(b) There are two alternations in the Polish data resulted from adding a plural ending a plural suffix ‘-i’. The two alternations are:

1. Consonantal.

In the following data:

1. klup klubi ‘club’
5. ʒwup ʒwobi ‘crib’
6. trut trudi ‘labor’
3. dom domi ‘house’
7. dzvon dzvoni ‘bell’

The final consonant appears as voiced before the plural suffix ‘-i’ and as voiceless in word final position (in klup, trup, snop, and ʒwup.) Nasals do not participate in the change, neither conditions will affect nasals (in dom—domi, dzvon—dzvoni). The root of the word in data (1) is either ‘klup’ or its ‘klub’. There are two possibilities:

1) Final devoicing

If the underlying phoneme is the voiced obstruent, then there is an allophonic rule of devoicing in word final position, as in data (1) klup – klubi; and data (6) trut – trudi.

[-sonor] \(\rightarrow\) [-voice] / ______#

2) Voicing intervocally.

If the underlying phoneme is the voiceless obstruent, then there is an allophonic rule of voicing between vowels:

[-sonar] \(\rightarrow\) [+voice] / V____V

The data suggest the final devoicing rule:

**1) In the data, many of them show a voiceless obstruent appear intervocally.**

As in the following data:

4. snop snopi ‘sheaf’; 2. trup trupi ‘corpse’

If these two words apply the voicing rule, the plural form would be *‘snobi’ and *‘trubi’, which turned out wrong

**2) If we apply the devoicing rule, we can explain why some of the obstruents are not voiced intervocally. Plural ‘trudi’ in data (6) does not need to be explained, because /d/ is the underlying phoneme and nothing happens to it when its placed
between /u/ and /i/. It’s singular form ‘trut’ can be explained by a rule which devoice the final underlying /b/ to /p/. Plural ‘trupi’ in data(2) has the singular form of ‘trup’, it needs no explanation, since /p/ is the underlying phoneme and nothing happens to it before the ending ‘-i’. But the singular ‘trup’ is explained by the devoicing rule that neutralized the underlying /b/ into /p/.

2. Vocalic alternation

In the following data:

1. klup klubi ‘club’ 6. trut trudi ‘labor’
10. grus gruzi ‘rubble’ 20. jum jumi ‘noise’ set1
3. dom domi ‘house’ 4. snop snopi ‘sheaf’
8. kot koti ‘cat’ 11. nos nosi ‘nose’
15. sok soki ‘juice’
9. lut lodi ‘ice’ 12. vus, vozi ‘cart’
16. ruk rogi ‘horn’ 17. bur bori ‘forest’
18. vuw vowi ‘ox’ 19. sul soli ‘salt’
5. zwp zwobi ‘crib’

There is a change between /u/ and /o/ in the third set of data above. It is either a vowel lowering or vowel rising in Polish. The two possibilities are:

1) /u/ is the underlying phoneme. But if this is so, its unclear why the vowel lowers in the set 3. But failed to do so set 1. The context for this change is unclear because none of the possible triggering consonants form a natural class.

2) /o/ is the underlying phoneme. [o] rise to [u] in the singular form. Then there should be a rule that rises [o] to [u] in set 3, and at the same time do not affect [o] in set 2, which show a non-alternating [o] in the singular forms.

Therefore, the solution should be, [o] raises before voiced obstruents and approximants.

\[
[o] \rightarrow [u] / \quad +\text{voice} \\
\quad -\text{nasal}
\]

3. Ordering

The rule of rising should apply before the rule of final devoicing:
In example 12: vus---vozi ‘cart’, the underlying form of this word should be ‘voz’

\[
\begin{array}{lll}
/voz/ & /voz/ \\
vus & vowel rising & vos & devoicing \\
vus & final devoicing & ______ & can not apply vowel rising rule \\
\rightarrow & correct [vus] & \rightarrow & wrong [voz]
\end{array}
\]

(c) Discuss the given patterns.

4. Timeline for the given forms.

1) klup klubi ‘club’
Underlying form /klub/
------ vowel rising does not apply
klup final devoicing
\rightarrow correct [klup]

9) lut lodi ‘ice’
Underlying form /lod/
------ vowel rising does not apply
lut final devoicing
\rightarrow correct [lut]

10) grus gruzi ‘rubble’
Underlying form /gruz/
------ vowel rising does not apply
grus final devoicing
\rightarrow correct [grus]

14) wuk wugi ‘lye’
Underlying form /wug/
------ vowel rising does not apply
wuk final devoicing
\rightarrow correct [wuk]

All of these historical process show a potentially neutralizing phenomenon. The phonemes /p/ & /b/ ; /t/ & /d/ ; /k/ & /g/ ; /s/ & /z/ are all contrastive pairs, but a devoicing rule eliminates the contrast between two phonemes in a certain position.

