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## Number of phonemes and number of speakers

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## **Number of phonemes and number of speakers (1961)**

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*translated by Alexis Michaud*

### **Abstract**

[Observations from unrelated language families paradoxically bring out what looks like an inverse correlation between the number of phonemes in a language and the number of its speakers: languages with fewer speakers seem to have more phonemes. The interpretation proposed here is based on historico-geographical perspectives, as well as on socio-demographic considerations. The increase or decrease in the number of phonemes of a language appears to be influenced by the proportion of bilingual speakers, which itself depends on the type of relationships established with neighbouring societies, as well as on the absolute size of the group at issue. Equal bilingualism is typically found between small language communities. It involves neighbouring populations that are in contact and have long-standing ties through exchanges and marriages. This type of bilingualism tends to enrich phonemic inventories. It differs sharply from the unequal bilingualism that prevails in Europe, typically involving a stigmatized local variety spoken as first language and a prestigious national language spoken as a second language.]

### **1. The facts**

In recent years, G. Dumézil and H. Vogt have provided descriptions of Ubykh, a Caucasian language which is probably the language with the largest inventory of consonants in the whole world: 78 (see Vogt 1960; Dumézil 1955, 1957; and Dumézil and Namitok 1953). Ubykh only has three vowels, which nonetheless brings the number of phonemes to a total

of 81.<sup>1</sup> This West-Caucasian language is now only spoken by a few elderly speakers and is about to become extinct. Is there a relationship between the considerable number of phonemes in Ubykh and the fact that this language only has few speakers left?

The decrease in the number of people speaking this language results from a sequence of historical events. When the Russians conquered the Caucasus in 1864, all the Ubykh left their homeland and resettled in Turkey, where they became scattered across different villages among other Caucasians; they are currently abandoning their language and switching to Cherkés or Turkish. However, the reason these historical circumstances have inevitably led to the impending demise of Ubykh is that, before the Russian conquest, Ubykh was already spoken by fewer speakers over a much more restricted territory than neighbouring Caucasian languages. Interestingly, the neighbouring languages, while they have the same vocalic system as Ubykh, have fewer consonants: 57 in the Temirgoi-Abadzekh dialect of Cherkés-Adyge; 66 in the Bjedough-Chapsough dialect; 48 in Kabardian; 65 in Abazine; 49 in Abkhaz-Bzyb (Jakovlev and Ashkhamaf 1941: 424; Jakovlev 1948, 1949; Vodozhdokov 1960; Genko 1955; Zhironov et al. (1956: 597);<sup>2</sup> Khashba 1934).

In the East Caucasus, similar differences are found between Khinaloug, with its 59 consonants (and 18 vowels), which at present is spoken by fewer than 2,000 people, and the languages of the same group spoken in Daghestan, which have 33 to 40 consonants and 6 to 16 vowels (Desheriev 1959: 12–15; Bokarev 1949, 1959; Zhirkov 1955). Modern Georgian can serve as another term of comparison: it only has 28 consonants (and 5 vowels); Classical Georgian only had two or three more consonants (Marr and Brière 1931: 3–14; Rudenko 1940: 19–27).

Now examining another region, North America, great discrepancies are observed in terms of number of consonants as one goes from the Atlantic to the Pacific. In the Atlantic region, languages have under 20 consonants. We can mention, among Algonquian languages, Delaware (14 consonants), and among Iroquoian languages, Oneida (10 consonants). It is only as one draws close to the Rocky mountains that one comes across languages with

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1. In general there are more consonants than vowels in a language's phonological system, and languages that are rich in vowels are not good competitors in terms of their total number of phonemes. Thus, Khmer, whose thirty vowels make it one of the richest languages in this respect, only has eighteen consonants, yielding a total of forty-eight phonemes.
  2. [Cited by Haudricourt as "Serd'uchenko n.d.".]

more than 30 consonants (in Athabaskan): Apache-Chiricahua (31), Navajo (34), and Chipewyan (39). Similar figures are found among the languages of Oregon and British Columbia in the Cascade Range: Chinook-Wishram (32) and Tsimshian (35) (Meillet and Cohen 1924: 1164, 1180; Lounsbury 1953: 28–32; Hoijer 1946: 58; Reichard 1951: 16–20; Sapir 1909: XV; Boas 1911a: 565, 1911b: 289–291; Barbeau 1951: 108–109).

The historical turmoil involving the indigenous populations of these areas has been greater than in the Caucasus, making it difficult to assess the original numbers of speakers for each language. Looking at language maps, one can nonetheless notice that there are far more languages in Oregon and British Columbia than in the regions of the Mississippi and Saint Lawrence rivers (Voegelin and Voegelin 1953; a geography of phonemes was attempted by Milewski 1953).

In the Caucasian area, we drew comparisons across languages that are generally considered to have a common origin, whereas in America the comparison ranged across different linguistic groups. However, the same degree of richness in phonemes is found along the Pacific coast across the most diverse language groups: among the languages mentioned above, some belong to the Athabaskan family, others to Salish, Wakash, or (in the case of Tsimshian and Chinook) North-Penutian.

## **2. A historico-geographical explanation: archaism and degree of isolation**

Comparative linguists who have worked on Indo-European and Semitic languages commonly believe that rich phonemic inventories go back to the most distant past, that it is a primitive, original trait. Thus, the 28 consonants of Classical Arabic correspond to the proto-Semitic system, which simplified to yield the 22 consonants found in the Phoenician alphabet. The 31 consonants of Sanskrit have long been considered to reflect directly the proto-Indo-European consonant system, whereas only 15 consonants are found in Greek, and 13 in Latin. In this perspective, one could consider a language's richness in consonants as reflecting the archaism which naturally characterizes the relatively isolated populations of mountain areas such as the Caucasus, the Rocky Mountains and the Cascade Range.

However, we now know for a fact that the evolution of languages does not consist of a gradual decay, as the romantically-inclined founders of

linguistics believed. Phonetic evolution can lead to the appearance of new phonemes, including new consonants. Thus, in modern Arabic dialects, emphatic *b*, *r*, *l* have appeared; these were not present in the classical language (Cantineau 1951: 67). Modern languages of India, such as Sindhi, have acquired preglottalized, implosive 'b, 'd and 'j [IPA: *ɓ*, *ɗ*, and *ɟ*] which were absent in Sanskrit (Bahl 1936), though in the end, these additions were compensated by the loss of other consonants. Romance languages provide better examples: Classical Latin (13 consonants) evolved into French (16 or 17) and Spanish (19) (Llorach 1950). Here again, dialects are richer than national languages: there are 26 consonants in the Vinzelle dialect of French (Auvergne – another mountain area), and, in the Alps, 23 in Hauteville and 28 in Ollon (Haudricourt and Juilland 1949: 128; Martinet 1956). Among Neo-Greek dialects, Tsakonian, spoken in the mountains of the Peloponnese, has 28 consonants (Trubetzkoy 1949: 173). This suggests that the presence of a great number of consonants can result from an increase in the inventory [and not necessarily from the preservation of a consonant-rich system inherited from the distant past]. In his research on the Salish languages, Swadesh showed that proto-Salish, with its 32 consonants, evolved into 23-consonant Tillamook (on the coast), on the one hand, and into 39-consonant Coeur d'Alène (in the Rocky Mountains), on the other. He also showed how neighbouring languages played a role in this evolution (Swadesh 1952).

### 3. A socio-demographic explanation: equal bilingualism

The above developments show that the historico-geographical account – that archaic characteristics are preserved due to isolation – is not the whole story. This is especially clear in the case of Oceanic populations: despite their insular isolation, they display great discrepancies in terms of number of phonemes, although they all belong to the Austronesian family (more commonly called Malayo-Polynesian).<sup>3</sup> Some of them are the most impoverished in the world: the languages of Hawaii and Tahiti, with 9 consonants, and of Samoa, with 10 consonants. These happen to be the most important languages of Polynesia: Hawaii, Tahiti and Samoa are the largest islands, and the most populated, leaving aside New Zealand which

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3. I raised this issue in an article published in 1946, but made errors in linguistic classification.

was settled more recently (Klieneberger 1957). On the other hand, in New Caledonia, we find at least seven languages in the Northern part alone, and a total of some twenty dialects. Their consonant inventories range from 30 to 40: voiced spirants, which in the far north of the island (Balade) are only variants, have phonemic status in the centre (Temala, Hienghène); in the south, they are accompanied by corresponding voiceless spirants (Voh, Kone) (see Leenhardt 1946, and my own – unpublished – 1959 fieldwork notes). It is clear in this case that the richness of consonant inventories is favoured, not by isolation, but rather by the presence of a neighbouring language. This leads us to the topic of bilingualism, since it is through bilingualism that the influence of a neighbouring language exerts itself.

It has long been known that bilingualism can have a great influence on a language. Large numbers of borrowings can lead to the introduction of new phonemes, *e.g.* the introduction of Germanic **h** in Gallo-Roman of the Frankish period. The superposition of the phonological systems of two languages can lead to the phonologization of a variant, modifying the evolution of the consonant system. Thus, in Old English, the phoneme **f** had an intervocalic variant **v**. The introduction of **v**-initial Anglo-Norman words created a **v** phoneme, distinct from **f** and **b**, with the result that **w** preserved its original pronunciation instead of changing to **v** as it did in the other Germanic languages. The bilingualism of Anglo-Norman times blocked the evolution of **w** by adding a new phoneme to the system; as a consequence, English is one of the very few Indo-European languages that have retained the prehistorical value of the phoneme represented by **w**.

Let us first clarify the kind of bilingualism that is involved here. In Europe, most bilinguals exemplify what one could call *unequal* bilingualism: their mother tongue is a *patois*, or a local dialect, whereas their second language is a national language – a language of communication or of culture. The two languages of the bilingual person differ in terms of functions, spheres of use and concepts; they are almost untranslatable into each other. This situation is unstable due to the inequality in prestige between the two languages. For instance, in the case of present-day *patois*, it is common for speakers to abandon them deliberately, with bilingual peasants systematically avoiding speaking to their children in *patois*. In the case of the Germanic dialect of the Franks, or of Anglo-Norman in England, the prestige language did not take root and the indigenous language – now enriched by borrowings – supplanted it in all its functions.

However, there exists another type of bilingualism, *equal* bilingualism, between neighbouring populations that are in contact and have long-standing ties through exchanges and marriages. In this case, the two languages match each other closely in their use and functions; in their concepts and grammatical categories, they often mirror each other. This is the type of bilingualism that dominates among small language communities (in which there are only a few hundred speakers of a language). Leenhardt has pointed out that in New Caledonia, “possessing several languages is one of the essential components of culture for a traditional Kanak” (Leenhardt 1946: XVII); festivals and marriages always bring together speakers of neighbouring languages. Taking these Oceanic languages as an example, we can try to understand how they have become richer in terms of number of consonants. Eastern Austronesian taken as a whole suggests that the proto-system of consonants had 15 phonemes – a figure close to the 14 found in present-day Fijian – and that there were consonantal losses in Polynesia due to mergers (merger of **l** with **r** and of **nd** with **t**) and to the loss of **ʔ** (and the change from **k** to **ʔ**) in Samoa, as in Hawaii (where **ŋ** merged with **n**) and in Tahiti (where **ŋ** changed to **ʔ**). Contrarily, the Polynesian dialect of Ellis and Greenwich has a series of aspirated consonants which constitute a recent development: they originate in the contraction of reduplicated forms (**kakalo** > **k<sup>h</sup>alo**; **popoko** > **p<sup>h</sup>oko**; etc) (Milner 1958). In New Caledonia (in the northernmost third of the island), the same phenomenon took place, yielding aspirated consonants; then, under different prosodic conditions, spirants appeared, aspirated consonants yielded unvoiced spirants and unaspirated consonants voiced spirants (**p** > **v**, **p<sup>h</sup>** > **v<sup>h</sup>** or **f**, etc). These variants became independent phonemes with the disappearance of the prosodic conditioning which had given birth to them. This is how *\*puci-cek* ‘snare, noose’ became **puye-cek** in Hienghène and **vuci-yeʔ** in Voh; *\*kape* ‘place’ became **kave** (variant: **kae**) in Hienghène and **ape** in Voh.

This type of bilingualism thus plays several roles: it can contribute to the preservation of the existing system; it can expand the system slowly (through the acquisition of new phonemes from neighbouring languages) or rapidly in cases where phonemic status is granted to an entire series of variants through levelling of prosodic contexts. The latter process is widespread because prosodic features (stress or tones) constitute the most change-prone aspect of the system of a language. And indeed, prosodic

features are the first to be modified by bilingualism (and they figure prominently among signs of “foreign-accentedness”<sup>4</sup>).

We can now contrast this “phonemic-expansion-prone” state of affairs with a “phonemic-reduction-prone” state of affairs. The latter situation is that of populations that are monolingual because they outnumber their neighbours, or because they are completely isolated, or, most importantly, because of the superiority that they have (or believe that they have) over their neighbours, who will have to take the trouble to learn their language. Indeed, they believe their superiority to be so obvious that they need not even bother to articulate properly in order to be understood: they can afford to merge two different phonemes, or to drop a phoneme, without any risk of becoming the laughing-stock of others. This is why the lowest number of consonants is found in the language of the Iroquois, agriculturalist-warriors who terrorized their Algonquian neighbors, or of the people of Tahiti and Hawaii, who combine insular isolation with a degree of demographic development that is considerably greater than in the other archipelagos, which are less well endowed.

### **Conclusion**

The increase or decrease in the number of phonemes in a language thus appears to depend on the proportion of bilingual speakers, which itself depends on the type of relationships established with neighbouring societies, relationships of reciprocity being conducive to mutual enrichment from a linguistic point of view, as well as on the absolute size of the group at issue. In the case of a small group, the entire population inhabits a frontier zone; the larger the group, the lower the proportion of the population living close to the borders.<sup>5</sup>

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4. [The passage within brackets was added at translation: the original only contains the mention “(accent étranger, etc.)”, i.e. “foreign accent, etc.”]
  5. In this article, the phoneme was considered as an objective, scientifically observable reality, following the general opinion of the linguists of the old continent. It must be pointed out that in the United States some authors, following Chao Yuen-ren (1934), consider the phoneme as an arbitrary construct made by the linguist. In this perspective, it would be necessary to operate with distinctive features instead (i.e. the components of the phonemes). Numerical differences between languages would then be less considerable, or at any rate much more difficult to bring out. I believe this to be an error of



**Comments, by Alexis Michaud**

Discussion of this article is divided into a brief review of more recent studies about equal multilingualism (§1), a caveat about the title of the paper (§2), and a thought about how to test Haudricourt's hypotheses about the mechanism of phoneme loss in dominant languages (§3).

## 1. Equal vs. unequal forms of contact between languages

The importance of bilingualism as a source of linguistic change was stressed by Antoine Meillet, whose works constituted Haudricourt's first introduction to linguistics (Haudricourt and Dibié 1987: 19, 22). But Meillet only discussed a type of bilingualism involving a stigmatized local variety spoken as first language and a prestigious national language spoken as a second language: "There are bilingual people wherever a major language of civilization sets in alongside an earlier, local idiom" (Meillet 1933). Haudricourt, on the basis of his observations in Oceania, broadens the typology to include not only *unequal bilingualism* but also *equal bilingualism* in neighbouring populations that are in contact and have long-standing ties through exchanges and marriages.<sup>6</sup>

The distinction made by Haudricourt between symmetrical and asymmetrical forms of language contact can be said to have become an uncontroversial part of the linguist's toolbox. Research into types of exchanges between languages of Oceania confirms the strong link between

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method on the part of these authors; however, discussing this issue would take us too far from the topic of this article. [*Editors' note*: it would be a misinterpretation to read Chao's article as claiming that the phoneme is an arbitrary construct. The main point of Chao's article is the following: "We may desire to have (a) phonetic accuracy, or smallness of range of phonemes, (b) simplicity or symmetry of phonetic pattern for the whole language, (c) parsimony in the total number of phonemes, (d) regard for the feeling of the native speaker, (e) regard for etymology, (f) mutual exclusiveness between phonemes, (g) symbol reversibility, and these motives are often conflicting" (Chao 1934 [1958]: 28).]

6. Haudricourt's terms are "bilinguisme non égalitaire" and "bilinguisme égalitaire"; this could be translated in English as "non-egalitarian bilingualism" and "egalitarian bilinguism" (the choice of terms in François 2012). The terms chosen here, distinguishing "unequal bilingualism" from "equal bilingualism", are used *e.g.* by Winford (2003).

social situations and types of linguistic convergence and divergence, and the great difference that exists between equal and unequal bilingualism. Beyond phonemic inventories, recent studies shed light on the effects of contact on lexicon and syntax. “While word forms are perceived as emblematic of place and diffuse to smaller social circles, linguistic structures are left free to diffuse across much broader networks. Ultimately, the effects of divergence and convergence are the end result, over time, of these two distinct forms of horizontal diffusion” (François 2011, 175 and references therein).

Haudricourt points out that situations of equal bilingualism are uncommon in the societies most commonly studied by linguists. Today, such situations are becoming ever scarcer: there remain few small-scale societies that “are economically self-sufficient, and proudly form the center of their own social universe without needing to defer unduly to more powerful outside groups” (Evans 2010). The Melanesian societies observed by Haudricourt have seen much change in the half-century since the publication of his paper, in particular community mergers, expansion of pidgin (Bislama in Vanuatu), and a rise of asymmetrical bilingualism in the context of modern formal education.

“A long lasting bias toward cultural differentiation of local communities has led historically to the linguistic mosaic observable today. This traditional fostering of diversity was correlated with a principle of egalitarian multilingualism. But while these ancient social attitudes have survived to this day, the linguistic diversity of northern Vanuatu has already begun to erode, due to various recent social changes. These changes have reshaped the language ecology of the region and already resulted in the partial loss of earlier linguistic diversity. While northern Vanuatu is still linguistically diverse today, the increased imbalance of power among languages potentially makes the weaker varieties vulnerable in the decades to come.” (François 2012, 85)

## 2. Number of phonemes and number of speakers

The title of Haudricourt’s article is highly provocative. In a sense, it is a private joke between Haudricourt and Lévi-Strauss: the article was written at the solicitation of Claude Lévi-Strauss, who was launching the anthropology journal *L’Homme*, and Haudricourt facetiously wrote his contribution *à la Lévi-Strauss*. He confesses that he would never have

dared submit it to a linguistics journal (Haudricourt and Dible 1987: 55). The title, which relates demography to phonological structure, is a pastiche of Lévi-Strauss's titles that bring together distant concepts: "Socialism and Colonization" (1933), "Reciprocity and Hierarchy" (1944), "Structure and Dialectic" (1956), or *Race and History* (1952). In detail, Haudricourt's article does not propose a simple relationship of inverse correlation between the number of phonemes in a language and the number of its speakers: the real factor is not the number of speakers by itself, but the type of sociopolitical relationships between users of languages in contact. The two types of factors brought out by Haudricourt are "historico-geographical" and "socio-demographic"; this is by no means a matter of demography alone. It is important to clarify that Haudricourt does not hold the untenable view that the sizes of speaker populations, in and of themselves, determine rates of language change. Linguistic facts are of such a degree of social complexity, and have such historical depth, that their reduction to two figures – number of phonemes, and number of speakers – cannot yield insights into the great diversity of phonemic inventories in the world's languages (as emphasized *e.g.* by Trudgill 2011:156).

A detailed critical review of statistical searches for a correlation between number of speakers and number of phonemes is proposed by Moran et al. 2012.

### 3. Decrease in phonemic inventories in dominant languages

One of Haudricourt's suggestions in this article is that speakers of dominant languages feel so confident of being understood that they hypoarticulate to an extent that leads to some confusions between phonemes, gradually decreasing the phonemic inventories of dominant languages. Trudgill (2002) expresses reservations about this proposal. The next step appears to lie in experimental verification.

"[F]orming hypotheses from case-based observations is a reasonable first step in investigating these kinds of questions, but the crucial next step in a scientific approach to language study is careful empirical analysis of as much data as can be gathered that bears on the question at hand. Without this further step, the claims of Haudricourt, Trudgill, and others can be no more than hypotheses—albeit thoughtful, refined, and educated hypotheses." (Moran et al. 2012: 878)

This appears as a highly interesting topic for phonetic studies, and a great challenge, as it requires both (i) a degree of technical precision that is best obtained in a phonetics laboratory, with specialized exploratory techniques, and (ii) the successful elicitation of specific sociolinguistic attitudes that are difficult to reproduce in the unnatural setting of a recording booth.

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