.) seen in Commutative series 1, 2 and 3 does not exist in Yorkshire assimilation context. Whereas we have [p] vs. [b], leading to /p/ vs. /b/, [t] vs. [d], leading to /t/ vs. /d/, etc. in Commutative series 1, 2 and 3 associated with word-medial intervocalic context, word-initial context, and word-final pre-pausal context, respectively, we have [p] (but not [b]), [t] (but not [d]), etc. in Yorkshire assimilation context. It is incumbent on us to identify the distinctive units of the second articulation, be they phonemes or archiphonemes, whose realizations are [p], [t], etc., respectively. To this end, the task to be carried out consists in examining *the phonological implications* of the differences among the 12 consonants, viz. [p], [f], [t], [θ], [s], [tʃ], [ʃ], [k], [m], [n], [ŋ] and [l], which occur in Yorkshire assimilation context. How are the distinctive units characterized in terms of relevant features? We take note, first of all, that there is no possibility, in Yorkshire assimilation context, unlike in Commutative series 1, 2 and 3, of differentially comparing [p] with [b], [f] with [v], [t] with [d], [θ] with [ð], [s] with [z], [tʃ] with [dʒ], [ʃ] with [ʒ], and [k] with [g], simply because only the voiceless consonants occur. This means that none of the distinctive units we are after whose realizations are [p], [f], [t], [θ], [s], [tʃ], [ʃ] and [k] in Yorkshire assimilation context will be characterized by either the relevant feature "voiced" or the relevant feature "voiceless". As for the four remaining consonants that occur in the same context, viz., [m], [n], [ŋ] and [l], the difference between a voiced consonant and a voiceless consonant is irrelevant, as all these consonants are voiced. These four consonants should not nevertheless be disregarded in our task of determining the identities of the distinctive units occurring in Yorkshire assimilation context.

The following shows how my phonological analysis is carried out of all the distinctive units occurring in Yorkshire assimilation context.

(1) The differential comparison among [p], [f], [t], [θ], [s], [tʃ], [ʃ] and [k] yields the relevant features “labial” (attributable to the two distinctive units whose realizations are [p] and [f], respectively), “apical” (attributable to the distinctive units whose realizations are [t] and [θ], respectively), “hiss” (attributable to the distinctive unit whose realization is [s]), “hush” (attributable to the distinctive unit whose realization is [ʃ]), and “dorsal” (attributable to the distinctive unit whose realization is [k]).

(2) The differential comparison between [p] and [f], between [t] and [θ] and between [tʃ] and [ʃ] yields the relevant feature “plosive” (attributable to the distinctive units whose realizations are [p], [t] and [tʃ], respectively) and the relevant feature “fricative” (attributable to the distinctive units whose realizations are [f], [θ] and [ʃ], respectively). Note that the distinctive unit whose realization is [k], does not receive the relevant feature “plosive”, as [x] (voiceless dorsal fricative) does not occur.

(3) The differential comparison between [p] and [m], between [t] and [n] and between [k] and [ŋ] yields the relevant feature “non-nasal” (attributable to the distinctive units whose realizations are [p], [t] and [k], respectively) and the relevant feature “nasal” (attributable to the distinctive units whose realizations are [m], [n] and [ŋ], respectively).

(4) The differential comparison between [m], [n] and [ŋ] yields the relevant features “labial”, “apical” and “dorsal” (attributable to the distinctive units whose realizations are [m], [n] and [ŋ], respectively).

(5) The only remaining consonant occurring in Yorkshire assimilation context is [l]. The only direct minimal differentiation that [l] enters into is with [t] and [d]. How are [l] and [t], and [l] and [d], distinguished from each other? It is obvious that apicality which all of [l], [t] and [d] share is irrelevant for us in eliciting the relevant feature attributable to the distinctive unit whose realization is [l]. We will notate this distinctive unit by /l/. What we look for is a relevant feature that is attributable to /l/ and by virtue of which /l/ is distinguished from /t/ and /d/. The difference between [l] on the one hand and [t] and [d] on the other is that the former is laterally articulated and the latter centrally articulated. It is laterality in [l] that differentiates it from [t] and [d]. We will therefore attribute the relevant feature “lateral” to /l/ whose realization is [l]. This distinctive unit is differentiated from all the other distinctive units occurring in the context by being “lateral”.

(6) On the basis of the findings shown above ((1) to (5)) and by collating the findings, I am now ready to determine the phonological contents (in terms of relevant features) of all 12 distinctive units occurring in Yorkshire assimilation context.

“labial non-nasal plosive”	the distinctive unit whose realization is [p]
“labial fricative”	the distinctive unit whose realization is [f]
“apical non-nasal plosive”	the distinctive unit whose realization is [t]
“apical fricative”	the distinctive unit whose realization is [θ]
“hiss”	the distinctive unit whose realization is [s]
“hush plosive”	the distinctive unit whose realization is [tʃ]
“hush fricative”	the distinctive unit whose realization is [ʃ]
“dorsal non-nasal”	the distinctive unit whose realization is [k]
“labial nasal”	the distinctive unit whose realization is [m]
“apical nasal”	the distinctive unit whose realization is [n]
“dorsal nasal”	the distinctive unit whose realization is [ŋ]
“lateral”	the distinctive unit whose realization is [l]

The reader will have noted that I have so far not revealed which of the distinctive units listed above are phonemes and which are archiphonemes. This will become apparent as we proceed below.

Let us consider, for example, the distinctive unit whose phonological content is “labial non-nasal plosive”. We know that in Yorkshire assimilation context, [p] occurs but not [b], with the result that the distinction between voicelessness and voicedness is impossible in this context. This means that [p] which is non-nasal (as against [m] which also occurs in this context) and plosive (as against [f] which also occurs in this context) and labial (as against [t], [tʃ] and [k] which also occur in this context) cannot be a realization of /p/ which bears the relevant feature “voiceless” by virtue of which /p/ is opposable to /b/ which bears the relevant feature “voiced”. (We recall that /p/ and /b/ have already been established in the course of our phonological analysis of the consonants in ‘word-medial intervocalic context’ (cf. Commutative series 1), in ‘word-initial context (cf. Commutative series 2) and in ‘word-final pre-pausal context’ (Commutative series 3)). We note that /p/ and /b/ are distinguished from each other by virtue of the opposition between “voiceless” (of /p/) and “voiced” (of /b/). When we compare both the phonological contents “voiceless labial non-nasal plosive” (i.e. /p/) and “voiced labial non-nasal plosive” (i.e. /b/) on the one hand and the phonological content “labial non-nasal plosive” that characterizes the distinctive unit whose status we are trying to establish on the other, it is clear that “labial non-nasal plosive” is equal to, on the one hand, “voiceless labial non-nasal plosive” (i.e. /p/) *minus* “voiced” and, on the other, “voiced labial non-nasal plosive (i.e. /b/) *minus* “voiced”. The elimination of the relevant features “voiceless” and “voiced” results from the neutralization of the opposition /p/ - /b/ in Yorkshire assimilation context. In English, there is no other distinctive unit whose phonological content contains “labial non-nasal plosive”. In other words, the phonological content “labial non-nasal plosive”, which is maximally shared by /p/ and /b/, is *exclusive* to this distinctive unit whose status we are trying to establish. This proves the opposition /p/ - /b/ to be an

exclusive opposition.¹² The distinctive unit characterized as “labial non-nasal plosive” is the product of the neutralization of the opposition between /p/ and /b/ in Yorkshire assimilation context, arising as it does from the cancellation of the opposition between “voiceless” (of /p/) and “voiced” (of /b/), and therefore the distinctive unit in question is the *archiphoneme* characterized as “labial non-nasal plosive”. I will notate this archiphoneme by /p-b/. Therefore [p] that we saw earlier in the vertical list of consonants in Yorkshire assimilation context is a realization of this archiphoneme.

Turning now to the 7 other voiceless consonants, viz. [f], [t], [θ], [s], [tʃ], [ʃ] and [k], which also occur in Yorkshire assimilation context, we can confirm the neutralization of the oppositions /f/ - /v/, /t/ - /d/, /θ/ - /ð/, /s/ - /z/, /tʃ/ - /dʒ/, /ʃ/ - /ʒ/ and /k/ - /g/. Consequently we identify 7 archiphonemes, associated with the 7 neutralizations, characterized as, respectively, “labial fricative”, “apical non-nasal plosive”, “apical fricative”, “hiss”, “hush plosive”, “hush fricative” and “dorsal non-nasal”. I will notate these 7 archiphonemes by /f-v/, /t-d/, /θ-ð/, /s-z/, /tʃ-dʒ/, /ʃ-θ/, and /k-g/, respectively.

Now we know that the 8 consonants, viz. [p], [f], [t], [θ], [s], [tʃ], [ʃ] and [k], that occur in Yorkshire assimilation context are realizations, respectively, of the 8 archiphonemes we have established.

Here below is the full list of the 8 archiphonemes we have established, with relevant supplementary information.

- /p-b/ “labial non-nasal plosive” is the archiphoneme associated with the neutralization of the opposition /p/ - /b/, and is realized by [p].
- /f-v/ “labial fricative” is the archiphoneme associated with the neutralization of the opposition /f/ - /v/, and is realized by [f].
- /t-d/ “apical non-nasal plosive” is the archiphoneme associated with the neutralization of the opposition /t/ - /d/, and is realized by [t].
- /θ-ð/ “apical fricative” is the archiphoneme associated with the neutralization of the opposition /θ/ - /ð/, and is realized by [θ].
- /s-z/ “hiss” is the archiphoneme associated with the neutralization of the opposition /s/ - /z/, and is realized by [s].
- /tʃ-dʒ/ “hush plosive” is the archiphoneme associated with the neutralization of the opposition /tʃ/ - /dʒ/, and is realized by [tʃ].
- /ʃ-ʒ/ “hush fricative” is the archiphoneme associated with the neutralization of the opposition /ʃ/ - /ʒ/, and is realized by [ʃ].

¹² For the distinction between ‘exclusive opposition’ and ‘non-exclusive opposition’ as well as the concepts and terms of these two types of phonological opposition, see Akamatsu (1988: 58).

/k-g/ “dorsal non-nasal” is the archiphoneme associated with the neutralization of the opposition /k/ - /g/, and is realized by [k].

Eight out of the 12 distinctive units having been identified as 8 archiphonemes, there remain 4 distinctive units whose status (phonemes or archiphonemes?) is to be examined. The 4 distinctive units in question are characterized as “labial nasal”, “apical nasal”, “dorsal nasal” and “lateral” and are realized by [m], [n], [ŋ] and [l], respectively. The distinctive unit that is realized by [m] can be characterized as “labial nasal”, as ‘labial’ is opposed to “apical” (cf. /n/) and “dorsal” (cf. /ŋ/), and “nasal” is opposed to “non-nasal” (cf. /p-b/). The distinctive unit that is realized by [n] can be characterized as “apical nasal”, as “apical” is opposed to “labial” (cf. /m/) and “dorsal” (cf. /ŋ/), and “nasal” is opposed to “non-nasal” (cf. /t-d/). The distinctive unit that is realized by [ŋ] can be characterized as “dorsal nasal”, as “dorsal” is opposed to “labial” (cf. /m/) and “apical” (cf. /n/), and “nasal” is opposed to “non-nasal” (cf. /k-g/). Finally the distinctive unit that is realized by [l] can be characterized as “lateral”, and is opposed as such to all the other distinctive units occurring in Yorkshire assimilation context. All these 4 distinctive units are phonemes, as none of them are involved in any neutralization.

It is perhaps worth emphasizing that *all* 12 distinctive units, i.e. both the archiphonemes and the phonemes, *are opposed to each other* in the same context, i.e. in Yorkshire assimilation context.

Notice that /h/ definable as “glottal” and /r/ definable as “spirant”, both of which occur in word-medial intervocalic context (cf. Commutative series 1 associated with the phonetic context [hæ – ə]) and in word-initial context (cf. Commutative series 2 associated with the phonetic context [– i:]), do not occur in Yorkshire assimilation context.

Some may wonder why I do not arrive at the determination of the phonological contents of the archiphonemes expediently and directly by identifying the ‘common base’ of the phonological contents of the phonemes of the neutralizable oppositions, these phonological contents having been previously identified in the contexts of maximum or near-maximum differentiation. It must be said that, after all, an archiphoneme is indeed generally defined, as ‘the sum of the relevant features of the member phonemes of a neutralizable opposition’. This definition of an archiphoneme is correct as a theoretical summary of an archiphoneme.¹³ However, such a definition

¹³ Trubetzkoy (1939: 71) defines the archiphoneme as follows: ‘...wir unter Archiphonem die Gesamtheit der distinktiven Eigenschaften verstehen, die zwei Phonemen gemeinsam sind.’ At the end of this definition of the archiphoneme, Trubetzkoy refers us to Jakobson (1929: 8 ff.), but as I see it this cross reference is ‘both unexpected and inappropriate’ (Akamatsu 1988: 215) and I suspect that, as I pointed out (Akamatsu 1988: 461, n. 329) this cross reference is not found at the corresponding point straight after Trubetzkoy’s definition of the archiphoneme in Trubetzkoy (1936: 32). It may have been the case that Jakobson, as editor of Trubetzkoy (1939) after Trubetzkoy’s death,

cannot necessarily, and should not safely, be applied, *as a pragmatic device by which to identify archiphonemes*. I have entered this cautionary plea in some of my past writings.¹⁴ What I do, and have done in the present paper too, is to determine the phonological content of the distinctive unit (that later reveals itself to be an archiphoneme) through the commutation test conducted with regard to the context where there occurs the sound (in the present case, a voiceless consonant) that reveals itself to be the realization of the distinctive unit (ultimately identified as an archiphoneme). In executing this task, I examine at the initial stage of phonological analysis the differential relationship among the 12 consonants occurring in Yorkshire assimilation context. This examination is carried out, so to speak, independently of the distinctive units whose phonological contents have previously been identified in the contexts of maximum or near-maximum differentiation. After the 12 distinctive units in question (whose realizations are [p], [f], [t], [θ], [s], [tʃ], [ʃ], [k], [m], [n], [ŋ] and [l], respectively) have been identified in terms of the relevant features (i.e. their phonological contents) as a result of the phonological analysis of the 12 consonants occurring in Yorkshire assimilation context, I discover, when comparing the phonological contents of the 12 distinctive units with those of the distinctive units that have previously been identified in the contexts of maximum or near-maximum differentiation, that the phonological contents of 8 of the 12 distinctive units correspond to the common bases of the phonological contents of 8 pairs of the previously established phonemes (i.e. /p/ and /b/, /f/ and /v/, /t/ and /d/, /θ/ and /ð/, /s/ and /z/, /tʃ/ and /dʒ/, /ʃ/ and /ʒ/, and /k/ and /g/) and the “voiceless” – “voiced” opposition that serves to distinguish from each other the members of the pairs of phonemes is nullified in Yorkshire assimilation context. This is why we can identify the 8 distinctive units in question as the archiphonemes associated with the neutralization of the opposition between the phonemes of each pair. This is exactly the procedure I followed in identifying the archiphonemes in Yorkshire assimilation context.

Besides, the application of ‘common base’ to the exclusion of the commutation test with regard to the context that turns out to be the context of neutralization may

added the cross reference. I myself defined the archiphoneme as follows in Akamatsu (1988: 199): ‘THE ARCHIPHONEME IS A DISTINCTIVE UNIT WHOSE PHONOLOGICAL CONTENT IS IDENTICAL WITH THE RELEVANT FEATURES COMMON TO THE MEMBER PHONEMES OF A NEUTRALIZABLE OPPOSITION, WHICH IS DISTINCT FROM ANY OF THESE MEMBER PHONEMES AND WHICH OCCURS IN THE POSITION OF NEUTRALIZATION [the capitals as in the original].’ Martinet (1960: III-18) defines the archiphoneme as follows: ‘...l’archiphonème...est l’ensemble des traits pertinents, communs à deux ou plus de deux, phonèmes qui sont seuls à présenter tous.’ All these definitions are acceptable (except that Trubetzkoy’s mention of ‘zwei Phonemen’ is obviously unacceptable). But as I will go on to emphasize in the text of this paper, these definitions are not meant to be operationally followed in eliciting archiphonemes which should be elicited through the commutation test.

¹⁴ My first paper in which I discussed this issue was Akamatsu (1973). See also Akamatsu (1992: 90-2).

lead in some cases to an erroneous identification of the phonological content of the archiphoneme. Here is one such case, which I discussed in several writings in the past. In English, in a certain style of speech, the opposition between /m/ “labial nasal” and /n/ “apical nasal” may be neutralized before /f/ or /v/ (cf. *infer*, *invent*, *comfort*, *convent*, etc.) and the archiphoneme associated with this neutralization is realized by [m], i.e. a labio-dental nasal. What is the phonological content of the archiphoneme /m-n/? Recourse to the criterion of ‘common base’ would lead to the archiphoneme /m-n/ being characterizable as “nasal”, as the common base of /m/ and /n/ is “nasal”.¹⁵ This is plainly erroneous, as the relevant feature “nasal” occurs also in /ŋ/ “nasal dorsal”, and the neutralizable opposition /m/ - /n/ would have to be considered a non-exclusive opposition. This is untenable. Such an error results from disregarding two essential points. Firstly, the task of identifying the archiphoneme should be conducted *during the course of the commutation test* whereby the distinctive unit that proves to be the archiphoneme /m-n/ can be found to be opposed to /ŋ/ among other distinctive units susceptible of occurring in the same context, i.e. the context of neutralization of /m/ - /n/. Secondly, recourse to the application of ‘common base’ in a case like the above (and there are a number of similar cases in various languages) loses sight of the fact that a neutralizable opposition is bound to be an exclusive opposition.

Correctly, the phonological content of this archiphoneme /m-n/ should be “non-dorsal nasal”, as the archiphoneme /m-n/ “non-dorsal nasal” is opposed to /ŋ/ “dorsal nasal” in the same context, and the opposition /m/ - /n/ which is neutralizable in that context is indeed an exclusive opposition as “non-dorsal nasal” is not found in any other distinctive unit in English, be it a phoneme or another archiphoneme. The correct identification of the archiphoneme /m-n/ associated with the neutralization of /m/ - /n/ before /f/ or /v/ is ensured by recourse to the commutation test in the very context where [m] (which is a realization of the archiphoneme /m-n/ before /f/ or /v/) is distinct from [ŋ] (which is a realization of /ŋ/). That the opposition /m/ - /n/ is an exclusive opposition is of course no surprise, as it is a neutralizable opposition. The ‘cautionary’ procedure I follow during the course of the commutation test is certainly laborious as I examine what opposition the distinctive unit that proves to be the archiphoneme /m-n/ enters into in the context of neutralization of the opposition /m/ - /n/. This procedure guarantees arriving at the correct result.

I know that, in a number of other cases, the phonological content of an archiphoneme arrived at through the criterion of ‘common base’ agrees correctly with that arrived at only through the laborious but sure-fire procedure I recommend and have demonstrated above. This is exactly what happens in identifying the phonological

¹⁵ If the common base of /m/ and /n/ is “nasal”, so is the common base of /m/ and /ŋ/ and also the common base of /n/ and /ŋ/. We would be hard put to know which opposition is neutralized: /m/ - /n/, /m/ - /ŋ/ or /n/ - /ŋ/? The second and third oppositions (/m/ - /ŋ/, /n/ - /ŋ/) would easily and quickly be rejected by anyone who acknowledges that /ŋ/ is susceptible of occurring before /f/ or /v/ (cf. *ring finger* [...ŋ f...], *long veil* [...ŋ v...]) in the context where /m/ - /n/ is neutralized.

contents of all the archiphonemes resulting from the neutralizations that occur in Yorkshire assimilation context. To cite just one more example from English, the phonological content of the archiphoneme associated with the neutralization of the opposition /m/ - /n/ - /ŋ/ in the contexts ‘before /p/ or /b/’ (cf. *lamp*, *iamb* when pronounced [-mb]), ‘before /t/ or /d/’ (cf. *tent*, *tend*), ‘before /k/ or /g/’ (cf. *anchor*, *anger*) and ‘before /tʃ/ or /dʒ/’ (cf. *hunch*, *hinge*) is “nasal”, and this phonological content, which is correct, can be arrived at through either of the procedures mentioned above. There is a definite reason why the correct result is arrived at through either procedure, but I need not enter into a discussion of this topic in the present paper.

Some may also wonder why I do not phonologically solve Yorkshire assimilation in terms of ‘defective distribution’ or ‘limited distribution’ of /b/, /v/, /d/, /ð/, /z/, /dʒ/, /ʒ/ and /g/, and consequently in terms of the occurrence of only /p/, /f/, /t/, /θ/, /s/, /tʃ/, /ʃ/ and /k/. My answer is that I do not subscribe to either the principle ‘once a phoneme, always a phoneme’, a principle which in no way takes the concept of ‘opposition’ into account, or the simplistic application of the criterion of ‘phonetic similarity’. I rigorously base the task of identifying phonological units on the principle of ‘opposition’, which is basically Saussurean. Neutralization of a phonological opposition is one of the inevitable consequences of phonological analyses based on the principle of ‘opposition’.

I have mentioned that, in my view and according to my interpretation, Yorkshire assimilation results in 8 neutralizations of oppositions, which are /p/ - /b/, /t/ - /d/, /f/ - /v/, /θ/ - /ð/, /s/ - /z/, /tʃ/ - /dʒ/, /ʃ/ - /ʒ/ and /k/ - /g/, and consequently I have established 8 archiphonemes associated, respectively, with these 8 neutralizations. It is well known that, in English, after /s/, there occurs the neutralization of the opposition /t/ - /d/ (cf. *stale*), that of the opposition /p/ - /b/ (cf. *speak*), and that of the opposition /k/ - /g/ (cf. *skin*), though these neutralizations do not necessarily occur after /s/ in all cases (cf. *discussed* - *disgust*).¹⁶ It is assumed that these neutralizations take place in the speech of those who manifest Yorkshire assimilation as well as in the practice of many other speakers. The 3 neutralizations mentioned just above give rise to the associated 3 archiphonemes, viz. /p-b/ “labial non-nasal plosive”, /t-d/ “apical non-nasal plosive” and /k-g/ “dorsal non-nasal”, respectively. Note that the rest of the neutralizations I have mentioned in connection with Yorkshire assimilation, viz. those of /f/ - /v/, /θ/ - /ð/, /s/ - /z/, /tʃ/ - /dʒ/ and /ʃ/ - /ʒ/, do not occur ‘after /s/’. The reason why I consider that the neutralizations of /p/ - /b/, /t/ - /d/ and /k/ - /g/ in Yorkshire assimilation context on the one hand and the neutralizations of the same 3 oppositions ‘after /s/’ on the other yield the same 3 archiphonemes (/p-b/, /t-d/ and /k-g/) is simply that each of these 3 archiphonemes has an *identical phonological content* in both contexts of neutralization, namely, /p-b/ “labial non-nasal plosive”, /t-d/ “apical non-nasal plosive” and /k-g/ “dorsal non-nasal”, respectively. It is not important that the *realizations* of these 3 archiphonemes *differ* in connection with Yorkshire assimila-

¹⁶ Akamatsu (1997: 19 *et passim*).

tion on the one hand and ‘after /s/’ on the other. In Yorkshire assimilation context we have [p], [t] and [k] that are ‘voiceless fortis’, while ‘after /s/’ we have [p], [t] and [k] that are describable as ‘voiceless lenis unaspirated’. An archiphoneme may not and need not be realized by the same sound in different contexts of neutralization. It may be realized by Sound A in one context of neutralization and Sound B in another context of neutralization, and so on. This can also be the case even in one context of neutralization where Sound A and Sound B both occur in free variation, as in the case of the neutralization of /e/ - /ɛ/ in French in word-non-final open syllable (see below). What crucially matters is the phonological content of the archiphoneme, which determines its identity, no matter how the archiphoneme may be realized in the same context or different contexts of neutralization. As Martinet says,¹⁷

Fonctionnellement [Martinet’s italics], la façon dont se réalise la neutralisation n’importe pas. Seule est décisive l’impossibilité de réaliser l’opposition...

It is customary that, at the end of the phonological analysis of a language, the researcher presents a list of the distinctive units of the second articulation that he has established. These are the phonemes, and also the archiphonemes if any, of the language. In the case of the type of spoken English that is subject to Yorkshire assimilation, all 22 consonant phonemes established in the context of maximum differentiation (e.g. ‘word-medial intervocalic context’ associated with Commutative series 1) go into the list. Also to be included in the list are: all the 8 consonant archiphonemes that occur in Yorkshire assimilation context; all the consonant archiphonemes that result from other neutralizations of consonantal oppositions (care should be taken not to double-count one and the same archiphoneme (e.g. /p-b/) that appears in different contexts of neutralization); all vowel phonemes which can be established in the context of maximum differentiation; and all the vowel archiphonemes that occur in contexts of neutralization of vocalic oppositions.

The above concludes the account of my own phonological analysis of Yorkshire assimilation.

Unlike the majority of phoneticians and phonologists working in theoretical frameworks different from mine, I do not subscribe to the interpretation according to which the voiceless consonants ([p], [t], [f], etc.) into which their corresponding voiced consonants ([b], [d], [v], etc.) are said to change in Yorkshire assimilation context are identified as (allophones of) the *corresponding voiceless phonemes*, i.e. /p/, /t/, /f/, etc. The customary interpretation known to me is compatible with the principle of ‘once a phoneme, always a phoneme’, which is closely associated with Bloomfieldians and Jonesians but to which I do not subscribe. This interpretation would lead to the so-called ‘defective distribution’ or ‘limited distribution’ in the present case. In other words, /p/, /t/, /f/, etc. occur, but not /b/, /d/, /v/, etc., in Yorkshire assimilation context.

¹⁷ Martinet (1968: 5).

But how do Bloomfieldians and Jonesians identify phonologically the voiceless consonants ([p], [t], [f], etc.) that occur in Yorkshire assimilation context? In, for instance, ['bratfəd] *Bradford* and ['bratfət 'sɪtɪ] *Bradford City*, it is most likely that [t]'s in these examples will each be regarded as an allophone of /t/, and that will be all there is to it. The Bloomfieldians' and Jonesians' explanation would be that [t]'s in ['bratfəd] and ['bratfət 'sɪtɪ] are phonetically similar to [t]'s which occur in other phonetic contexts in English. Anyhow, their conclusion is that [t]'s in, for example, ['bratfəd] and ['bratfət 'sɪtɪ], are allophones of /t/ which occurs in *tea* /ti:/ [t^hi:], *mutton* /'mʌtn/ ['mʌtn], *hit* /hɪt/ [hɪt], and even *storm* /stɔ:m/ [stɔ:m] as they would phonologically notate. (Manifestly we have articulatorily dissimilar [t]'s here, however.) Their analysis is based on the criterion of 'phonetic similarity' and the principle 'once a phoneme, always a phoneme'.

Earlier in the present paper, on p. 133, I noted that Ward, in adducing the example of *Bradford* (my boldface) in connection with 'Yorkshire assimilation' (though she does not use this expression), mentions [ʔ] only, not [t] as well which other phoneticians mention. I am inclined to understand that the archiphoneme /t-d/ that I have established in Yorkshire assimilation context has two realizations, [t] and [ʔ]. That an archiphoneme may have more than one realization in the same context is not infrequent. For example, in French, the opposition /e/ - /ɛ/ (cf. *fé* /fe/ - *fait* /fɛ/) is neutralized in word-non-final open syllable context (as in e.g. *maison*) and the associated archiphoneme /e-ɛ/ characterized as "front mid (= "non-1st-degree non-4th-degree") unrounded" is realized by [e] or [ɛ] or in fact by any front vowel whose degree of opening lies between [e] and [ɛ]. The case of [t] and [ʔ] as two possible realizations of the archiphoneme /t-d/ is comparable to the case of varied realizations of the archiphoneme /e-ɛ/, except that the realizations in the former case are limited to just two in number ([t], [ʔ]) while those in the latter case are more than two ([e] ... [ɛ]) and that, in my view, the occurrence of [t] precedes [ʔ] in the two-stage phonetic process I mentioned further above, on p. 133, but a conceivable two-stage phonetic process is irrelevant to our French example.

Recognition of the fact that both [t] and [ʔ] occur in Yorkshire assimilation context leads me to reformulate the information earlier given about the archiphoneme /t-d/ "apical non-nasal plosive" as follows.

(a) The archiphoneme /t-d/ "apical non-nasal plosive", the product of the neutralization of the opposition /t/ - /d/, is realized by [t] or [ʔ].

Or to put it in reverse order,

[t] or [ʔ] is a realization of the archiphoneme /t-d/ "apical non-nasal plosive", the product of the neutralization of the opposition /t/ - /d/.

However, recognition of only [ʔ], by skipping the occurrence of [t], as Ward does, would need a further reformulation such as follows.

(b) The archiphoneme /t-d/ “apical non-nasal plosive”, the product of the neutralization of the opposition /t/ - /d/, is realized by [ʔ].

Or to put it in reverse order,

[ʔ] is a realization of the archiphoneme /t-d/ “apical non-nasal plosive”, the product of the neutralization of the opposition /t/ - /d/.

This latter reformulation (i.e. (b)) is attended with the difficulty of explaining why [ʔ] occurs, a sound that has nothing to do with the apically articulated consonant, [t]. The occurrence of [ʔ] instead of [t] can best be explained in terms of ‘[t] > [ʔ]’. Why ‘[t] > [ʔ]’ happens will be explained below.

I am of the opinion that the former reformulation (i.e. (a)) of the archiphoneme is preferable.

My solution to the description that [ʔ] (as well [t]) as a realization of the archiphoneme /t-d/ which I have defined as “apical non-nasal plosive” may surprise some readers as there appears at first blush to be incongruity between, on the one hand, the relevant feature “apical” which frequently corresponds to [t] whose articulation necessarily requires apico-alveolar articulation, be it accompanied by the glottal stop or not and, on the other, the glottal closure on its own.

I wish to re-emphasize that the distinctive unit whose realization is [t] or [ʔ] is one and the same distinctive unit, i.e. the archiphoneme /t-d/, as we have seen. This means that both [t] and [ʔ] are functionally identical in spite of their appreciable physical difference. It is of course wrong to try to identify the distinctive unit merely on the basis of the physical nature of its realizations, and this applies to identifying an archiphoneme as well. To do so is actually putting the cart before the horse. We only need to bring back what Martinet says, in the passage I have already quoted further above, in connection with neutralization (and thereby implicitly, the archiphoneme). To repeat,

Fonctionnellement [Martinet’s italics], la façon dont se réalise la neutralisation n’importe pas. Seule est décisive l’impossibilité de réaliser l’opposition...

In connection with my present discussion of Yorkshire assimilation, I would say that how the neutralization of the opposition /t/ - /d/, hence the associated archiphoneme /t-d/, is realized is of minor importance, that is, by [t], or by [ʔ], or by [t] and [ʔ]. This said, it is legitimate on the part of the reader to wish to know *why* [ʔ] occurs at all instead of [t] in the present case. (It should be remembered in this connection that none of the other stops or affricates involved in Yorkshire assimilation has any connection with [ʔ].)

A couple of explanations other than mine spring to mind.

First, it is well known that, as pointed out by Gimson,¹⁸ apical articulation is unstable in English in syllable-final position. This instability affects consonants like [t], [d], [n], [s] and [z], in syllable-final context. These consonants normally produced with apical articulation are easily subjected to regressive assimilation (triggered by consonants that follow them) when occurring in syllable-final context, so that the place of articulation of [t], [d], [n], [s] and [z] undergoes a change.

Gimson does mention the occurrence of [ʔ] in place of /t/,¹⁹ if not specifically in relation to Yorkshire assimilation. We must seek elsewhere for an explanation.

It is conceivable that the instability of the apical articulation of [t] results in this articulation not being achieved in realizing the archiphoneme “apical non-nasal plosive”. If so, no apico-alveolar closure is formed. But it *is* necessary for this archiphoneme to be realized by a stop (cf. the relevant feature “plosive”). If the apico-alveolar closure (required for [t]) does not materialize, another stop in whose articulation the place of closure is not apical must take over the job unfulfilled by [t]. Neither [p] nor [k] is available as they are realizations of the archiphoneme /p-b/ “labial non-nasal plosive” and the archiphoneme /k-g/ “dorsal non-nasal”, respectively, to which the archiphoneme /t-d/ is opposable. The only, and in fact, the only appropriate, stop to take the place of [t] is [ʔ] in whose articulation the necessary closure is achieved by the two vocal folds, that is, by the glottal closure. In other words, [ʔ] functions as a secondary and accessory ‘prop’ for the apical articulation of [t]—this would particularly be the case if [t] is preglottalized or concomitantly glottalized—and can ultimately assume on its own the essential role of being a stop in place of [t] if [t] does not materialize. In this way, the unmissable stop articulation is guaranteed by the occurrence of [ʔ]. Thus, either [t] or [ʔ] fulfils an identical and equally valid function as a realization of the archiphoneme /t-d/. Even when the apico-alveolar articulation that is necessary for [t] does not take place and is missing because of the instability of the alveolar articulation, [ʔ] can take over as it is a stop (the glottal stop) and can assume the full role. I have in the past offered an explanation along this line on the question of *why* [ʔ] occurs in English as a realization of /t/,²⁰ though not in connection with Yorkshire assimilation. The same explanation will hold in connection with a realization of the archiphoneme /t-d/, as in the present case, as well as a realization of the phoneme /t/ in English.

It is assumed that the velic closure (also known as velopharyngeal closure) is taking place when [t] is pronounced (cf. the relevant feature “non-nasal”) so that no pulmonic egressive airstream is allowed to enter the nasal cavity, thus preventing any nasal articulation. The velic closure is irrelevant to the articulation of [ʔ]—it may be

¹⁸ Gimson (1960).

¹⁹ Gimson (1962: 164-5, 1970: 169-70, 1980: 170-1, 1989: 170-1, 1994: 155-6, 2001: 170-1, 2008: 180-1).

²⁰ Akamatsu (2007: 16-7).

present or absent—but it may be suspected that it is likely to be present as, in the present case, [ʔ] substitutes [t].

A different explanation from mine is offered by Wells, who mentions what he calls ‘the principle of least effort’.²¹ Notice, however, that he is specifically concerned with [ʔ] occurring in unaccented intervocalic context (cf. [ˈbeʔə] for *better*, [ˈæʔəm] for *atom*). The particular phonetic context that Wells refers to in proposing this explanation based on ‘the principle of least effort’ does not relate to the syllable-final context followed by voiceless consonants, i.e. the particular context in which Yorkshire assimilation occurs. Wells writes as follows.²²

Another way of simplifying [t] is to abandon the alveolar component, concentrating all the articulatory modifications (switch-off of voicing, plosive occlusion) at the glottis. The outcome in this case is a glottal plosive, [ʔ], as in the typical Cockney (and wider British) pronunciation [ˈbeʔə], [ˈæʔəm].

As can be seen from Wells’s explanation in the above quoted passage, he is concerned with ‘the principle of least effort’ which translates into economizing motor commands to the organs of speech. This is achieved in the present case by doing away with the alveolar articulation normally required. Note that in Wells’s explanation there is no reference, either explicitly or implicitly, to the instability of the English alveolar articulation that Gimson lays emphasis on. Note also that in proposing ‘the instability of English alveolar articulation’, Gimson is not concerned with ‘the principle of least effort’ or economizing the motor commands to the speech organs. It seems therefore that Gimson’s and Wells’s explanations must be considered to be unrelated to each other. Note further that Wells’s explanation is not at all associated with my idea, mentioned above, of the glottal stop serving as a secondary and accessory ‘prop’ for the apical articulation of [t] and ultimately assuming the full role as a stop on its own (i.e. *the* essential role, no longer a secondary or accessory role) in place of [t] in case the apical articulation fails to materialize.

The phonological status of [t] into which [d] is said to change as a result of Yorkshire assimilation does not in general attract many researchers’ attention or engage them in trying to identify the phoneme of which [t] in question is a realization.

For example, Windsor Lewis, in part of the eighth paragraph of his paper entitled ‘Some Variations in Spoken English’ (undated, unpublished and unpaginated),²³ writes:

²¹ Wells (1982: 94).

²² As fn. 21.

²³ Windsor Lewis’s article in question entitled ‘Some Variations in Spoken English’ can be consulted at the website ‘The home page of Jack Windsor Lewis’. Once the reader has reached this website, go to ‘3. English Language’, then to ‘10. Some Variations in Spoken English’.

[...] the final soft consonants /b, d, g, dʒ, v, ð, z, ʒ/ of a preceding syllable are habitually converted to their corresponding sharp equivalents /p, t, k, tʃ, f, θ, s, ʃ/ under the influence of a following sharp consonant.

Hughes & Trudgill adduce the examples of *Bradford* and *could swing* (my bold-face) and proceed straightaway to give the phonological notation /brætʃəd/ and /kʊtswɪŋ/.²⁴ This is perfectly compatible with the practice of those many researchers whose phonetic and phonological theory is such as to simply convert square brackets (used for phonetic notation) into diagonal bars (used for phonological notation). This practice on their part is compatible with the principle of ‘Once a phoneme, always a phoneme’ and, in addition, with operating with the criterion of ‘phonetic similarity’, in establishing phonemes. This is evident in the works of Wells, Windsor Lewis, Hughes, Trudgill, and a host of other researchers.

Wells, when considering in general terms [ʔ] in connection with /t/ in English, makes it clear that he regards [ʔ] as an ‘allophone’ of /t/. He writes in *LPD*, of which he is the sole compiler, as follows.²⁵

It [a glottal stop] may be used as an allophone of the phoneme t in certain positions. This is known as “glottalling”, or “glottal replacement”.

In his ‘My daily phonetic blog’ on J. C. Wells Homepage (at his website on the internet), Wells unambiguously says (22 November 2006):

[...] I treat the glottal stop as an allophone of /t/ [...]

It can be conjectured that Wells’s interpretation, if he is asked for it, about [ʔ] (occurring as it does as an alternative to [t]) in the phenomenon of Yorkshire assimilation would be that [ʔ] is an ‘allophone’ of /t/, which also has [t] as another allophone. His interpretation would certainly not involve the concepts of neutralization and the archiphoneme, still less ‘opposition’, and his notion of the phoneme has nothing to do with relevant features. One can surmise what justification Wells as well as Jones, Gimson and a host of other phoneticians would be prepared to offer for regarding [ʔ] (as well as [t]) as belonging to /t/ in English. In terms of the criterion of ‘phonetic similarity’, would they talk about ‘auditory’ similarity rather than ‘articulatory’ similarity, as this latter is out of the question where [ʔ] and [t] are concerned? It seems to me that the criterion of ‘phonetic similarity’ which is frequently resorted to along with

²⁴ These phonological notations by Hughes & Trudgill for these examples appear in Hughes & Trudgill (1979: 58, 1987: 63, 1996: 90). Note that Hughes, Trudgill & Watt (2005: 95) give, for the same two examples, the phonetic notations [ˈbrætʃəd] and [ˈkʊtswɪŋ] where they consider [ʔ] as a realization of /t/ without, however, giving the corresponding phonological notations. It may safely be assumed that their phonetic notations here would correspond to the same phonological notations given in Hughes & Trudgill (1979: 58, 1987: 63, 1996: 90).

²⁵ Wells (1990: 307).

the criterion of ‘complementary distribution’ in establishing a phoneme involves ‘auditory similarity’. I find the following lines in one of the works by Jones.²⁶

The relationship between sounds in a phoneme may be acoustic or organic [i.e. articulatory]. For instance, in the case of **t** and the glottal stop [ʔ], which probably belong to one phoneme in some types of English (§§ 618, 620), the relationship is acoustic; to the ear they have a certain similarity in some situations in spite of the great difference in their manner of formation.

Jones’s term ‘organic’ above is of course equivalent to ‘articulatory’, and I would prefer the term ‘auditory’ to his term ‘acoustic’ in phrases like the above. It would not be impossible, if one included ‘auditory similarity’ under the umbrella notion of ‘phonetic similarity’, for many researchers to consider both [t] and [ʔ] (as well as other relevant consonants such as preglottalized or concomitantly glottalized [t]) to be ‘allophones’ of /t/.

Wells gives a reason, different from that of an ‘auditory similarity’, why he regards [t] and [ʔ] as ‘allophones’ of one and the same phoneme, i.e. /t/. He writes as follows.²⁷

Of all putative co-allophones in accents of English, the phonetically most dissimilar – at least from the articulatory point of view – are the alveolar [t] and the glottal [ʔ], which in many British accents are presumably to be analysed as co-allophones of one phoneme, /t/. The gross difference in their place of articulation is all the more striking in that they straddle the place of [k] (and variants), which belong to the different phoneme /k/. Yet apart from this the grounds for grouping [t] and [ʔ] together are strong, since they do not contrast in syllable-final position, and in many cases alternate freely, as when people pronounce *right* sometimes as [raɪʔ] and sometimes [raɪt].

My reading is that Wells clearly recognizes phonetic *dissimilarity*, at least articulatory dissimilarity, though it is not clear to me whether or not he recognizes auditory similarity as well. At any rate, Wells appears to be somewhat more positive about assigning [t] and [ʔ] to one and the same phoneme, /t/, than does Jones. One specific reason Wells adduces for his analytical course of action is, as seen in his passage quoted above, that [t] and [ʔ] do not ‘contrast with’ (I would say ‘are not opposed to’) each other in syllable-final context ([raɪʔ], [raɪt]), which leads him to interpret [t] and [ʔ] as allophones of one and the same phoneme, i.e. /t/.

The interpretation that /t/ may be realized by [ʔ] in British English is not at all surprising to me. As a matter of fact, in a paper by me earlier referred to, I presented my own phonological analysis of the use of [ʔ] on its own in R.P. and non-R.P. in syllable-final context where we might expect [t] (with co-occurring [ʔ] or otherwise) (e.g. *bat* [bæʔ], *Atkins* [ˈæʔkɪnz], *that year* [ˈðæʔ ˈjɜː], and I arrived at the conclusion

²⁶ Jones (1950: § 33, 1962: § 33, 1967: § 33).

²⁷ Wells (1982: 44).

that [ʔ] is the realization of /t/ characterizable as “voiceless apical non-nasal plosive”, even though [ʔ] does not involve apical articulation.²⁸ My reasoning for reaching this conclusion does not involve a conceivable phonetic process that I schematically showed in the form of ‘[t] > [ʔ]’ earlier in the present paper. It is entirely based on the result of the commutation test. I am also aware of an archiphoneme whose sole realization is [ʔ] in British English. This archiphoneme is also arrived at with regard to some other context. I arrive at this archiphoneme while analyzing the speech of those (some users of R.P. as well as those of non-R.P.) who pronounce *map* [mæʔ], *mat* [mæʔ], *mack* [mæʔ], *limply* [ˈlɪmʔli], *neatly* [ˈniːʔli], and so on, in which [ʔ] occurs in syllable-final context. In this case the archiphoneme is the product of the neutralization of the opposition between /p/, /t/ and /k/ and notated by /p-t-k/ and characterized as “voiceless non-hush non-nasal plosive”.²⁹ The relevant feature “plosive” here results from the inclusion of the phoneme /x/ “dorsal fricative”, consequently defining the phoneme /k/ as “voiceless dorsal non-nasal plosive”. However, within the confines of the present paper, in which /x/ is not included, the phonological content of the archiphoneme /p-t-k/ should instead be “voiceless non-hush non-nasal”. It is therefore a different archiphoneme from the archiphoneme /t-d/ “apical non-nasal plosive” that I have arrived at in my analysis of Yorkshire assimilation in the present paper.

I have endeavoured in the present paper to bring to a wider audience’s attention the phenomenon of ‘Yorkshire assimilation’, with which even many readers interested in English phonetics may not necessarily be familiar, and then to offer within the framework of functional phonology my own phonological analysis with a view to determining the phonological status of the voiceless consonants into which the corresponding voiced consonants are said to be converted as a result of Yorkshire assimilation. I have further presented a phonological assessment of those voiceless consonants given by a large section of phoneticians whose theoretical framework differs from mine and discussed a few issues that pertain to their phonological assessment.

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²⁸ Akamatsu (2007: 8-12).

²⁹ Akamatsu (2007: 12-7).

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