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Consonantal alternations in Polish and English  
A survey of research problems

While alternations of linguistic units at the phonological level had always been recognised in serious studies of the sound structure, it was only with the advent of generative phonology that they were placed in the centre of interest. Interpreting sound alternations had also been regarded as significant — in point of fact Kruszewski (1881/1967), Baudouin de Courtenay (1894) and other early structuralists attached considerable importance to the study of alternations; within classical structuralism, both in Europe and America, morpho(n)ology was recognised as a legitimate discipline with specific objectives of its own and a theoretical apparatus to pursue these objectives (see Fischer-Jørgensen 1975). Morphophonology as the study of the phonological structure of morphemes was normally based on and conditioned by a prior phonological (phonemic) analysis and in this sense it came second: it covered whatever alternations were left after the completion of the phonological analysis. Generative phonology, by rejecting the structural tradition of a phonological analysis (including the phonemic level) reversed the relative importance attached to various types of phenomena — in particular, alternations in the shape of morphemes came to be viewed as significant, while purely phonetically conditioned modifications were relegated to detail rules and usually disregarded in descriptions. Within this tradition morphological alternations are treated as the major source of information concerning the phonological rules of a language. Phonology is then inextricably linked with grammar or, in other words, phonological rules are manifested in the grammatical (mostly morphological) structure; morphological alternations came to be regarded as exponents of the phonological structure.

Generative phonology has introduced important innovations as far as the identification of morphological alternations is concerned, i.e. the very fact that a given word or morpheme appears in two or more shapes does not necessarily mean that we are dealing with an alternation or, granting that the alternation is genuine, it gives no clue as to how the alternation is to be interpreted. We will now consider one aspect of the problem, namely we will argue for a non-mechanical approach in dealing with alternations.

There are conditions, which may be called systemic prerequisites, that a given alternation must meet in order to qualify as a genuine exponent of phonological regularities of some language. The gist of the prerequisite consists in the fact that a process which a given alternation seems to reveal cannot be isolated in the language but must be systematically confirmed. If this is not the case, the alternation must be reinterpreted in the light of some other process or must be treated as marginal, i.e. outside the prevailing system. In English for example one can find instances of the alternation [r - s], e.g. adhering - adhesive; since there are very few words exhibiting this alternation, the fact of its existence remains a lexical curiosity which, at best, can be reflected by an allomorphy rule (in the sense of Aronoff 1976). Not every case, however, is as simple as that. Consider the Polish verbs with the root ending in the voiceless dental plosive /t/ which take /a/ as the verbalising suffix, e.g.: szept 'whisper, n.' - szeptac 'id. vb.', kiopot 'trouble, n.' - kiopotac 'id. vb.'. This root-final [t] alternates with [c] in certain verbal forms: obligatorily in the imperative (szept[c], kiopot[c] etc.) and optionally in the 1st pers. pl. present tense where [c] is also admitted (szept[c]ę / szept[c]ę, kiopot[c]ę / kiopot[c]ę etc.). With the exception of a case discussed directly below, the alternation [t - c] is completely isolated in Polish; in fact we might say that it does not occur as an alternation but rather as a highly restricted variation of a different and regular alternation, viz. [t - c].

Systemic prerequisites do not necessarily have to refer to the phonological entrenchment of an alternation but may involve morphological, specifically, derivational structure just as well. Consider examples of the other case of the [t - c] alternation in Polish: broda[t] 'bearded' - broda[c] 'bearded man', bogal[t] 'wealthy man', bogal[c] 'wealthy man', kudzia[t] 'curly' - kudzia[c] 'man (and-

mal) with rich curls'. On the face of it, the final plosive of the adjective is turned into the affricate of the nominalisation. The situation is actually very different since what we are dealing with here is not an alternation but rather two distinct suffixes: the adjective forming suffix -at- (cf. broda 'beard', kudzia 'top of hair') and the noun forming suffix -ac- (also found in palacz 'smoker', siacz 'athlete' and numerous other formations, see Gregorzczkova & Puzynina 1979:93-100). The two suffixes -at- and -ac- are very different from the point of view of their functions whereas formally they just happen to share the same vowel, which is of no significance; thus the suspected [t - c] alternation turns out to be no alternation at all.