(d) How Polish acquire such patterns.

Generally, speakers apply these rules without being aware of it. They acquire the rules early in life without any explicit teaching. But such rules give language productivity. It can be applied to new words. If Polish people run into a new word such as ‘boyi’ (means ‘fight’, Odden, pp122), they will automatically apply the rules of vowel rising and final devoicing and pronounce [buy] to refer to a singular form. The rules give speakers intuitions about what words are “well-formed”. If a speaker hears a word that does not conform to the language's phonological rules, the word will sound foreign or badly formed.
(c) Alternation in forms (5-7).

The data shows that either the final consonant of the stem is voiced intervocalically, or the voiced consonant is devoiced before voiceless consonants. Combining with the first four sets of data, we can make a decision that it is the devoicing rather than voicing. The reason is:

1) If it’s voicing the voiceless obstruents intervocalically: [-son] \(\rightarrow\) [+voice] / V______V. It does not apply to data (4). In data (4), [klo:pos] and [klo:pi] did not appear as *[klo:bos] and *[klo:bi]. This suggests that the voicing rule is wrong.

2) Therefore it’s final devoicing. Then both data (4) and data (5-7) can be explained:

\[-son\] \(\rightarrow\) [-voice] / _____[s]

Data (4) will not participate in this rule because the stem forms are voiceless by themselves. Data (5) then can be explained. The underlying form is \(p^{\text{b}}\text{le:b}\), it is devoiced into \(p^{\text{b}}\text{le:ps}\) when a voiceless [s] follows. Here the rule can be generalized more broadly by changing [s] into ‘voiceless obstruents’. But since we have more data to analyze, I will keep it as [s] for now.

(d) Alternation in forms (8-10).

This set of data shows an alternation of aspiration or de-aspiration. Either aspirated stops are de-aspirated before [s], or plain stops are aspirated intervocalically. Again, combining with the previous data, for example, data (4) and data (5), we can rule out the possibility of aspirate the plain stops. Because the stops in data (4) and data (5) are not aspirated even though they are placed between vowels.

1) If it’s aspirate the plain stops: [-son] \(\rightarrow\) [+asp] / V ____V Then for data (4), the gen.sg. form should be *\([klo:p^{\text{b}}\text{os]}\). This is a wrong form. The same problem occurs with data (5). If this rule is right, then the dat.sg. form in data (5) should be *\([p^{\text{b}}\text{le:bi}\], which is also wrong. Besides, in data (9), the [k] in all the four forms are not aspirated, even though two forms put [k] intervocalically.

2) Therefore its de-aspiration before [s]. [-son] \(\rightarrow\) [-asp] / ________[s] Then we can explain data (8-10) by suggesting the underlying form of \([kate:\text{lip}^{\text{b}}]\) in data (8), \([p^{\text{b}}\text{ulak}\) in data (9), and \([onuk^{\text{b}}]\) in data (10). This can also explain data (1-7). Because in these data, either there is not an aspirated stop underlying, or the aspirated stops do not alternate (it appears before [l] or [u])
(e) [t] deletion in data (11-12)

In data (11), the underlying form is either [tʰeːt] or [tʰeːs]. If its [tʰeːs], then the dat.pl. form should be *[tʰeːssi], the gen.sg. should be *[tʰeːsos] instead of [tʰeːtos]. Therefore, the correct underlying form is [tʰeːt], the [t] is deleted under certain circumstance.

The condition for [t] deletion should be:

[t] \( \rightarrow \emptyset / \_\_ \_ [s] \)

(f) Coronal deletion in data (13-16)

These data show a wider influence of [s]. Based on the rule: [t] \( \rightarrow \emptyset / \_\_ \_ [s] \), there seems to be more phonemes taking part in the deletion. In data (13-16), Data (13) shows [d] is deleted before [s]; data (14) shows [tʰ] is deleted before [s]; data (15) and data (16) show [n] deletion before [s];

To express this in terms of feature theory, I would like to use the feature [Coronal]. Since there are no palatal-alveolar stops in the given data, I think [+coronal] can refer to [t], [d], [n] and [tʰ] in the given data. So the coronal deletion rule is:

[+coronal] \( \rightarrow \emptyset / \_\_ \_ [s] \)

(g) Ordering and conclusion

The rules for ancient Greek is:

1. underlying form: /pʰleːb -s/
2. devoicing and deaspiration pʰleːps
3. coronal deletion: 
4. surface form: [pʰleːps]

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>underlying form</td>
<td>/pʰleːb -s/</td>
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<tr>
<td>6</td>
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<td></td>
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<td>7</td>
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</tr>
<tr>
<td>8</td>
<td>surface form</td>
<td>[pʰleːps]</td>
</tr>
</tbody>
</table>

It seems the order of devoicing, deaspiration and coronal deletion do not affect us to get the correct form: