A conference on Salish should have as its prime object of attention substantive matters of Salish languages. Of course, it is all to the good if these matters also have something to offer general linguistic theory. Naturally, we will wish to bring to bear any lessons from theoretical linguistics that can instruct us in solving specifically Salish problems. It should be clear from the outset, then, that my main concern is to explore avenues of further light on an interesting problematic area of Salish.

However, Salish languages have phonologies that cannot fail to be of considerable interest to students of phonology and of linguistics at large. Moreover, Tillamook is bound to be somewhat of a museon-piece among the world of phonologies. This effect is heightened nowadays, when a strong renewed interest in universals is asserting itself in various fields of linguistics. To linguist and to光泽ist alike are linguistic universals, one of two things must be true: Either all languages are somehow the same, and we must still apply great effort to the unravelling of what is really surface difference—a view which changes our understanding, but not the magnitude of our total task. Or else the true universals are so abstract in form that we will be a long time in making a connexion between them and the order of things that current grammars tend to talk about.

L.C. and M.T. Thompson (A fresh look at Tillamook phonology, JAL 32.313-19, 1966), in the course of bringing invaluable fresh data as well as insights and reasoning to this urgent problem, have recently said that "Tillamook is meaningfully characterized as a language totally devoid of labial elements." (TT 316, §3.3) It is the purpose of the present paper to lay the foundations, in brief compass, for a discussion of what that statement may mean. TT (315, §3) have stated regarding their work "It is beyond the purpose of this paper to present an extensive treatment of the phonology." Certainly, I, who have not even heard nor read texts in the language, could not pretend to to exceed their claim. Apart from the inherent interest of the problem, it is rather the urgency of the matter, while there is yet a surviving speaker available for possible re-check, that leads me to urge this on your attention.

What does it mean to lack labial elements? Clearly it does not mean the same things as to lack, e.g., coarticulated velaro-labial sounds (as in West African languages), or front-velar groove articulations (as in Polish or Serbo-Croatian, which incidentally in both languages are generated in any case by rule), or uvular consonants. There are obviously types of articulation, or features, that few languages have, and others that few lack. Here is a sort of asymptotic universal. Languages with any sort of elaboration of consonant features (which means practically all known languages) may usually be expected to show labials; I ignore here the question, not without importance, whether in such a framework vowels may be independent of consonants in feature composition.

Yet there does seem to be a built-in tendency in human language to show a weakness in the labiales. We find widespread scattered evidence of this in Eurasia. Keltic is well known for having the labial *b*; I have discussed this in relation to the later resolutions of the labio-velars in Lochnann 1, 1958. Then there is the well recognized blank in the earliest reachable Indo-European. This affects, seemingly strangely, what would be expected to be *b*, but Pedersen (Die idg. Verschlusslaute ...ca.1956— I haven't the exact ref. for the monograph, KDakäVidenskab, København) "suggested a prehistoric shift in the consonant orders. Semitic, and particularly Arabic, show an asymmetry in the (voiceless) labial, and that must have some connexion with the fact that the emphatic feature fails to apply to the labials (I know none of what must be a rich Semitist literature on this point). Mongolian shows within its reconstructable history an instability in *p*; see Poppe, Vgl. Grammatik, and Young. Ket (Schütz, Anglistische Studien, 32.129-32, 1960) an asymmetry (lack of *p*) and impoverishment in the labials, in which h interestingly participates. In the New World there is similar evidence to be found: Athapaskan, with its lone labial
stop. And the whole Mayan family, with its asymmetric voiced by-
 vibration, would surely may be viewed to see the seeds of the phenomenon in the
 analogical development of Maya-Chipayan *ph > h and the merger of
 asymmetric */v (see Hamp, IJAL 31:74-6, 1967). The prehistory of
 Japanese shows a weakening of p to h, but it is clearly not removed from
 the surface system, since it remains in the strong or geminated position.
 In all these cases we see an asymmetric development in the labials,
 normally affecting the voiceless member where the opposition applies.

Cases of total lack of labials, or a whole order of labials, are
 different, even though we might envisage their genesis as somehow ticked
 off in each case by developments such as we see partially realized above.
 Incidentally, the realistic likelihood of this happening independently
 over and over again, with no historic (and therefore a human-universal)
 connexion, seems assured by the fact that we can see the recoverable
 process clearly on quite dissimilar grounds in Keltic (regardless of the
 conceivable relation to IE *b and *sw), Arabic, Mongolian, Japanese, and
 Mayan. Hottentot also shows, in relation to the rest of Khoisan, special
 distributional properties for the labials, but that is rather in the
 direction of greater freedom. As I say, we might envisage some cases of
 total lack of labials as having their start in such partial developments,
 since there seems to be a provision for the labial members in the
 articulatory system, since it remains in the strong or geminated position.

As a matter of fact, of the cases that have come to my attention several
 can be interpreted much more directly, or, in a sense, as not having
 occurred at all. A Polynesian case such as Tahitian is easily explained,
 go to speak, as having too few features in the first place; the opposition
 [+grave]: [-grave] is exactly equivalent to the Hawaiian one of [+flat]
 : [-flat] that requires explanation or notice here is rather the
 impoverished number in the total matrix of features. Then in a case of
 the type seen in Chatino: Zapotec(an) (if such others exist, apart from
 Proto-Otomanguean as reconstructed by Rensch) we have exactly the same
 situation as I have argued to be the case in early Keltic dialects for
 */h/. That is to say, the same feature [+flat] is always present, but
 the detail of the position of articulatory occlusion varies from language
to language. For Iroquoian the case is fundamentally the same, but just
 one step removed, so to speak. Despite the absence of surface labials,
 Postal has argued for the existence of underlying segments marked by a
 feature corresponding to this, from which the observed surface structures
 are generated by rule. Thus the dictionary entries of Mohawk do not lack
 the usual feature of 'rounding', though the terminal phonetics for the
 most part do.

For purposes of our present discussion, the surprising thing is this:
In all these last cases the total number of phonemes, or feature-bundles
 per segment, is, as languages go, a modest one. Put another way, the
 feature of rounding fills out a rather small number of specifications
 per matrix-column, in these instances; in this sense, we
 may leave aside the consideration whether the feature is notably rewritten
 in earlier or in very late rules. But the ease of Tillamook seems different
 here we have a relatively rich array of feature-bundles; paucity of
 numbers cannot be alleged as a reason for the Tillamook incidence of
 features. What is more, we appear also to have ostensibly (either by
 etymology or by plausible feature specification) rounded (post)velar.

On the report of competent phoneticians and field workers such as the
 Thompsons, we must immediately accept one sense in which Tillamook lacks
 labials (assuming that a last remaining speaker is typical of a community):
 there is no evidence for the usual labial contractions in the articulatory
 production of finished phonetic sentences. But as a typological problem,
 we may yet ask two further questions. Is it possible that some other
 articulation does acoustic duty for the expected labial feature? Is there
 some other systematic distinctive feature that does duty, isomorphously,
 for the feature that, on the basis of other Salish languages, we might
 call 'rounded'?

To answer the first question, we need an acoustic analysis. It is known (e.g.
 Jakobson, Fant, Halle, Preliminaries 1952, p.31) that in
 phonological systems and in borrowing of loanwords pharyngeal constriction
 and lip-rounding may operate articulatorily in lieu of one another. The
 difference is merely one of physical orientation; either the front or the
 back end of the oral chamber is constricted. Tt 316, 83.3 describe the
 colouring of q (qW) and f (kW) as produced by a
 "cupping of the tongue". Is this accompanied by, symptomatic of, or
 equivalent to constriction of the pharyngeal opening?
The answer to this question, while thoroughly interesting, will however neither be complete for Tillamook, nor adequate for our total understanding of the full Salish interrelationships involved. The answer to the second question calls, in effect, for a provisional distinctive-feature analysis of the whole language. On the basis of current theory, of course, such an analysis to be maximally economical and correct should take into account all pertinent morpho-syntactic information—the rules of the base and T components, plus any semantic feature specifications to lexical entries that might happen also to apply. My analysis will be possibly short of the mark by the fact that I can work only from surface phonetics, plus a few observations (e.g. the reduplication by \([X]\) of underlying \([X']\)—a sort of Salish Grassmann's Law; see examples in Reichard, *IJAL* 25.242-3, 1959) of morpho-syntactic character; but I simply hope that it will not be damagingly deficient, and that some important lines will emerge.

There is a sense in which any feature analysis of a Salish language is of fairly immediate interest to almost any other language of the family. Consider the following charts (my own rearrangements):

**Tillamook (TT)**

<table>
<thead>
<tr>
<th>(t)</th>
<th>(c)</th>
<th>(\lambda)</th>
<th>(\lambda')</th>
<th>(t')</th>
<th>(c')</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n)</td>
<td>(l)</td>
<td>(n)</td>
<td>(l)</td>
<td>(n)</td>
<td>(l)</td>
</tr>
</tbody>
</table>

**Upper Chehalis (Kinkade)**

<table>
<thead>
<tr>
<th>(p)</th>
<th>(t)</th>
<th>(c)</th>
<th>(\lambda)</th>
<th>(\lambda')</th>
<th>(t')</th>
<th>(c')</th>
</tr>
</thead>
<tbody>
<tr>
<td>(m)</td>
<td>(n)</td>
<td>(l)</td>
<td>(y)</td>
<td>(w)</td>
<td>(y)</td>
<td>(w)</td>
</tr>
</tbody>
</table>

**Twana (Drachman preliminary version; without his permission; eliminating borrowed and dubious segments)**

<table>
<thead>
<tr>
<th>(p)</th>
<th>(t)</th>
<th>(c)</th>
<th>(\lambda)</th>
<th>(\lambda')</th>
<th>(t')</th>
<th>(c')</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b)</td>
<td>(d)</td>
<td>(s)</td>
<td>(s)</td>
<td>(x)</td>
<td>(x)</td>
<td>(h)</td>
</tr>
</tbody>
</table>

**Reichard (eliminating special innovation and incorporating recent better knowledge)**

<table>
<thead>
<tr>
<th>(p)</th>
<th>(t)</th>
<th>(c)</th>
<th>(\lambda')</th>
<th>(\lambda')</th>
<th>(t')</th>
<th>(c')</th>
</tr>
</thead>
<tbody>
<tr>
<td>(m)</td>
<td>(n)</td>
<td>(l)</td>
<td>(y)</td>
<td>(w)</td>
<td>(y)</td>
<td>(w)</td>
</tr>
</tbody>
</table>

CA has some retroflexes, but lacks the lateral affricates; CA and Kal lack the unrounded front velars.

It would seem reasonable if the underlying matrices for these systems of segments were not too different, and if the rules of the phonological components were fairly comparable.

Perhaps we may hazard another guess from this tabulation: It has been noted by several workers (Elmendorf *passim*; Reichard, *IJAL* 25.53, 1960) that the lexicon diverges among the different languages far more than the rest of the grammar. How this came about and what this means is one sort of question, and I do not propose to enter upon that matter here. But we may also ask: What sort of rules will permit that? It would seem to me that the following (as in Semitic, but not in IE generally) would be a minimum set of necessary conditions:

1. Features necessary to specify underlying forms should also appear in surface forms.
2. There should be a fair number of phonological rules redistributing the incidence of \(V_x\) and \(C_x\); this prevents elements from getting "frozen" in one shape, then to become the victim of a simple Lautgesetz.
3. These rules should affect large numbers and broad categories of elements. Such generality makes their subdetail easily recoverable.
4. Context-sensitivity for such rules should be relatively simple. This hinders context from becoming part of the rule and vice versa.
5. Features of rule-marking (Lakoff, *On the nature of syntactic...*).
irregularity, Cambridge 1965) should be minimized. This is in part a more precise specification of (3) above.

If the above conditions are correct, (1) should enhance the ultimate relevance of our present attempt to sketch the feature matrix of Tillamook.

To approach the consonants we do best to start with the vowels. From TT §3.6 we may extract the following summary tabulation:

<table>
<thead>
<tr>
<th>[e, o]</th>
<th>e'</th>
<th>æ</th>
<th>æ'</th>
</tr>
</thead>
<tbody>
<tr>
<td>(post)vels.</td>
<td>unround.</td>
<td>front C</td>
<td>?</td>
</tr>
</tbody>
</table>

Let us now classify these vowels by phonetic range.

| i | high- mid; front | non-compact, acute |
|æ | low, "unrounded" (TT fn.8) | compact, acute |
|ə | non-front, non-low | non-compact, otherwise best unspecified and filled in by rule |

Because the front Vs seem not to permit much retraction, we regard them as the marked member phonetically; hence they are called acute here, but see further below. Likewise, low vowels stay low, while the non-low are attracted up and down; hence the former are marked phonetically, and are compact. The results so far may be approximated as follows:

```
<table>
<thead>
<tr>
<th>i</th>
<th>æ</th>
<th>ə</th>
</tr>
</thead>
<tbody>
<tr>
<td>acute</td>
<td>+ +</td>
<td>-</td>
</tr>
<tr>
<td>compact</td>
<td>-</td>
<td>+ +</td>
</tr>
</tbody>
</table>
```

There are two difficulties with this. Schwa is ambiguously specified, though this is deliberate, to try to allow the indeterminacy and overlap observed; though it contravenes the binarism. Still, this could be mended. More important is the fact that (a) as we shall see, we want for the C's not acute, but grave, and it would be desirable not to multiply features; and (b) we can then adopt no convention (e.g. 'observe the plusses') that will tell us which is the marked member (either in the sense of phonetically restricted, or of less usual and therefore economically specified for purposes of symbol counting).

Let us now classify the above sets of environmental consonants by the vowel effect which they seem to provoke.

<table>
<thead>
<tr>
<th>back velars, ?</th>
<th>lowering</th>
<th>OR compact</th>
</tr>
</thead>
<tbody>
<tr>
<td>pals., lat., k-series raising, fronting</td>
<td>&quot;rounded&quot;, unclustered h backing, &quot;round&quot;</td>
<td>grave</td>
</tr>
<tr>
<td>unrounded (post)velars fronting</td>
<td>non-grave</td>
<td></td>
</tr>
</tbody>
</table>

That is to say, compact is obvious and easily decided. Backing and "rounding" go together, and are efficiently attributed to grave; this is clearly the more restricted, hence marked, member. Unless we find a pressing need to proliferate our set of features, we shall not, of course, wish to do so.

We may now solve the dilemma of acute/grave by abandoning simple binarism and adopting marking rules. (If I do not use marking throughout what follows, it is because I may not in some instances see its advantage clearly enough, or I may lack syntactic information to make decisions, or because my technical skill and understanding are as yet inadequate; in such cases, I simply enter customary + or -.)
Let us revamp our vowel matrix:

\[
\begin{array}{c|cccc}
  \text{cons} & - & - & - & - \\
  \text{grave} & m & m & u & u \\
  \text{compact} & u & m & m & u \\
\end{array}
\]

Now, anticipating our results for the Cs which will preserve the values arrived at above on strong grounds, we write the following rules to convert marking to + and -.

(i) \([\text{m comp}] \rightarrow [+ \text{ comp}]\)

(ii) \([\text{m grv}] \rightarrow [- \text{ grv}] \text{ in env. } [- \text{ cons}]\)

(iii) \([\text{m grv}] \rightarrow [+ \text{ grv}] = [+ \text{ cons}]\)

Obviously, (ii) and (iii) would be well collapsed into an alpha-rule.

(ii.a) \([\text{m grv}] \rightarrow [\alpha \text{ grv}] \text{ in env. } [\alpha \text{ cons}]\)

Now we may proceed to the consonant matrix. For clarity of the argument, we will first fill in just those feature-specifications which result from the above analysis, plus others which seem pretty obvious at a glance and on past experience.

\[
\begin{array}{lccccccccc}
  t & c & k & q & k^w & q^w & s & \xi & x^w & x^w & n & ? & h & l & w & y \\
  \text{cons} & + & + & + & + & + & + & + & + & + & + & + & + & + & + & + \\
  \text{chkd} & + & + & + & + & + & + & - & - & - & + & + & + & + & + & + \\
  \text{lat} & u & u & u & m & u & (u) & u & u & m & m & m & m & m & m & m & m \\
  \text{grv} & (u) & u & u & u & u & u & u & m & m & m & m & m & m & m & m & (u) \\
  \text{comp} & (u) & u & u & m & u & (u) & u & u & m & m & m & m & m & m & m & (u) \\
\end{array}
\]

Parenthesis means that the feature can be specified by redundancy rule. The checked and unchecked (currently being called glott, I believe) stops are collapsed into the same entry to save space.

The key problem, as well as our starting problem, is to find the most natural and parsimonious distinctions for the stops; the spirants for the most part will then follow. Let us assume that \(k^w\) and \(x^w\) follow \(k\) for compactness. Now we have all that TT call (318) "back"(of the stops proper) successfully specified; \(t, c, s\) must all be \([u \text{ grv}]\) and \([u \text{ comp}]\), So is \(n\), by rule. \(?\) and \(y\) are \([u \text{ grv}]\). Since we want \(w\) and \(y\) to fit naturally with \(i\) and \(\emptyset\), they must be \([u \text{ comp}]\), by rule.

Now we need some more features to distinguish the "front" Cs. The groove segments must be strident. But what separates \(t\) from \(k, c\) from \(\xi, s\) from \(\emptyset\)? Note (TT 316, and Edel) that \(k\) is \(\xi\), especially before \(i\). To distinguish \(t/\xi\) etc., Preliminaries (27) would invoke compactness, but this is already exploited on strong grounds. I therefore suggest sharpness (which currently might be assigned, with changed signs, by some to anterior).

As we have seen, the lone nasal is easy, and \(w/y\) are clear up to this point; \(l\) follows the latter and the laterals quite naturally. Now \(h\) (and \(?)\) cannot be \([-\text{cons}, -\text{voc}]\), since we require \([-\text{grv}]\) by the above alpha rule; we seek then to distinguish the laryngeals from the sonants. Note (TT 315) that aspiration in clusters is correlated with checked Cs; that hints at a motivation for calling the laryngeals \([+\text{chkd}]\), and the sonants accordingly \([-\text{chkd}]\). With this marking, we may now write grv and comp for the laryngeals in by rule. Our matrix now looks as follows:
In all of this, certainly grv and comp are the two most interesting features, and in them seems to lie the answer to our question. Tillamook seems indeed to be a language lacking rounding in the conventional sense, i.e. a feature flat. This applies even to the segments labelled with "w".

And now an interesting diachronic fact comes out. Salish p and m appear to have merged in Tillamook with h and w; note now that the latter pair share features with the segments labelled "w". On the other hand, to judge by Drachman's Twana, h and w were marked in the old system with [+grv]. Thus, by merging flat and grv, Tillamook has placed more of a load on compactness for the back Cs. This has called forth in a limited role the feature sharp (or the like). Hence, by merger, Tillamook may not have saved a feature; it may have merely traded one.

Note, too, that, counter to most languages, k is [-grv, -comp]. If that were true throughout Salish, it would explain its unstable behaviour.

Beograd, 1 June 1967