Our discussion so far has been intended to show that the concept of a morphological alternation is not a primitive one; deciding whether something is or is not an alternation cannot be done without a prior morphological analysis and without at least some general understanding of the phonological processes operative in the language. This, of course, verges on the circular with morphological alternations determining the phonological rules and the phonological rules deciding upon alternations; the dilemma here is more theoretical than real and simply requires that the linguist should consider his data very carefully.

Another reason why morphological alternations have to be handled with care is that very often they do not yield any direct evidence as to the phonological rules which underlie them. In other words, morphological alternations need to be analysed since in a great many cases the alternating segments result from the cumulative effect of several distinct phonological processes. These processes are often completely independent even if they interact in specific derivations. Consider from this point of view the Polish alternation [r - k] as in the word k[r]ę 'iceberg' - k[k]ę 'loc. sg.'. It is not only the relative unnaturalness of a process that would have to be postulated in order to capture the alternation that makes us look at it as a composite structure; the existence of additional alternations such as marc[k] 'carrot, dim. gen. pl.' - marc[r] 'gen. sg.' justifies a rule unvoicing spirants after a voiceless obstruent (Gussmann 1978:117-118). Once we abstract away the effect of progressive assimilation for the second member of our pair (i.e. krze), we face an alternation between [r] and [k] which is found in numer-

ous contexts within Polish phonology and morphology. These contexts also require other alternations, in particular between non-palatal-

ised anterior consonants and their palatalised equivalents, e.g.: [s - ʃ] (lo[ʃ]e 'late' - lo[ʃ]e 'loc. sg. '), [z - ʒ] (ko[ʒ]a 'goat' - ko[ʒ]e 'loc. sg. ') etc. Thus the basic phonological regularity underlying the alternation [r - ʒ] is a process of palatalisation; when stated in its most general form and covering all consonants the process makes consonants [high, -back]. This means that the alternation noted at the outset is the cumulative result of at least four rules: palatalisation whereby r → r̄, obstruent formation whereby r̄ → ʒ, depalatalisation ʒ → ʒ̄ and finally progressive unvoicing ʒ̄ → ʒ.

A similar case might be made for such surface alternations in English as [d - s] e.g.: deci[s]e - deci[s]ive, comprehe[n]d - comprehe[n]sive etc. Here the plosive undergoes spirantisation to /z/ and subsequent unvoicing rather than being modified with one fell swoop.

As can be seen from these remarks an analysis of morphological alternations couched in terms of surface segments can be utterly fallacious; in order to be significant it has to take into account the systemic prerequisites, which means interpreting a given alternation against the background of the morphological and phonological structure of the language. The former requires some understanding of the word formation rules of the language since they primarily justify morphological divisions of words and morphological boundaries; the latter on the other hand encourages the search for an interpretation of alternations which is general and natural in terms of rules, of the modifications those rules introduce and the contexts of their applicability. Since the concepts of generality and/or naturalness are notoriously difficult to justify, it is hardly surprising that conflicting interpretations of the same sets of data have at times been put forward.

In the remaining part of this paper a survey will be offered of the major phonological rules of Polish and English consonantal phonology as these rules are reflected in morphological alternations. The alternations and the rules have been extensively studied and hence no detailed justification of the processes will be presented; relying on past work in the field we shall indicate the areas of relative agreement among scholars as well as marking problems that continue

to be controversial. We begin our survey by looking at the major consonantal phenomena in Polish.

The central rules of the Polish consonantal phonology cluster round the processes of palatalisation; these include not only rules palatalising segments, and depalatalising them in required contexts but also late rules which provide detailed phonetic specifications which at times have little if anything to do with palatal quality. In other words, if we follow the phonetic tradition of regarding the process of palatalisation as consisting in the addition of feature specifications [high, -back] to a given segment, then some surface reflexes of palatalisation that we find in Polish are not palatalised at all. What allows us to speak about palatalisation in the first place? To answer the question let us look at the way consonants are modified when a suffix starting with a front vowel is added to them. For the moment we restrict our attention to the diminutive suffix /ik/ added to nouns that all end in an anterior consonant, e.g.: sklep [p] 'shop' - sklep[ɨ]k, spos [b]ɣ 'method, noun, pl.' - spos[ɨ]k, chle [v] 'pigsty' - chle[ɨ]k, punk [t] 'point' - punk[ɨ]k, skia [d] 'stove, gen. sg.' - skia[ɨ]k, gic [s] 'voice' - gic[ɨ]k, oboc [z] 'camp, gen. sg.' - oboc[ɨ]k, dwa [n] 'carpet' - dwa[ɨ]k, ɔt [r] 'rascal' - ɔt[ɨ]k, artuku [v] 'article' - artuku[ɨ]k.

Note that labial consonants appear as phonetically palatalised when the suffix follows; dental obstruents are also palatalised but their articulation is considerably modified (the plosives surface as affricates, the spirants are phonetically distributed). It is the resonants that exhibit greatest diversification: the dental nasal appears phonetically as palatalised but is also made non-coronal, the trill appears as the non-palatalised spirant [ʒ] while the labio-velar semivowel turns in the palatalising context as the lateral [l] with marginal traces of palatalisation. In addition to the consonantal modifications, the vowel of the suffix is retracted (made "non-palatal") in the case of the reflex of underlying /r/. It is important to note that the same correspondences can be found in the case of other suffixes starting with a front vowel, no matter whether the suffix is derivational or inflectional. Consider the following pairs of nouns or adjectives and verbs derived from them by means of the verbalising suffix /-/: ślępy 'blind' - oślep[ɨ]ć 'id. vb.', ślaby 'weak' - osłabić 'weaken', świadomy 'conscious' - uświadomić 'realise', zabawa 'play' - zabawić 'id. vb.', trać 'strike' -

- *tracić* 'hit', *bloto* 'mud' - *zabłocić* 'make muddy', *zadać* 'advice' - *radzić* 'advise', *grzmas* 'whim' - *grzmasić* 'be choosy', *obraca* 'offence' - *obracić* 'offend', *biały* 'white' - *bielić* 'whitewash', *ostry* 'sharp' - *ostrzyć* 'sharpen', *rana* 'wound' - *ranie* 'id. vb.'. This regularity is not restricted to the front high vowel as conditioning the change but is also found elsewhere before the front mid vowel as in the case of the desiderative /e/ of the dat. loc. & voc. sg. of certain nouns: *chłop* 'peasant' - *chłopie*, *baba* 'crone' - *babie*, *row* 'ditch' - *rowie*, *szafa* 'wardrobe' - *szafie*, *rama* 'frame' - *ramie*, *brat* 'brother' - *bracie*, *woda* 'fault' - *wadzie*, *las* 'wood' - *lesie*, *woz* 'cart' - *wozle*, *tlen* 'oxygen' - *tlenie*, *para* 'steam' - *parze*, *kóło* 'wheel' - *kole*. These examples allow us to answer the question asked above: it is the systematic patterning of the phonetically non-palatalised reflexes (such as [ʒ, ʃ]) of other non-palatalised segments (such as [r, w]) with the alternations of palatalised and non-palatalised consonants (such as [s - ʒ]) that forces us to recognise underlying unity of the process and to ascribe all differences to latter (detail) rules. By abstracting away these superficial differences we arrive at the following formulation of the basic palatalisation process:

$$(1) \quad \left[ \begin{array}{c} \text{+anterior} \\ \text{-back} \end{array} \right] \rightarrow \left[ \begin{array}{c} \text{+high} \\ \text{-back} \end{array} \right] / \text{---} \left[ \begin{array}{c} \text{+syll} \\ \text{-back} \end{array} \right]$$

This rule, which we elsewhere (Gussmann 1978, 1980a) call the *l̄*-anterior palatalisation and which we will modify below, together with several late phonetic detail rules derive the lower row segments in (2) from the higher one and in this way account for the alternations of the consonants on the surface.

(2)

p	b	f	v	m	t	d	s	z	r	ʃ(w)	n
p'	b'	f'	v'	m'	t'	dʒ	ʒ	ʒ	ʒ	ʃ	n'

The palatalisation rule interacts with three other rules worth mentioning here, viz. two rules of depalatalisation and one of palatal assimilation.

A general rule of labial depalatalisation applies to palatalised labials when they appear either preconsonantly or in word final position. Consider the following alternations: *kar[ʃ]a* 'carp, gen. sg.' - *kar[b]*, *ko[ʃ]a* 'pigeon, gen. sg.' - *ko[ʒ]*, *pa[ʃ]a* 'peacock, gen. sg.' - *pa[f]*, *ra[ʃ]a* 'place name' - *ra[ʒ]*.

This rule can be formulated as

$$(3) \quad \left[ \begin{array}{c} \text{+anterior} \\ \text{-coron} \end{array} \right] \rightarrow \left[ \begin{array}{c} \text{-high} \\ \text{-back} \end{array} \right] / \text{---} \left[ \begin{array}{c} \text{+coron} \\ \text{-back} \end{array} \right]$$

The rule of labial depalatalisation has to be sharply distinguished from another rule which depalatalises dental plosives /t/, d'/ and the dental trill /r/ before a coronal consonant; it also depalatalises the dental nasal before another nasal. Consider: *wy[ʃ]anam* 'I cut out' - *wy[t]ang* 'id. fut.', *wy[ʒ]erem* 'I tear out' - *wy[ʒ]reg* 'id. fut.', *ma[ʃ]ec* 'March' - *ma[ʒ]ca* 'gen. sg.', *jesie[ʃ]* 'autumn' - *jesie[r]* 'id. adj.'. Such alternations are covered by the rule of anterior depalatalisation

$$(4) \quad \left[ \begin{array}{c} \text{+coron} \\ \text{-cont} \\ \text{<nasal>} \end{array} \right] \rightarrow \left[ \begin{array}{c} \text{-high} \\ \text{-back} \end{array} \right] / \text{---} \left[ \begin{array}{c} \text{+coron} \\ \text{-nasal} \end{array} \right]$$

A rule of palatal assimilation, which will not be given a formal statement here (see Gussmann 1978, Paulson 1979), is responsible for the spread of palatal quality to the immediately preceding consonant as in the following examples: *mlasto* 'to wnt' - *mlęście* 'loc. sg.', *jasny* 'bright' - *jaśni* 'nom. pl.', *jazda* 'travelling' - *jeżdżie* 'loc. sg.', *zły* 'bad' - *złi* 'nom. pl.', *spać* 'sleep' - *spi* 'the sleeps'.

Another rule of palatalisation affecting the same class of segments has been called the *l̄*-anterior palatalisation (Gussmann 1978, 1980a) since it is claimed that the segment triggering the process is the glide /j/. The rule is operative in certain conjugational forms as well as in derivationally related words. Effects of this rule are seen most clearly with dental obstruents since labials and dental resonants neutralise reflexes of this palatalisation with those of the *l̄*-anterior rule. Consider the following table:

(5)

p	b	f	v	m	t	d	s	z	r	ʃ(w)	n
p'	b'	f'	v'	m'	c	dʒ	ʒ	ʒ	ʒ	ʃ	n'

The boxed alternations are exemplified by the following derivationally related pairs of words: *żądny* 'desireous' - *żądza* 'lust', *płatny* 'payable' - *płatca* 'payment', *kosz* 'scythe' - *koszę* 'I mow', *woz* 'cart' - *wożę* 'I cart'. Two more problems call for a comment in connection with the *l̄*-anterior palatalisation. Firstly, the recognition of the glide /j/ as the palatalising segment is based on theoretical assumptions since no glide appears phonetical-

ly. In any of the forms that are assumed to undergo the rule, the selection of the glide is determined by two considerations: the negative one stipulates that since front vowels all trigger the i-anterior palatalisation, /j/ is the only segment which could evoke a process partly identical to the front vowel palatalisation: additionally it might be noted that a rule with morphological conditioning is not a feasible counterproposal here since no coherent morphological class(es) could be set up. On the positive side, the choice of the glide is determined by the virtual absence of sequences of an obstruent plus the glide in Polish phonetic representations. This restriction would be inexplicable under any morphological rule formulation; we claim that the glide occurs freely in underlying representations, causes the i-anterior palatalisation and is subsequently deleted post-consonantly and in word-final position (a detailed discussion of the rule and possible counter-examples is presented in Gussmann 1980a, b).

The existence of two rules affecting the same class of segments even if in different environments and with partially different outputs naturally prompts a suggestion that the two processes may be related. This possibility cannot be ruled out in particular since a very simple, almost trivial, universal generalisation underlies them, viz. a consonant is palatalised in a palatalising environment. The fact that all anterior consonants are palatalised by the two rules is due to the fact that the occurrence of anterior consonants in underlying representations is relatively unconstrained; hence they also appear before front vowels and the glide /j/. Since, however, the phonetic reflexes are different at least in the case of dental obstruents, some rules somewhere in the derivation have to be made sensitive to the distinction between a following front vowel and a following glide. In other words, it is perfectly possible to generalise the i-anterior palatalisation in such a way that it would apply before a palatalising segment, be it a vowel or a glide, i.e. before [-conson, -back]. Subsequent rules would have to ensure, however, that when the non-obstruent is in fact syllabic, underlying /t/ has to surface as [c]. And when it is non-syllabic, the same segment emerges as [c]. We take this issue up again after considering alternations involving velar obstruents.

The three velar consonants alternate in accordance with what we call the 1st, the 2nd and the surface velar palatalisation producing the following sets of correspondences:

(6)	k	g	x		1st velar palatalisation
	č	ž/dž	š		2nd velar palatalisation
	c	dz	š		surface velar palatalisation
	k'	g'	x'		

Some studies additionally recognise also the progressive velar palatalisation (Gussmann 1978, Laskowski 1975, Steele 1973) but the alternations the rule allegedly produces are very scanty and are not uncontroversially phonological. For this reason the progressive velar palatalisation will be left out of account here.

The 1st velar palatalisation applies to velars preceding a palatalising segment (most frequently the segment is a front vowel although the glide /j/ can also be justified); this we illustrate by means of the diminutive suffix [ek] deriving from the phonological /k/: język 'tongue' - język 'ek', brzeź 'coast, gen. sg.' - brzeź 'ek, móz 'brain, gen. sg.' - móz 'ek, orze 'nut' - orze 'ek. The rule of the 1st velar palatalisation may be formulated in its general form as



This general statement would have to be supplemented by a later rule of spirantisation whereby the voiced affricate /dž/ would be turned into the spirant /ž/ unless itself preceded by a spirant (cp. móz-dżek above).

The 2nd velar palatalisation is restricted in its applicability to the context of: a) the vowel /e/ when it is a marker of the dat. and loc. sg. of nouns, e.g.:

- a) rzeka 'river' - rzecze, noga 'leg' - nodze, starucha 'crone' - starusze;

b) the vowel /i/ when it represents the ending of the nom. pl. of personal nouns and adjectives, e.g.:

- b) rybak 'fisherman' - rybacy, daleki 'distant' - dalecy, pedagog 'pedagogue' - pedagodzy, ubogi 'poor' - ubodzy;

c) the vowel /e/ when it functions as a marker of deadjectival adverbs, e.g.:

- c) wysoki 'high' - wysoco, wielki 'great' - wielce.

The actual formalisation of this rule and its ordering with respect to the 1st velar palatalisation have been subject to considerable

controversy (see Cohen 1969, Laskowski 1975, Gussmann 1977) which has no direct bearing on the problems at hand. In brief a rule can be formulated which applies prior to the 1st velar palatalisation and affects velar obstruents in phonologically or morphologically delimited environments. Alternatively, the 1st velar palatalisation applies across the board and a subsequent rule fronts the affricates /tʃ, dʒ/ to /c, dz/ in phono-morphologically specified contexts (i.e. those of a, b and c above). Either interpretation treats the 2nd velar palatalisation as a rule of restricted generality in the modern language.

This survey of the four palatalisation processes in modern Polish reveals one thing very clearly: all of the rules invariably apply before a front vowel or the front glide. This fact prompts the possibility of a slightly different approach to palatalisation phenomena in Polish: instead of speaking of four different processes, all of them applying in the same or very similar environment, we may just speak of one deep phonological rule of palatalisation formulated as (8)

$$(8) \quad \left[ \begin{array}{c} \text{+cons} \text{ } n \\ \text{-back} \end{array} \right] \longrightarrow \left[ \begin{array}{c} \text{+high} \\ \text{-back} \end{array} \right] / \text{---} \left[ \begin{array}{c} \text{-cons} \text{ } n \\ \text{-back} \end{array} \right]$$

The consonants palatalised by (8) will now have to undergo further modifications depending upon the following segment. Schematically we may present these subsequent adjustments of the crucial consonants as follows:

- (9)
- a) k' g' x' → c dz ʃ in morphologically specified contexts
  - b) k' g' x' → č dž ʒ before [syllab]
  - c) t' d' s' z' → c dz ʒ before [syllab]
  - d) t' d' s' z' → č dč ʒ

a, b, c, d correspond to the 2nd velar, the 1st velar, the l-anterior and the l-anterior palatalisations respectively.

This approach avoids the redundancy inherent in the earlier interpretations since it treats the changes in (9) as basically the addition of phonetic features to phonologically distinct units, i.e. they may be regarded as a sort of spell-out rules. Note in particular that the earlier 1st velar and l-anterior palatalisations are now context-free modifications - there is simply no need to repeat the context of the front vowel or glide since this is the only context where they can appear due to the application of the general palatalisation rule (8). The ordering of the 2nd velar and the l-anterior palatalisations (and also of the depalatalisations discussed above) suffices to cause the proper distribution of all palatalisation re-

flexes. Another advantage of this approach is that the Polish rule (8) is now truly a palatalisation process in the sense of universal phonology, while rules (9) are to a large extent language specific implementations of the general process.

On the language-specific side, our analysis opens up another interesting possibility which is worth mentioning. There are cases where underlying palatalised consonants must be recognised since otherwise the phonology and/or the morphology of the language would have to be artificially adjusted or complicated; the case of the Slavic soft stems immediately springs to mind here. If the Polish nouns chęc 'willingness' and cmenarz 'cemetery' were to be entered lexically with final palatalised consonants then, on our analysis, there is absolutely no need for these consonants to be /č/ and /ž/; rather they may be /c' / and /r' / which undergo the context-free spell-out (9d) or depalatalisation (4) in chęcny 'willing' and cmenarzny 'of the cemetery'. No complex depalatalisation rule of the type suggested by Rubach (1981:52) is necessary or called for. Indeed, if palatalised consonants have to be admitted in phonological representations, then the question immediately arises as to which of the phonetic features should be omitted (i.e. assigned to rules), since clearly there is no justification for identifying a phonological segment with a phonetic one in every detail (just as one does not include aspiration in English phonological representations). Our proposal provides a non-arbitrary basis for selecting those features which are due to palatalisation (8) rather than to later spell-out rules (9).

The interpretation of palatalisation phenomena comprising rules (8) and (9) follows from the possibility and desirability to regard the actually attested, complex morphological alternations as the cumulative product of the application of distinct phonological processes. This position follows from observing the 'systemic prerequisites' that we discussed at the outset.

The final process affecting velar consonants in Polish is the surface velar palatalisation; it applies to plosives (and marginally also to the spirant) when they are followed by a front vowel which arises in the derivation, i.e. underlyingly it is either a back vowel or zero. This may be the vowel [i] which goes back to the underlying /#/, as in several inflectional endings, e.g. wielki 'great', wielkim, wielkim, etc. or in the derivational suffix /#w/ e.g. wymachiwac

'wave', zakochiwad 'fall for sb.', etc.; it may also be the vowel [e] derived from several sources, e.g. from /ɛ/ as in kier 'truck' - kia 'gen. sg.', from /ɛ/ as in kier 'hearts' - kiera 'gen. sg.' or from the sequence /oje/ as in wielkie, 'great, nom. pl. fem.' - drogie 'expensive, nom. pl. fem.', etc. (Justification of these underlying representations can be found in Steele 1973, Lasnik 1975, Gussmann 1980). In all these cases the vowel following the velar is back at the stage in the derivation when rule (8) applies; in the case of locative ending -em, e.g. domkiem 'house', progiem 'threshold'; the vowel may be assumed to be phonologically zero, i.e. it is in fact epenthetic (Lasnik 1975:111). The surface velar palatalisation is fully general with the plosives /k, g/: it affects the sibilant /x/ only when the suffix /w/ follows (for further discussion of problems pertaining to this rule see Gussmann 1980c, 1981).

Once the phonological processes centring round palatalisation have been discussed, relatively little of significance is left and definitively nothing that could compare with palatalisation in the scope of generality or in morphological consequences. Brief reference may be made here to two assimilatory rules. One of them is nasal assimilation which is responsible for the nasal consonants [ɲ - m - ŋ] in words such as dęć, dnię, dęty where the underlying nasal consonant is /m/, for the nasal consonants [ɲ - ŋ] in words such as jęcie, jęcka, jęka where the underlying consonant is /n/ or for the alternation [ɲ - ŋ] in piąg - pnę with /n/ also being the phonological source of the surface variation. Details of the rules involved are offered in several surveys (Gladney 1968, Gussmann 1974, 1978, 1980, Paulsman 1975, Rubach 1977a).

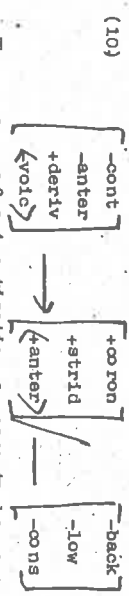
Another assimilatory process covers voice phenomena: it comprises two rules: regressive assimilation, e.g. liczyć 'count' - liczyć 'number, mbody 'young' -  młodsz 'younger', and progressive voice assimilation e.g. bitew 'battle, dim. gen. pl.' - bitwa 'nom. sg.', marche 'carrot, dim. gen. pl.' -  march 'gen. sg.' where the latter is restricted to spirants only; for details see Gussmann (1978:115-118).

The final class of minor processes comprises alternations of consonants with zero; this in the case of Polish denotes mostly deletions of consonants in specific contexts (the deletion of the glide /j/ has been mentioned above). Examples of the process: zazdrość 'envy' - zazdrośny 'envious', piśk 'squeak' -  piśnąć 'id. vb.', mlask 'click' -  mlaskać 'id. vb.'. Deletions of consonants in Polish

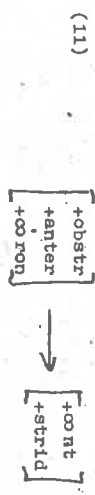
have been extensively studied by Rubach (1977b:111-143) and his work should be consulted for details and formal statements.

Against the background of the variety offered by the Polish consonantal alternations, the situation in English is relatively uninteresting. It has been studied by Chomsky and Halle (1968) but as the number of processes which might be called productive is restricted, many scholars have been led to question the basic validity of their interpretation (see for example Shibatani and Crothers 1975, Straus 1982). Analysing the existing alternations in terms of the phonological rather than, say, lexical or morpho-lexical structure is dependent upon the admission of a considerable degree of abstractness into phonology. As is well-known many scholars have demurred at the phonological abstractness admitted by the Sound Pattern of English (SPE) and the work it influenced. The development of so-called Natural Generative Phonology (Hooper 1976) constitutes a dramatic anticlimax to the approach dominant in the late 1960's and early 1970's. It is noteworthy, however, that most of the nonabstract work is notoriously derived from a highly restricted data base and so far no analysis even vaguely comparable in coverage to SPE but couched in concrete terms has been offered for any language. Since alternative analyses have only been talked about rather than actually carried out, we will continue to hold that a phonological interpretation of the English consonantal processes is to be preferred over lists or quasi-lists of largely suppletive forms. It should be added, however, that even with this proviso the number and generality of rules which can be defended and justified is fairly small and comprises processes of velar palatalisation (known as Velar Softening in SPE), a process of spirantisation and another one of palatalisation. Since in this report we are concerned with consonantal alternations only, we extend our list of rules by including an s-voicing process while forgetting about any redundancies which might and should be captured in rules in so far as they are reflected merely in distributional restrictions.

The process of velar softening turns the underlying velar plosives into the surface [s] and [dʒ] as illustrated by the following examples: produkt [k]tion - produkt [s]e, critic [k]al - critic [s]ism, prod [g]al - prod [dʒ]y, pur [g]atory - pur [dʒ]e. The regularity underlying these alternations is restricted to words of foreign - mostly Romance - origin. In SPE the rule is formulated as



The process of spirantisation appears to be more widely observed. The basic modification might be stated as



i.e. dental obstruents are turned into strident spirants; we have skipped the environments where the rule applies since the SPE formulation is not only very complex but is also inadequate in certain ways. Pending further study of English spirantisation (Szybra, to appear) we limit ourselves here to presenting some contexts where it seems to have applied producing morphological alternations: conclude - conclusive, apprehend - apprehensive, offend - offensible, suspend - suspensible, accurate - accuracy, adequate - adequacy, silent - silence, coherent - coherence, competent - competence. This rule needs further study; related to it are some problems of voicing which will also have to be tackled.

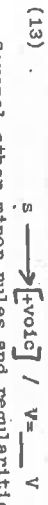
The rule of palatalisation is restricted to coronal obstruents and has been formalised as follows (Chomsky & Halle 1968:230):



It affects both underlying dental obstruents as in fact - factual, grade - gradual, profess - professional, precise - precision, but also obstruents which underwent spirantisation, e.g.: act - action, Egypt - Egyptian, recede - recession. This explains why [t] alternates with [ʃ] in act - action but with [k] in act - actual.

The final process we shall consider gives rise to the alternation of voiced and voiceless dental spirants and is known as s-voicing. Consider: a) consist, persist, insist, desist, resist, assist; b) consume, presume, resume, assume; c) consign, assign, resign, design; d) conserve, deserve, reserve, preserve. These words are morphologically complex and can be analysed as consisting of a prefix and a stem. In this way a prefix boundary (=) can be inserted after con-, per-, in-, de-, re-, pre-. The stem initial spirant is voiced in some of the words and remains voiceless in others, SP offers the

following rule to cover the cases



Several other minor rules and regularities could be pointed to; they have little relevance to the topic of this paper and are omitted from consideration.

The major phonological processes in the sphere of Polish and English consonants as these processes are reflected on the surface in morphological alternations belong mostly to palatalisation and concomitant phenomena. This seems to be the major area of convergence between the two languages, however. Where they part ways is in the scope, generality and productivity of the rules. In Polish they affect the whole of inflectional and derivational morphology, they often apply not only to native words but also to recent loans, in other words they form one of the phonological specificity of the language. In English, conversely, these processes are often marginal, largely opaque and highly restricted in their applicability.

Our presentation of the major consonantal processes in Polish and English phonology was based on a specific interpretation of existing alternations. In particular it was assumed that given an alternation we should try and analyse it in the same way in every instance unless we have clear evidence to the contrary. This assumption means in effect that an alternation taking place entirely within a morpheme boundaries, e.g. the alternation [t - ʃ] in the Polish pairs wycinać 'I cut out' - wytnę 'I will cut out' on the one hand and butyk 'shoe, dim.' - but on the other involves underlying /t/ and the application of palatalisation processes in the left hand member of each pair. Obviously other approaches are possible; proponents of so-called cyclic phonology (Mascaró 1976, Rubach 1981) and lexical phonology (Strauss 1982, Mohanan 1982, Kiparsky 1982) claim that processes involving morpheme boundaries should be set apart from those applying irrespective of such boundaries. Consequently, Rubach (1981) in his analysis of Polish palatalisations is forced to posit the underlying palatal /č/ in the wycinać - wytnę pair and /t/ in but - butyk. An approach like this is obviously possible if one is prepared to endorse its consequences; if one were prepared to endorse the consequence one might also develop a phonology which separates processes applying in the first syllable of the word from those applying in the last syllable with the syllables in between (if any) sometimes displaying properties of the initial and sometimes of the final syllable. Clearly the number of



such bizarre assumptions can be multiplied almost ad infinitum but it is hardly worth arguing whether any of them could qualify as a phonology of a native language. The assumptions behind the cyclic and the lexical models are by no means absurd. They are not self-evident either; they further involve fundamental questions of morphology such as morpheme identification, the role of word formation rules, the nature of the lexicon and lexicalisation in phonology that none of the authors quoted above appears to have asked, let alone answered (Strauss 1982 is probably the only one who has something of interest to say on the subject). Without an attempt at grappling with these issues it is doubtful whether the mere making of new assumptions will advance our understanding of phonological processes. In this way we have been led to the conclusion that if morphological alternations are to shed light on phonology they must be subject to an analysis which links phonology with morphology in as yet undiscovered ways. The nature of these links remains a challenge for the future.

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LUBELSKIE MATERIAŁY NEOFILOLOGICZNE — 1982

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Trace and PRO - A Spurious Distinction?

The past few years have seen a growing interest in the empty categories on the part of linguists working in the framework of the Revised Extended Standard Theory /REST/. Incorporating the Trace Theory of Movement Rules /Chomsky 1977, 1980, 1981, Kayne 1981, Koester 1981, Jaeggli 1982, Rizzi 1982/. The proposed analyses have led to the distinction of two types of the Empty Category: PRO and trace. The difference between them is summarised by Chomsky /1981:56/ as follows:

- / / /a/ PRO is linked to its antecedent by a control rule, trace is the result of the rule Move $\alpha$
- /b/ PRO need not have an antecedent while trace always has an antecedent
- /c/ the antecedent-PRO relation /in case PRO has an antecedent/ need not satisfy the Subjacency Principle
- /d/ trace is governed, PRO must be ungoverned
- /e/ the antecedent of trace is not in a  $\theta$ -position

Recently, however, the dichotomy between trace and PRO has come under attack from the linguists who claim that this distinction is an unnecessary complication of a grammar and should be abandoned /see, for example, Koester 1978/.

In this article we will examine this claim in detail, basing our observations on data from Polish. We will demonstrate that evidence from Polish appears to falsify the validity of the trace-PRO distinction.

We begin though by reviewing the arguments in /1/ adduced in support of this distinction. Consider /1a/ first. The relevant examples to be discussed here may be sentences like the following: