

Spirants, nasals, and liquids participate neither in this correlation nor in any other correlation based on the manner of overcoming an obstruction of the second degree. As for the clicks, they are divided into voiced, voiceless-aspirated, voiceless with a "hard" onset, and nasalized. At least in the case of voicelessness they show the above opposition between complete and restricted egress of air.¹⁶⁷ The clicks in Sandawe, as described by Dempfwolff, are divided into a "lateral," a "dental," and a "cerebral" series, in accordance with the localization series. Grouping the lateral click phonemes with lateral λ , λ , λ' is a matter that needs no further discussion. According to Dempfwolff, the "dental" click with a hard onset seems very similar to ts' acoustically. Further, it is presumably also difficult to distinguish the "cerebral" recursive click acoustically from k^s (*op. cit.*, p. 10). The "dental" click phonemes may therefore be grouped with the sibilant series, the "cerebral" clicks with the guttural series. The latter presupposes that for the "gutturals" of Sandawe it is not a particular part or a specific shape of the tongue which is phonologically relevant, but merely the contact of a particular part of the palate and the dorsum or retroflected tip of the tongue. The consonantal system of Sandawe may therefore be represented by the chart which follows.¹⁶⁸ (The transcription used by Dempfwolff is retained.)

Finally, the consonantal system of Hottentot may be discussed. Thanks to the excellent work done by D. M. Beach,¹⁶⁹ we now have reliable data on the number of phonemes in Hottentot and the essential characteristics of their phonetic realization. The only question is to determine the relation of these phonemes to each other. Hottentot, or more precisely the Nama dialect, has only one occlusive and one nasal in the labial series, and only one occlusive and one spirant in the laryngeal series. At first glance the apical series seems to show the same structure as the labial series ($t:n = p:m$), and the sibilant series the same structure as the laryngeal series ($c:s = c':h$). However, this impression is contradicted first by the fact that the sibilant occlusive (affricate) c is strongly aspirated, while the other occlusives of Nama are voiceless lenes without, or almost without, aspiration. Second, the guttural series of Nama stands in a certain contradistinction with the above interpretation of the other series of localization. This guttural series has not only plosive k (realized as a voiceless lenis without aspiration) and a spirant x , but also a strongly aspirated affricate kx . It is clear that the relation $kx:x$ is identical with the relation $c:s$. But how then should the relation $k:kx$ be interpreted? Is it the opposition between plosives and affricates that is phonologically relevant for this pair of phonemes, or is it the opposition between unaspirated and aspirated occlusives? Aspiration cannot be explained as a phonetic consequence of

Consonants	Labials		Apicals		Gutturals		Sibilants		Laterals		Laryngeals	Without localization	
Occlusives	Voiced		Voiced		Voiced		Voiced		Voiced		Voiced		
	Voiceless		Voiceless		Voiceless		Voiceless		Voiceless		Voiceless		
Fricatives		Fricatives		Fricatives		Fricatives		Fricatives		Fricatives		Fricatives	
Nasals		Nasals		Nasals		Nasals		Nasals		Nasals		Nasals	
Liquids		Liquids		Liquids		Liquids		Liquids		Liquids		Liquids	
Full expiration	b	d	k, kh	t	g	dz	t'	g	d	l'	$'$		
Restricted expiration	b	d	ph	t	g	ts	lh	s	t	lh	(h)		
Full expiration	p	t	k^s, k^s	x	ts'	ts'	l'	s	t', t^s	l'	h		
Restricted expiration	p	t	k^s, k^s	x	ts'	ts'	l'	s	t', t^s	l'	h		
Fricatives		f	x	x	s	s	s	s	s	s	h		
Nasals		m	n	lh	n^{170}	n	lh	n	l/n	l/n	$-$		
Liquids		w	$-$	$-$	$-$	$-$	$-$	$-$	l	l	$-$	y, r	

affrication. Conversely, however, affrication may be interpreted as a phonetic consequence of strong aspiration. Consequently it would probably be advisable to consider Nama *kx* (or more precisely *kxh*) an aspirated fortis consonant, and the affrication an irrelevant phonetic phenomenon. But since the relation "*kx*":*x* in Nama must clearly be equated with the relation "*c*" (= *tsh*):*s*, the affrication of *c* (= *tsh*) must also be considered irrelevant. In other words, "*c*" (= *tsh*) is a strongly aspirated fortis consonant which stands in the same relation to the lenis *t* as the "*kx*" stands to *k*. Accordingly there is no reason to posit a special sibilant series for Nama: instead there exists only one apical series in which aspirates and spirants are realized as sibilants, the unaspirated tenuis consonant and the nasal, on the other hand, as nonsibilant occlusives. Accordingly in a phonemic transcription "*kx*" and "*ts*" must be rendered as *k^h* and *t^h*. From a phonological point of view, with respect to these phonemes there is no difference between Nama and Korana, where they are actually realized as unaffricated aspirated plosives. The results at which we have arrived so far may be summed up as follows: Nama shows the following correlations with respect to nonclicks: (a) the correlation of aspiration, (b) the correlation of constriction, and (c) the correlation of nasals. Neither the correlation of aspiration nor the correlation of constriction are present in the labial series. They coalesce in the laryngeal series. (*h* may therefore be designated with equal justification as a laryngeal aspirate or a laryngeal spirant.) The correlation of nasals, on the other hand, is found only in the labial and apical series. The "sole liquid" *r* stands outside the system of correlations. This may be presented in a diagram as follows:

<i>p</i>	<i>t</i>	<i>k</i>	<i>ʔ</i>	+ <i>r</i>
-	<i>t^h</i>	<i>k^h</i>	<i>h</i>	
-	<i>s</i>	<i>x</i>		
<i>m</i>	<i>n</i>	-	-	

As regards the click series, we have already seen above, when we discussed the click correlation, that in Hottentot only the apical and the guttural series participate in that correlation.¹⁷¹ We further mentioned that the clicks are divided into "plosive" and "affricative" clicks. Let us disregard this opposition for the present and occupy ourselves with the various manners of overcoming an obstruction which exist in each of the click

series of Nama. According to D. M. Beach, there are five such manners or types: (a) "the weak unvoiced velar plosive type" (pp. 82 f.); (b) "the strong unvoiced velar affricative type" (pp. 83 f.); (c) "the glottal plosive type" (pp. 84 ff.); (d) "the glottal fricative type" (pp. 86 f.); and (e) "the nasal type" (pp. 87 f.). It is clear that the nasal clicks correspond to the nasal nonclicks, though one can at the most only speak of an exact correspondence in the prelingual series. The guttural series in Nama does not contain any nasal. However, similar symmetrical phenomena are not rare in the phonemic system of Nama, in which the click phonemes show great differentiation in general. It is also not difficult to interpret the other "types." Types (c) and (d) are characterized by the fact that the anterior as well as the posterior lingual closure (i.e., the "basic closure" and the "supplemental closure") are released first. Only then does the egress of air necessary for the articulation of the vowel begin, i.e., with a hard onset (*ʔ*) in the case of (c), with an aspirated onset (*h*) in the case of (d). It is clear that type (c) corresponds to the unaspirated occlusives, while type (d) corresponds to the aspirated occlusives. Types (a) and (b) are characterized by the fact that the egress of air sets in after the basic closure is released but prior to the release of the supplemental closure. Thus after the specific suction or click sound a *k* is audible in type (a), a *kx* in type (b). These sound approximately like normal *k* and *kx*. "*kx*," as we already know, is an aspirate. Therefore, exactly the same relation as between (c) and (d) holds between types (a) and (b). How then should the relation (a):(c) and (b):(d) be construed? The description by Beach shows that in the "glottal types" [(c) and (d)] both closures are released more quickly and the onset of the egress of air is delayed longer than is the case in the "velar types" [(a) and (b)]. The total duration of the clicks of type (a) is presumably shorter than that of the clicks of type (c) (*op. cit.*, p. 117). Thus ultimately the delay in onset of the egress of air is decisive for the acoustic result.¹⁷² Accordingly the relation between types (a) [or (b)] and (c) [or (d) respectively] could perhaps be designated as a correlation of intensity. The types with an accelerated onset of the egress of air [(a) and (b)] would then have to be considered the "weak" members of this correlation, the types with a delayed onset in the egress of air [(c) and (d)] the "strong" members.¹⁷³ The phonological interpretation of the opposition between the "plosive" and the "affricative" click series is the most difficult. We have already seen that in the nonclick series the affricates are only a phonetic realization of the aspirates. The opposition between *k* and "*kx*" (or *t* and "*ts*" respectively) in the click sounds thus corresponds to the opposition between types (a) and (b) [or between (c) and (d) respectively]. The opposition between plosive and affricative clicks has nothing

to do with this because types (a), (b), (c), and (d) exist in the plosive as well as the affricative series. The question, however, remains whether the opposition between the plosive and the affricative click series could not be compared with the correlation of constriction in the nonclick series. The parallelism is certainly not complete. An actual "constrictive" or "spirant" cannot be produced under the phonetic conditions that are prerequisite to click production. Each click must of necessity begin with an occlusion, and this is part of its very nature. What remains then is the opposition between sudden (plosionlike) and frictionlike release, which is certainly not dissimilar to the opposition between occlusion and constriction. The "dental" affricative clicks have something "ts-like" and may therefore be considered click equivalents of *s*. The relation between the "lateral" affricative clicks and *x* is less evident, as is the relation between the plosive "alveolar" (or "cerebral") clicks and *k*. But since a real velar click is in general impossible, there can here be a question of relative similarity only. And if one considers that the position of friction is located much farther back for lateral clicks than for dental clicks, this relation can probably be compared with that between *s* and *x*.¹⁷⁴ But even if the interpretation of the Hottentot affricative click series proposed by us is accepted, a certain asymmetry remains in the phonemic system: while the nonclick lingual series have only one "fricative" each (*s* or *x*), the corresponding click series indicate five affricates or fricatives each. These are differentiated by the correlation of nasals and by a bundle consisting of the correlation of aspiration and the correlation of intensity. The chart opposite may illustrate our interpretation of the consonantal system of Nama. We are using the transcription in the Latin alphabet suggested by D. M. Beach, in which the various clicks are expressed by ligatures. As one can see by the chart, the category of "affricates" is ambiguous.¹⁷⁵

These examples should suffice to give a picture of the variety of consonantal systems that are the result of a combination of various correlations based on the manner of overcoming an obstruction of the second degree.

c. *The opposition of gemination as a correlation of overcoming an obstruction of the third degree (Überwindungsartkorrelation dritten Grades).* Correlations based on the manner of overcoming an obstruction of the second degree may, of course, be considered as such only if both opposition members are evaluated as monophonematic. In a language such as Ukrainian a combination between a voiced consonant and a voiced aspirate occurs very frequently. However, since this combination always exceeds the duration of a single consonant and is either distributed over two syl-

Consonants			Labials	Prelingual		Postlingual		Laryngeals
				Simple	Click	Simple	Click	
Occlusives	Unaspirated	Light	<i>p</i>	<i>t</i>	$\neq k$	<i>k</i>	$!k$	(Not designated)
		Heavy			\neq		$!$	
	Aspirated	Light	<i>ts</i>	$\neq \chi$	$^k\chi$	$!\chi$		
		Heavy		$\neq h$		$!h$		
Fricatives	Unaspirated	Light	-	δ	$/k$	χ	$//k$	<i>h</i>
		Heavy			$/$		$//$	
	Aspirated	Light			$/\chi$		$//\chi$	
		Heavy			$/h$		$//h$	
Nasals	Plosive	<i>m</i>	<i>n</i>	$\neq n$	-	$!n$	-	
	Affricative			$/n$	$//n$	-		

+r

lables (as in "pid horoju" [at the foot of the mountain], "vid-horodyty" [delimit]) or can be divided etymologically ("z-hodyty s'a" [to unite, fit together]), it cannot be interpreted as the realization of a single phoneme but only as the realization of a phoneme sequence (*d + h*, *z + h*, etc.). Accordingly there can be no question of a correlation of aspiration in Ukrainian. However, many languages have so-called geminated consonants. These are distinguished from "simple" or "nongeminated" consonants by a longer duration, and in most cases also by a more energetic articulation that is reminiscent of the correlation of intensity. In intervocalic position geminated consonants are distributed over two syllables, their "on-glide" being grouped with the preceding syllable, their "off-glide" with the following syllable. Furthermore, these geminated consonantal combinations are found in those positions where consonantal combinations are permitted by the particular language. They have the same effect on their environment as consonant clusters and are generally treated in the

same way as combinations of consonants. All these features point to a poly-phonemic interpretation, that is, they call for an interpretation of "geminated" consonants (or "geminates") as a combination of two identical consonants.¹⁷⁶ This becomes immediately clear in those languages where geminated consonants occur only at the morpheme boundary, as, for example, in Russian or Polish (with the exception of loanwords). However, in those languages where geminated consonants *do not occur only* in that position (as, for example, in Sanskrit), and particularly in those languages where they *never* occur at a morpheme boundary (as, for example, in Japanese), geminated consonants take an intermediary position between single phonemes and phoneme clusters. From the point of view of those languages, geminates are special consonantal phonemes which are distinguished from other consonantal phonemes in that their beginning and end exist phonologically as two separate points, while the beginning and end of all other consonantal phonemes coalesce phonologically into one point.

Accordingly a special *correlation of consonantal gemination* is present in some languages. Its correlation mark is the separate existence of the beginning and end of a consonantal phoneme, as opposed to the coalescence of beginning and end. It is evident that this correlation cannot be counted among the correlations based on the manner of overcoming an obstruction of the second degree. Its mark is fundamentally different from those of the six correlations enumerated above (Chap. IV, 4Bb). The correlation of gemination must therefore be termed a *third-degree* correlation based on the manner of overcoming an obstruction.

While oppositions based on the manner of overcoming an obstruction of the second degree exist within the individual degrees of obstruction, the correlation of gemination is basically found within the resultant classes. It is true, of course, that in some languages this correlation extends to all classes based on the manner of overcoming an obstruction, but in very many languages it is limited to only a few particular classes. For example, the opposition between geminated and nongeminated consonants is found only in sonorants in some languages of Daghestan (Tabarasan, Aghul, Lak, Darghinian, Kubachi, Artshi, and Andi),¹⁷⁷ only in nasals and voiceless obstruents in Japanese,¹⁷⁸ in all consonants except the "mediae" in Classical Greek (Ionic-Attic), and only in sonorants and lenis occlusives in Korean.¹⁷⁹

There are languages that do not have any second-degree correlations based on the manner of overcoming an obstruction, but only oppositions based on the manner of overcoming an obstruction of the first degree on the one hand, and the correlation of gemination on the other. To these

languages belong, for example, the above-mentioned Tamil, in which the correlation of gemination comprises all sonorants (except *r* and *R*) and all obstruents;¹⁸⁰ also Vogul ("Mansi"),¹⁸¹ Ostyak¹⁸² ("Hanti"), and a few others. Finnish should actually also be considered as belonging to the same type. Finnish *g* occurs only in the combination "*ng*," which from the point of view of the Finnish phonemic system must be considered the realization of a geminated dorsal nasal, that is, as *ŋŋ* (e.g., "hanko" [fork], gen. sing. "hangon"; "lintu" [bird], gen. sing. "linnun"; "kampa" [comb], gen. sing. "kamman"). The opposition *t-d*, though bilateral, is thus isolated. (Incidentally, Finnish "*d*" is not a real occlusive.) Accordingly Finnish does not have any second-degree correlation based on the manner of overcoming an obstruction at all. But at the same time all Finnish consonants participate in the correlation of gemination (with the exception of *j*, *v*, *d*, and *h*, which are not permitted syllable-finally).¹⁸³

The relationship between the correlation of gemination and the correlation of intensity takes on a different form, depending on the language. The marked members of the correlation of intensity are very often longer than the unmarked members. (In some languages this difference in length is even obligatory.) Thus there is a great similarity between the correlation of intensity and the correlation of gemination.¹⁸⁴ The difference between the two correlations lies mainly in the fact that geminated consonants occur *only* in those positions where consonantal clusters are also permitted in the particular language, while the "heavy" consonants (that is, the marked members of the correlation of intensity) *do not occur only* in those positions. For example, in Lak, *ll* and *mm* occur only between vowels. Various consonantal groups are permitted in this position as well, in particular "liquid + consonant," "consonant + liquid," "nasal + consonant," "consonant + nasal." The "heavy" *p*, *t*, *k*, *q*, *c*, *č*, *x*, *š*, *s*, *š*, on the other hand, occur not only in this position but are also found initially, where consonantal clusters are not permitted.¹⁸⁵ There are also complicated cases in which the correlation of intensity and the correlation of gemination form a correlation bundle that is difficult to analyze. This is the case in Lapp, for example, where consonantal combinations are permissible only intervocally. The "long" consonants are also found only in this position. Consequently, these "long" consonants show different degrees of length, and their degrees of length are distinctive. In the maritime Lapp dialect of Maattivuono¹⁸⁶ geminated consonants show two distinctive degrees of length. But the same two degrees of length are found in consonantal clusters as well: in the case of the greater degree of length the first member of the consonant cluster is very long and forceful, with increasing

syllable intensity. Conversely, in the case of the lesser degree of length the syllable intensity is level or falling, and the first member of the consonantal cluster is short and weak. It is clear that the opposition between longer and shorter first members of a consonantal cluster can only be an opposition of intensity, and not an opposition of gemination. The relations between intensity and length in the case of geminated consonants in the particular Lapp dialects are exactly the same as for consonantal combinations. The "longer" geminates must therefore be interpreted as "heavy," and the "shorter" ones as "light": the relationship between Maativuono Lapp nom. sing. "boTtu" (bush) and gen. acc. "bottu" is exactly equivalent to the relationship between nom. sing. "luNtu" (stopper in a cartridge) and gen. acc. "luntu" (the "heavy" consonants are transcribed by capital letters). There are other Lapp dialects that phonemically distinguish not just two but three types of consonantal clusters: combinations in which the first component is "heavy," combinations in which the second component is "heavy," and those in which both components are "light." Before combinations of the first type only quite short vowels are permitted. Short and semilong vowels are distinguished before the second type, and semilong and long vowels before combinations of the third type. Accordingly three types of geminates are also distinguished in these Lapp dialects. They exert the same influence on the quantity of the preceding vowels and must therefore be interpreted as *Tt*, *tT*, and *tt* (*Pp*, *pP*, *pp*, etc.).¹⁸⁷ Thus the intensity of a geminated consonant does not remain unchanged in these and similar cases: an opposition of intensity exists between the beginning and end of the particular consonant. In Lapp these differences in intensity are accompanied by a gradation in the total duration of the geminated consonants (*Tt* is longer than *tT*, which in turn is longer than *tt*). However, from a phonological point of view this is unimportant and unnecessary. There seem to be languages in which the differences in intensity between the beginning and end of a geminated consonant do not influence the total duration of a particular consonant. This seems to be the case in Gweabo, a language of Liberia which has been mentioned already.¹⁸⁸ Here three types of geminates are distinguished: the first type is set apart from the other two by its somewhat shorter duration, but above all by its "lighter," that is, less forceful articulation (E. Sapir transcribes this type by 'b, 'd, 'm, 'n, 'ñ, 'w, 'y); the second type (according to Sapir, 'B, 'D, 'G, 'GW, 'GB, 'DJ, 'V, 'Z, 'M, 'N, 'Ñ) is also distinguished from the third (according to Sapir, "B, "D, "DJ, "W, "Y, etc.) by the distribution of intensity (pressure) which also affects the following vowel. The present case, as well as Lapp, thus involves a combination of the correlation of gemination with the correlation of intensity.

Accordingly it is not difficult to delimit the correlation of gemination from the correlation of intensity. It is sometimes more difficult to decide whether the correlation of consonantal gemination or the so-called correlation of close contact is present in a given language. But this problem has to be discussed in its proper place in connection with the prosodic properties. [See esp. pp. 199 ff.]

C Resonance Properties

Actually only the opposition between nasal and "oral" consonants belongs to the consonantal resonance properties.

Ordinary nasals are characterized by an oral closure with a lowered velum. Accordingly they stand in a relation of bilateral opposition to the occlusives. In most languages of the world the opposition "occlusive-nasal" is not only bilateral but also proportional, because it exists in at least two series of localization, the labial and the apical ($d-n = b-m$). In the few languages that do not have any labial obstruents, the dorsal (guttural) nasal usually exists as an independent phoneme, thus again creating a proportion ($t-n = k-ŋ$). This is true, for example, in Aleut (Unangan),¹⁸⁹ in Hupa,¹⁹⁰ and in Chasta Costa.¹⁹¹ Among the languages with which we are familiar only Tlingit indicates an isolated relation of opposition "occlusive/nasal" ($d-n$). The *n* here is the only nasal, and the labial class of localization is nonexistent altogether.¹⁹²

The opposition between occlusives and nasals is bilateral and proportional in all languages (with very few exceptions), and may be conceived of as privative. It can therefore be regarded as a correlation. This *consonantal correlation of nasals* occurs in all languages, but it is only rarely neutralizable. A clear example of the neutralization of this correlation in final position is found in Ostyak-Samoyed (or Selkup):¹⁹³ here the opposition between occlusive and nasal is phonologically irrelevant in final position. This means that one and the same word in final position sometimes has a voiceless oral occlusive and sometimes the corresponding nasal. Accordingly *m* and *p* (or *n* and *t*, or *ŋ* and *k* respectively) in that position are optional variants of one archiphoneme, while in all other positions *m*, *n*, and *ŋ* on the one hand, and *p*, *t*, and *k* on the other, are distinguished as independent phonemes.

Any localization series with the exception of the laryngeal series may, in principle, have its own nasal. A distinction between the nasal of the apical series and the nasal of the sibilant series is, of course, only possible if the articulatory difference between these two series exists and is distinctly marked not only by the shape of the tongue but also by the point of

contact at the roof of the mouth. Gweabo may be cited as an example in which the nasals are broken down into five localization series each, a labial, an apical, a palatal, a labiovelar, and a sibilant. The nasal "ŋ" probably corresponds to the apical series, and the nasal "n" to the sibilant series.¹⁹⁴ Normally, however, the sibilant series remains without its own nasal, insofar as it should not rather be designated as the palatal-sibilant or sibilant-palatal series. The number of languages in which each series of localization, except the pure sibilant and the laryngeal series, has its own nasal, is rather large. Such languages are found in Africa (Nuer, etc.) and Asia (Tamil, Central Chinese, Korean, etc.), as well as in America (Eskimo). However, there also exist those languages, and again in all parts of the world, in which the nasals occur only in part of the localization series. Particularly noteworthy is the circumstance that in very many of these languages the correlation of nasals is, so to speak, not compatible with the correlation of constriction within one localization series. In other words, these two correlations are mutually exclusive within the same localization series. This is true of Czech and Slovak, where the correlation of nasals is found in the labial, the apical, and the palatal series ($p-m$, $t-n$, $t'-n'$), while the correlation of constriction occurs in the guttural and both sibilant series ($k-ch$, $c-s$, $č-š$). The same relation between these two correlations in Europe is also found in Upper Sorbian ($p-m$, $t-n$, $ć-ń$ ~ $k-ch$, $c-s$, $č-š$), and in Čakavian-Croatian; in Africa, for example, in Chichewa ($p-m$, $t-n$, $k-ŋ$, $č-ŋ$ ~ $c-s$, $š-f$),¹⁹⁵ in America, for example, in Tsimshian (Nass dialect: $p-m$, $t-n$ ~ $k-x$, $k-y$, $k-z$, $c-s$),¹⁹⁶ in Chinook ($p-m$, $t-n$ ~ $k-x$, $k-y$, $k-z$, $c-s$, $č-š$, $λ-l$),¹⁹⁷ in Kwakiutl ($p-m$, $t-n$ ~ $k-x$, $k-y$, $c-s$, $λ-l$),¹⁹⁸ and in Tonkawa ($b-m$, $d-n$ ~ $g-x$, $g-z$, $c-s$, $h-l$),¹⁹⁹ in the Caucasus, for example, in Avar ($p-m$, $t-n$ ~ $k-x$, $k-y$, $č-š$, $λ-l$),²⁰⁰ and in Lak.²⁰¹ It seems as if there exists in all localization series an opposition between stops and continuants, which is realized in the one series by the correlation of constriction, in the other by the correlation of nasals. For the nasals are sonorants and accordingly continuants. In some of these languages a peculiar merger of the correlation of constriction with a second-degree correlation based on the manner of overcoming an obstruction may be observed, of which we already spoke above (pp. 154 f.). This is the case, for example, in Czech and Upper Sorbian ($p-b-m$ ~ $k-x-y$). In Chichewa the correlation of aspiration is found only in those series that also have the correlation of constriction. The same phenomenon also appears in the language of the Pueblo Indians of Taos ($p-p^h-m$, $t-t^h-n$ ~ $k-x$, $k-z$, $c-s$).²⁰² All these observations are not sufficient to formulate any laws, or even to posit structural types. We must also forgo for the time being an explanation of the aforementioned phenomena.

In any event it may be emphatically stated that the relationship of mutual exclusion between the correlation of nasals and the correlation of constriction is by no means a general phenomenon. It is only valid for a small number of languages. In most languages the two correlations are either compatible in the same localization series (as, for example, $k-x-ŋ$, $t-θ-n$, etc.), or neither one nor the other correlation is present in the individual localization series. (This is the case in Lithuanian, where the guttural series contains the two occlusives k and g , without a nasal and without a fricative.)

A nasal does not always stand in a relationship of bilateral opposition to a particular oral occlusive. In Hupa, Chasta-Costa, and Aleut,²⁰³ m is the only labial phoneme. There are languages with a palatal nasal and without palatal occlusives, for example, Slovenian and French. In Slovenian that is, in the standard language, the palatal nasal ("nj") could stand in a relationship of bilateral and proportional opposition to the palatal l sound ("lj"): ($ŋ:l = n:l$, perhaps also = $m:v$). In French, however, the situation is different. Here the palatal nasal (written gn) could only stand in a relationship of bilateral opposition to j (written i , y , hi , ill). The opposition $ŋ-j$ seems to be isolated in the French phonemic system (insofar as one does not wish to relate it to the opposition $m-v$).²⁰⁴ In any event, such cases are proof that the nasals can form correlations not only with occlusives but also with oral sonorants.

In languages that have only two nasals (usually an m and an n), a bilateral opposition exists between them. The parallelism of this opposition to $b-d$ and $p-t$ is not very marked because of its bilateral character. For, while m and n are the only nasals, p and t are not the only tenues, and b and d not the only mediae, etc. This relaxes the relation between the phoneme pair $m-n$ and the phoneme pair $p-t$ (or $b-d$, etc.). The relation $m-n$ sometimes indicates a tendency to be evaluated as privative, m being considered as the marked, n as the unmarked opposition member. The neutralization of the opposition $m-n$ in final position, where the archiphoneme is represented by n , is a phenomenon which is found in many languages. Examples are Classical Greek, Čakavian-Croatian, Italian, Finnish, Avar,²⁰⁵ Lak,²⁰⁶ Japanese, etc. These languages neutralize the opposition $m-n$ in medial position before consonants as well. The representative of the archiphoneme is here conditioned externally, that is, it assimilates to the localization series of the following consonants. In this way a nasal phoneme of indeterminate localization, that is, a phoneme that is phonologically characterized exclusively by its minimal degree of obstruction, is produced in some languages in certain positions.

As a result of the neutralization of an opposition in final position or before consonants, such nasal consonant phonemes without any property of localization occur also in those languages that in other positions distinguish not only between *m* and *n* but between other nasals as well, and in which the individual nasals thus stand in a relation of multilateral opposition to each other. For example, Tamil differentiates five nasal phonemes before vowels (*m*, *n*, *ɲ*, *ŋ*, and *ŋ̃*). It does not have these contrasts before obstruents, however, since the nasal always assimilates to the localization property of the obstruent (*mb-nd*, *ɲd*, *ɲg*, *nɔ*). Similarly, in some dialects of Central China four nasals (*m*, *n*, *ɲ*, and *ŋ*) are phonologically differentiated before vowels, but in final position these oppositions are neutralized. The nasal phoneme found in that position is realized as an *ɲ* after back vowels, and as an *n* after front vowels, etc. All these cases thus involve the neutralization of multilateral oppositions between *all* nasals, and only in this way is neutralization possible, that is, viewed only in this fashion is it possible to speak of a resultant archiphoneme that can be distinguished by specific phonological properties from all other phonemes that occur in this position.

As already mentioned, the specific properties of the "indeterminate" nasal (or of the nasal archiphoneme) are its nasal resonance and its sonorant character (i.e., the minimal degree of obstruction). That is why this archiphoneme comes close to the nasalized vowels. A rather close relation is indeed often found between the "indeterminate" nasal and the nasalized vowels. The nasalized vowels are frequently not independent phonemes, but only combinatory variants of the combination "vowel + indeterminate nasal." This is the case, for example, in the overwhelming majority of Polish dialects, where the indeterminate nasal (with an externally conditioned realization) occurs only before obclusives, while the nasalized vowels occur only before fricatives. But these vowels ("e," "a," i.e., *ē* and *ō*) seem to be independent phonemes in standard Polish (as well as in Portuguese), where the nasalized vowels occur not only before fricatives but also in final position. Before obclusives the combinations "e, o + indeterminate (homorganic) nasal" may be considered their combinatory variants. In cases where the syllabic nasals assimilate in their realization to the localization property of the following consonant, as is the case in numerous African and in some South American languages, one may with equal justification speak of an indeterminate syllabic nasal or of an indeterminate nasalized vowel.

Nasals are always sonorants, that is, they are consonants with a minimal degree of obstruction, even though the oral cavity is completely closed in their articulation: the egress of air through the nose, which is made pos-

sible by lowering the velum, renders the oral closure ineffective so to speak. But there are languages in which nasals with complete oral closure are distinguished from nasals with incomplete oral closure. As is well known, this is assumed for Old Irish, which is presumed to have distinguished *m* and *n* with complete oral closure from the "lenis" *m* and *n* with incomplete oral closure.²⁰⁷ In any event, such languages are rare. However, in certain other languages a genuine correlation of nasals must be distinguished from a *correlation of seminasals* or a correlation of consonantal nasalization. In languages of this kind normal obclusives are in opposition to normal nasals on the one hand, and to obclusives with nasalized implosion and nonnasalized plosive release on the other. Such seminasalized obclusives give the impression acoustically of being combinations of a very short nasal and an obclusive. They can exist as separate phonemes only if in the given language they are phonologically distinguished from normal (nonnasalized) obclusives on the one hand, and from combinations of "nasal + obclusive" on the other. A case of this type is present, for example, in Ful, where besides the nonnasalized *d*, *b*, *g*, and *j* the seminasalized *ḍ*, *ḅ*, *g̣*, and *j̣* as independent phonemes are in opposition to the genuine nasals *n*, *m*, *ɲ*, and *ŋ* and the nasal combinations *nd*, *mb*, *ɲg*, and *ɲj*.²⁰⁸ While the true nasals are sonorants and consequently continuants, the "seminasals" may be considered stops. The relation *ḅ:m*, etc., may be equated with the relation "stop:continuant." In a language in which this relation is found, *m*, *n*, *ɲ*, and *ŋ* must be termed "nasal continuants," and *ḅ*, *ḍ*, *g̣*, and *j̣* "nasal stops." The phonologically nasal character of these stops is just as little affected by their nonnasalized plosive release as the obclusive character of the affricates is affected by their fricative off-glide. In Chichewa not only are the voiced seminasals *ḅ*, *ḍ*, *g̣*, *ẓ*, and *ʒ̣* found, but also voiceless *p̣*, *ṭ*, *ḳ*, *ç̣*, and *ç̣̃*, and the seminasal fricatives *f̣*, *ẓ*, and *ʒ̣*. Thus here all degrees of obstruction and all manners of overcoming an obstruction occur in nasalized and nonnasalized form. Similar relations are also assumed for some other African languages. But inasmuch as the "seminasalized" consonants are not in phonological opposition to the respective combinations of normal nasals and nonnasalized consonants, one cannot speak of a correlation of consonantal nasalization.

The correlation of nasals or of nasalization respectively seems to be the only consonantal correlation of resonance. In descriptions of languages with various vocalic "correlations of muffling" it is often claimed that differences in vocal quality exist not only in the case of vowels but also in the case of consonants. But from what can be gleaned from these descriptions, it appears that what is really involved are combinatory variants of the consonantal phonemes in the environment of the particular muffled vowels.

5 PROSODIC PROPERTIES

A Syllabic Nuclei

In the overwhelming majority of languages distinctive prosodic properties are found only with respect to vowels. One may therefore be inclined to count these properties among the vocalic properties and to discuss them together with the degrees of sonority and classes of timbre. In fact, the present writer did just this in an earlier article.²⁰⁹ This was an error, however. Prosodic properties do not belong to the vowels as such but to the *syllables*. Part of the phonemes that constitute a syllable may be prosodically irrelevant. Usually such phonemes are consonants. But they can also be vowels which in this case are "nonsyllabic." On the other hand, certain languages have syllables that do not contain any vowel phoneme. The prosodically relevant part is then occupied by a consonantal phoneme. In such a case one speaks of a "syllabic" consonant. Finally, it is possible that certain prosodic properties belong to an entire polyphonematic phoneme combination (either "vowel + vowel" or "vowel + consonant"). Prosodic properties cannot therefore be considered vocalic properties, as, for example, degree of aperture or class of timbre, but must be considered properties of a specific portion of the syllable, and this syllable portion must be defined differently for the various languages.²¹⁰

We term that portion of a syllable which, in accordance with the laws of the particular language, carries the distinctive prosodic properties, *syllabic nucleus* (*Silbenträger*). Depending on the language, a syllabic nucleus may consist of (a) a vowel, (b) a polyphonematic vowel combination, (c) a consonant, or (d) a polyphonematic combination of "vowel + consonant." *There is no language in which the vowels would not function as syllabic nuclei.* In most languages of the world the vowels are the only possible syllabic nuclei. For example, in languages such as Classical Greek, polyphonematic vowel combinations (*ai, oi, ei, au, ou, eu, ui*) also occur as syllabic nuclei in addition to the vowels. In Serbo-Croatian, vowels and the liquid *r* occur; in many African languages, for example, in Lamba, Efik, and Ibo, vowels and the "homorganic nasal" occur, in Zulu, vowels and the nasal *m* (except before labials), and in the Hanakian dialect of Czech, vowels and the liquids *r* and *l*. Vowels, polyphonematic vowel combinations, and the liquids *l* and *r* occur as nuclei in Slovak (less distinctly in Czech). The combinations of "vowel + sonorant" seem to occur as syllabic nuclei only in those languages in which polyphonematic vowel combinations also occur with the same function, as, for example, in Danish, Lithuanian, Latvian, and Siamese. All four possible types of nuclei (vowels, consonants, polyphonematic vowel combinations, and combina-

tions of "vowel + consonant") occur in certain Chinese dialects, as, for example, in the Peking dialect.

It should be noted that in the case of the consonants only the so-called sonorants, that is, the nasals and liquids, are considered independent syllabic nuclei or members of the nucleic combination "vowel + consonant." Whether a phonetically "syllabic" consonant is interpreted as a monophonematic nucleus depends primarily on whether the particular language has an indeterminate vowel that can be considered the realization of the vocalic element that is almost inevitably connected with the "syllabic" consonant. We have already mentioned that this is the basis for the difference between "r" in Serbo-Croatian (as in "srce"), which is regarded as monophonematic, and "är" in Bulgarian ("särce" [heart]), which is regarded as polyphonematic. Languages that employ "syllabic" consonants as monophonematic nuclei have no "indeterminate" vowels in their phonological system. This rule applies to all languages enumerated above, and we do not know of any exceptions.

While the syllabic nucleus of such words as "l⁴" (two) in the Peking dialect of Chinese, for example, is probably a liquid (which may well be interpreted *l*, as is done by Henri Frei),²¹¹ the syllabic nucleus of such words as *s*⁴ (four), *š*² (stone), *ž*⁴ (day), *s*² (ten), etc., causes certain difficulties. Phonetically, if pronounced clearly, it is a type of vowel with a much lesser degree of aperture and with a much more fronted position of articulation than, for example, *i*, so that a frictionlike noise resembling a humming is audible in its production. Syllabic *z* or *ž* occur as optional variants in its place. Sometimes, particularly in unstressed final position, this phoneme is not realized at all. In Pekingese it occurs only after sibilants (*c, c^h, s, č, č^h, š, and ž*). Frei designates this phoneme, which is usually transcribed by an *i*, as a "zero vowel" (*voyelle zéro*, p. 128), and one might be tempted to posit a syllabic *s* in a word like *š* (four). However, since in Pekingese a combination of sibilants with a normal *i* does not occur, the *i* should probably be interpreted rather as a combinatory variant of *i* after sibilants. In other Chinese dialects the "humming" ("gingival") vowel does not occur only after sibilants. (Some dialects, as, for example, the dialect of Hsiang-Hsiang, Honan Province, even distinguish two such vowels, a back and a front.) But its realization always depends on the preceding consonant. In these dialects the vowel may be designated as "indeterminate." Characteristically such dialects do not seem to have syllabic liquids.

One and the same phoneme may sometimes function as a syllable nucleus and sometimes as "nonsyllabic" in the same language. Generally these two functions are contextually conditioned. For example, in Czech

l and *r* are syllabic when they occur after a consonant and are not followed by any vowel. In all other positions they are nonsyllabic. However, there are languages in which "syllabicity" becomes a distinctive property, that is, in which it is not completely conditioned by environment. This is true, for example, of standard Serbo-Croatian, in which *r* and *l* between a consonant and a vowel are syllabic in some words and nonsyllabic in others: for example, "gŕoce" ([trisyllabic] little throat), "gròza" ([bisyllabic] horror), "piem" ([written *pijem*] I drink), "pièna" ([written *pijena*] foam). The same phenomenon may also be observed between a vowel and a consonant; but in this case it depends entirely on whether there is a morpheme boundary between the vowel and the *r*: "zàrd ati" (to rust), "varnica" (spark), "zaimati" (borrow), "zàjmiti" (lend). In Old Czech *r* and *l* were syllabic between two consonants in some words, nonsyllabic in others: in verse, words such as "mrtvý" (dead), "plný" (full) were treated as bisyllabic, words such as "krvi" (blood), "slza" (tear) as monosyllabic. In such instances one may speak of a special *correlation of syllabicity*. However, cases of this type are extremely rare. In most cases the syllabicity or nonsyllabicity of a phoneme is determined automatically by its environment.

In cases in which the syllabicity or nonsyllabicity of phonemes is conditioned externally, different special relations result. In standard German *i* does not occur before vowels; *j* on the other hand occurs exclusively before vowels. Accordingly *i* and *j* are here not two distinct phonemes but only combinatory variants of a single phoneme.²¹² But standard German has a short as well as a long *i*, and this opposition is distinctive ("Mitte"/"Miete" [middle/rent], "wirr"/"wir" [disarranged/we], "Riss"/"Ries" [rent/giant], etc.), while *j* is always short. Hence the opposition of quantity is neutralized for *i* before vowels. The same phenomenon is also found in other languages with externally determined syllabicity of the phonemes: these have only prosodic properties in those positions in which they occur as syllabic nuclei. A more complicated case is found in Bulgarian. Here syllabic *i* is impossible between two vowels, while *j* is possible; *j* does not occur after consonants, but *i* does, and it may be either stressed or unstressed. (For example: "životo" [the living]: "živòtät" [life]; "nie" [we]: "čèrnatat" [the black one]; "vãrvi" [it is all right]: "krãvi" [cows].) In initial position before vowels only *j* is permitted, but *i* is not; before consonants only *i* is permitted, either stressed or unstressed, but *j* is not (e.g., "imam" [I have]: "imãne" [worldly possession]). However, after a vowel in final position, or between a vowel and a consonant, either *j* or stressed *i* may occur. Unstressed *i* is not permitted in this position (e.g., "moj" [my, sing.]: "moi" [my, plur.]; "dvòjka" [pair]: "dvoica" [dual]).

In this position the opposition of stress is thus replaced by the opposition of syllabicity. Bulgarian *i* and *j* must therefore be considered two phonemes that stand in a relation of neutralizable opposition to each other.²¹³

B Syllable and Mora: Phonological Conception of Quantity

The above summary of the possible syllabic nuclei shows that these may be either monophonemetic or polyphonemetic. There are languages that have only monophonemetic syllable nuclei, while there are others that, in addition to monophonemetic nuclei, have polyphonemetic nuclei. But the question may be raised whether the so-called long syllable nuclei should not be considered geminates. A standard answer cannot be given for all languages; the problem must be studied separately for each language. However, it is possible to set up certain types.²¹⁴

a. In languages where a morpheme boundary can fall between the beginning and the end of such a syllable nucleus, "long" syllable nuclei must definitely be considered polyphonemetic, that is, geminated nuclei. For example, in Finnish the so-called partitive has the ending *a* or *ä* respectively: "talo" (house): "taloa." In words that end in *a* or *ä*, the final vowel is lengthened instead: "kukka" (flower): "kukkaa"; "leipä" (bread): "leipää." The so-called illative usually ends in an *n* with lengthening of the stem-final vowel: "talo" (house): "taloon" (in the house); "kylä" (village): "kylään" (into the village). In Lak, "maʔi" (roof) forms the plural "maʔiu," but "zunttu" (mountain) has plural "zuntü." The perfect, with an object of the first and third class, of the verb "itan" (let) is "iutra," of "qaqan" (to dry) "qauqra," but of "utan" (put) the equivalent form is "ütra." In all cases of this kind the long vowels must be considered the sum of two homophonous short vowels. This interpretation may then also be extended to all long vowels of the same language.

b. The interpretation of long nuclei as a "monosyllabic combination of two like syllable nuclei" also holds for those languages in which the long nuclei are treated in the same way as the polyphonemetic diphthongs in the functioning of the system. In certain Central Slovak dialects and in standard Slovak the so-called law of rhythm is found, according to which long nuclei in the position immediately after a long syllable are shortened. However, long nuclei are not only shortened after syllables containing long vowels or long liquids but also after syllables with the positional diphthongs (*Stellungsdiphthonge*) *ie*, *uo* (written *ô*), *ia*, and *iu*. After a syllable containing a long nucleus (or diphthong) these diphthongs are themselves replaced by monophthongal short vowels.²¹⁵ Accordingly long vowels and the polyphonemetic diphthongs *ie*, *uo*, *ia*, and *iu* are treated alike. It follows that long nuclei are interpreted as monosyllabic combinations of two like vowels.

c. The same interpretation is also given to long nuclei in those languages where length in the delimitation of words is treated according to the formula "one long unit = two short units" (see further below). Classical Latin may be cited as a generally known example, where the accent delimiting words could not fall on the word-final syllable. It always occurred on the penultimate "mora" before the last syllable, that is, either on the penultimate syllable, if the latter was long, or on the antepenultimate, if the penultimate was short. A syllable with a final consonant was considered long. A long vowel was thus comparable to two short vowels or to a "short vowel + consonant."

Similar rules also exist for Middle Indic, but they are not restricted to word-final syllables. The final syllable of a word is always unstressed, and the accent falls on the "long" syllable closest to the end of the word. Not only syllables with long nuclei but also syllables with the combination "(short) vowel + consonant" are regarded as long. In colloquial Arabic the accent only occurs on the final syllable if the syllable ends in a long vowel + consonant or a short vowel + two consonants. It follows that the long vowel is prosodically equivalent to the combination of a short vowel plus a consonant.²¹⁶ In Polabian the accent fell on the syllable that contained the "penultimate mora" of the word; in other words, it fell either on the word-final syllable, if the latter was long, or on the penultimate, if the final syllable was short. Only those syllables that contained a long syllable nucleus or a biphonematic diphthong, such as *ou*, *au*, *ai*, or *ai*, were considered long.²¹⁷ In Southern Paiute, of the Shoshonean Group of the Uto-Aztecan family, the primary stress occurs on the second mora of the word, provided this mora is not part of the final syllable. Secondary stress occurs on all even morae of the word, that is, on the fourth mora, sixth mora, etc. Long vowels and diphthongs are regarded as syllable nuclei having two morae, and short vowels as nuclei having one mora.²¹⁸ In Tübatulabal of the Uto-Aztecan family the primary stress falls on the word-final mora, and a secondary stress on the penultimate, the fourth mora from the end, etc., in iambic rhythm.²¹⁹ In the Northeastern dialect of Maidu, of the California group of the Penutian family, the primary stress always seems to fall on the second mora of the word. Syllables containing a long vowel or diphthong, and closed syllables with a short vowel, are here considered bimoric, while open syllables with a short vowel are considered as having one mora.²²⁰ In all these cases a long syllable nucleus is equated with two short syllable nuclei.

d. The evaluation of the length of the syllable nuclei as biphonematic is also clearly recognizable in those languages that make a phonemic distinction between two types of accent with regard to long nuclei. The

phonetic nature of these accent types is unimportant. What is important, however, is that the beginning and the end of a long syllable nucleus be treated differently prosodically, the difference in treatment being distinctive, regardless of whether it involves the musical or expiratory prominence or absence of prominence of the beginning in one type of accent and of the end in the other. Lithuanian and Slovenian, for example, belong to this type. In languages of this kind the same two types of accent very often also occur with respect to the polyphonematic nuclei (diphthongs or combinations of vowels with sonorants). The long syllable nuclei are accordingly explicitly identified with the combinations of two phonemes, as, for example, in Lithuanian, Siamese, and Japanese. Long nuclei of course need not always be equated with biphonematic syllable nuclei. In Northern Chinese shorter and longer syllables are distinguished: the shorter syllables are either high or low, while the longer syllables are either rising or falling. Monophthongs and diphthongs are here treated alike not only in the longer syllables but also in the shorter ones. If one regards the longer syllables of Northern Chinese as bimoric, and the shorter syllables as having "one mora," one must conclude that this phonological system also contains polyphonematic diphthongs consisting of a single mora. Accordingly a certain discrepancy between the prosodic and the phonematic analysis of the syllable is present here.²²¹ As regards Burmese, which also has diphthongs in "one-mora" syllables, the situation is not quite clear, insofar as the polyphonematic character of the diphthongs cannot be proven.

e. What has here been said about languages with two types of accent for the long nuclei can also be repeated with respect to those languages in which the long syllable nuclei have the so-called *stød* (as in Danish). Whether this *stød* consists of a complete closure of the glottis or only of a strong constriction is not essential. What is important is that through this articulation the long syllable nucleus is divided into two parts.²²² The fact that in the languages in question the long syllable nuclei are divided into nuclei with an interruption and nuclei without such an interruption between their beginning and end, while no such contrast is found in short nuclei, clearly indicates that the existence of beginning and end as two separate moments in these languages is significant only for the long nuclei. In languages that have the contrast "with *stød*/without *stød*" for long nuclei, the same contrast also appears in the case of diphthongs and combinations of "vowel + sonorant." This is especially clear proof for the biphonematic nature of the long nuclei. For example, Danish and Latvian belong to this type.

In all languages discussed so far the long syllable nuclei may therefore be considered "geminated." Their length, or more particularly, their

stretchability, in contrast with the unstretchability of the "short" syllable nuclei, can be regarded as the external manifestation of their divisible nature. In other words, their beginning and end do not coalesce in one point but are interpreted as two separate moments in time.* According to R. Jakobson, who summarized the conditions for this divisibility, such an interpretation of the long nuclei is generally to be assumed for all languages in which long positional diphthongs are present. It does not matter if these languages cannot be subsumed under the five types enumerated above. The existence of biphonematically interpreted monosyllabic positional diphthongs, in addition to the long nuclei, would be the sixth criterion for establishing a biphonemic evaluation of the "long nuclei."²²³ This assumption seems somewhat questionable to us. The mere presence of polyphonemic positional diphthongs is not sufficient proof that the long monophthongs are also evaluated as monosyllabic combinations of two like short vowels. Such an evaluation can be considered objectively demonstrated only if in a given language the long monophthongs are actually treated in the same way as the polyphonemic diphthongs (our type *b*). Where this is not the case there exists no objective reason to interpret long syllable nuclei as geminated. In colloquial Czech (middle Bohemian) long vowels are not permitted in initial position, while the positional diphthong *ou* can occur in this position (e.g., "ouřad" [authority]: "oučet" [invoice]). In standard Czech, on the other hand, long vowels are permitted in initial position, but diphthongs are not (e.g., "úl" [beehive]). Nothing in the phonological system of Czech seems to point to the need of equating *ou* with long vowels.

Thus there are languages in which long syllable nuclei are regarded as monosyllabic combinations of two qualitatively like short nuclei. The stretchability of the long syllable nuclei in such languages is merely an expression of their bipartite nature. But this same bipartite, or composite, nature in general can also be expressed in different terms. In many African and American languages several tones are used distinctively. Generally speaking, each syllable has one specific tone. But in some cases the beginning of a syllable does not have the same pitch as its end. The pitch may change within the syllable, resulting in (musically) rising, falling, falling-rising syllables. All of these prosodic types are distinctive. For some languages with such a prosodic system observers state expressly that

* *Translator's note:* Roman Jakobson, with respect to the intersyllabic variety of quantity features, for the length feature, contrasts "a normal, short, *unstretchable* phoneme, with the long, *sustained* phonemes of the other syllables in the same sequence" (*Fundamentals of Language*, p. 24. Cf. also Jakobson-Fant-Halle, *Preliminaries to Speech Analysis*, pp. 14, 59).

syllables, in which the pitch does not remain level with regard to beginning and end, are longer than syllables with a single "level" tone, as, for example, Efik.²²⁴ In most cases investigators do not indicate this, however, and it seems impossible to ascribe their silence to carelessness alone. Rather, it should be assumed that in many languages that have a developed "tonal system" the prosodic multimember constituency of a syllable nucleus is not expressed through length but exclusively through change of pitch within the syllable nucleus itself. It may even be that in a language of this type both kinds of phonetic realization of "multimember constituency" exist side by side: bipartite nuclei that have the same tone on both parts are realized as long vowels (or syllabic sonorants) with "level tone"; bipartite nuclei that have a different tone on both parts, on the other hand, are realized as short vowels or syllabic sonorants with "nonlevel tone" (i.e., falling or rising).²²⁵

The interpretation of long syllable nuclei as geminated, or in terms of multimember constituency in general, may be regarded as an "arithmetic conception of quantity." Languages in which this conception finds expression are "mora-counting" languages since in these languages the smallest prosodic unit does not always coincide with the syllable.

Opposed to these languages are "syllable-counting" languages, in which the prosodic units always coincide with the syllables. Long nuclei, should these exist at all, are here evaluated as independent units and not as the sum of several smaller units. Here belong, particularly, languages that have exclusively monophonemic nuclei, as, for example, Hungarian, the Hanakian dialects of Czech, and Chechen. In Chechen the diphthongs are in part monophonemic. However, in part they are to be regarded as "vowel + *j* or *w*," where only the vowel occurs as the syllable nucleus, and *j* or *w* respectively is phonematically differentiated from *i* and *u*. Here belong also those languages in which polyphonemic diphthongs do exist, but where they do not get the same treatment as the long nuclei, as, for example, in standard, literary Czech. Finally, languages such as German, English, and Dutch must also be considered as belonging to the syllable-counting languages (see further below).

The relationship of opposition between long and short nuclei is always logically privative. Should this relationship become actually privative by neutralization, the short nuclei will always prove unmarked in mora-counting languages, while the long nuclei will be marked. In Slovak, or more precisely in standard Slovak, and in certain Central Slovak dialects, only *short nuclei* can occur after long and diphthongal nuclei; in Finnish only *short vowels* can occur before vowels (e.g., sing., "puu" [tree]: part. plur., "puita"). In Latin only *short vowels* could occur before final consonants,

except before *s*. In Prākṛit, that is, in Middle Indic, only *short vowels* could occur in closed syllables. In the Čakavian-Croatian dialect of Novi only *short vowels* can occur before a syllable with a long falling accent. In Slovenian (and in colloquial Egyptian Arabic) only *short vowels* occur in unaccented syllables. In Lamba, a Bantu language of N. Rhodesia, and in Ganda, in East Africa, only *short vowels* can occur in final position. The gemination of the nucleus may therefore here be considered as the correlation mark.

Syllable-counting languages are not as uniform in this respect. In Czech, especially in the Central Bohemian colloquial language, where only short vowels occur in initial position, the short syllable nuclei should probably be regarded as unmarked. In this case length (or stretchability) of the long nuclei may be regarded as the correlation mark. However, if one considers that length is an "intensity feature," and that no other intensity features are distinctive for Czech or for any other languages of this type, as, for example, Hungarian or Chechen,²²⁶ one may be more inclined to consider intensity as the correlation mark, length or stretchability, on the other hand, only as a type of realization of intensity.*

Languages such as German, Dutch, and English, however, present quite a different picture. Intensity is here realized by the free expiratory ("dynamic") accent. The opposition of quantity is neutralized in final open syllable. Only *long vowel phonemes* are permitted in stressed final open syllable. The long, not the short, syllable nuclei must therefore be considered the unmarked correlation members. What is involved here can therefore only be an opposition between normal unchecked vowel phonemes on the one hand, and vowel phonemes whose articulation is interrupted or checked by the beginning of the following consonant on the other. "Close contact" (*scharfer Silbenschnitt*) is here the correlation mark. For this *correlation of close contact* length is only the expression of unimpeded, fully developed vowel articulation, and shortness is nothing but the expression of the interruption of vowel articulation by the following consonant.†

* *Translator's note*: As regards the relationship between intensity and quantity, cf. Jakobson-Halle, *Fundamentals of Language*, pp. 24-25:

"Languages where both length and stress appear as distinctive features are quite exceptional, and if the stress is distinctive the latter is mostly supplemented by a redundant length.

"The observation of force and quantity features in their intersyllabic variety seems to indicate that the prosodic distinctive features utilizing intensity and those utilizing time tend to merge."

† *Translator's note*: For *Silbenschnittkorrelation* the term "correlation of close contact" is used here rather than "correlation of contact" to distinguish that term more clearly from "oppositions based on type of contact" (*Anschlussartgegensätze*) which

Incidentally, a language that has a correlation of close contact need not necessarily be a language that "counts syllables." A very peculiar type of combination of this correlation with the correlation of prosodic gemination is found in Hopi, a language of the Uto-Aztecan family, more specifically in the dialect of the village of Mishongnovi in Arizona. The information on this language stems from a private letter from Benjamin L. Whorf, to whom we would here like to express our sincere gratitude. Hopi has neither diphthongs nor polysyllabic vowel combinations nor distinctive differences of tone movement (*Tonverlaufunterschiede*). Its long vowels cannot be divided on the basis of morphology. The rule by which primary stress must fall on the second mora of a word (provided this mora is not part of the final syllable) is now only of historical significance since it is no longer valid for all grammatical categories. Unstressed syllables that originally contained one mora or several morae are now no longer differentiated. From the standpoint of the present system of Hopi, prosodic relations must be construed quite differently. The peculiarity of this language lies in the existence of three distinctive degrees of quantity for the vowels, which are the only syllable nuclei. For example: "pās" (very): "pas" (field): "pās" (quiet). Likewise "tēva" (nut): "teva" (to throw something): "qāla" (edge): "qāla" (rat); "sive" (container): "sive" (charcoal). In the positions where the oppositions of quantity are neutralized (namely, before the so-called preaspirated occlusives ^hp, ^ht, ^hk, ^hʃ, ^hq, ^hc) neither the short nor the long but the medial degree of quantity occurs as the archiphoneme representative. It follows that opposition series, such as *ā-a-ā*, do not involve two gradual but two privative oppositions. Their unmarked member is the vowel of "medial length." This is also confirmed by those cases in which only one opposition, not both, is neutralized. The opposition *ā-a* is neutralized in open stressed final syllables, more precisely in final syllables with secondary stress. *ā* is not permitted in this position. In other words, in Hopi, just as in German, Dutch, and English, short vowels can only occur before consonants. This seems to point to the conclusion that vowel shortness in Hopi is only an expression of close contact, and that the pairs *ā-a*, *ē-e*, etc., in Hopi form a correlation of close contact.²²⁷ As for the oppositions *a-ā*, *e-ē*,

also include the "correlation of *stod*" (*Stosskorrelation*). J. Vachek uses the term "correlation of contact" for what is here called "correlation of close contact." His discussion does not make mention of the correlation of *stod*, however, so that this further distinction within the oppositions based on type of contact there does not appear necessary. (See J. Vachek, *The Linguistic School of Prague*, p. 63.) Also cf. Jakobson's use of the terms *scharf geschnittener Akzent* (close contact) and *schwach geschnittener Akzent* (open contact) for what Trubetzkoy calls *fester* or *scharfer* and *loser Silbenschnitt* (cf. *Fundamentals of Language*, p. 24). See here pp. 197 ff.

etc., they occur only in polysyllabic words in open syllables word-medially and also, though only rarely, word-finally.²²⁸ In contrast, this opposition is neutralized in closed syllables in polysyllabic words, and the archiphoneme in such syllables is represented by "medium-length" vowels. A restriction of this type is otherwise known to us only from mora-counting languages (Japanese, Middle Indic, etc.). It appears to be based on the equation of a syllable-final consonant with a prosodic "mora" ($\bar{a} = at$), and on the establishment of the maximum number of morae that cannot be exceeded in a syllable.²²⁹ The opposition between a "medium-length" and a "long" vowel must therefore be regarded as a correlation of prosodic gemination. From a phonological point of view, "long" vowels in this language contain two morae and "medium-length" vowels one mora, so that a difference in the number of morae exists between \bar{a} and a (or i and i , etc.). In contrast, the difference between "short" and "medium-length" vowels in Hopi does not consist in the number of morae (since both types of vowels contain one mora), but in the fact that one is checked, in other words, in the type of contact with the following consonant. Hopi thus shows a peculiar combination of the correlation of close contact and the correlation of prosodic gemination.²³⁰

Three (or even more!) distinctive degrees of quantity for the syllable nuclei are also indicated for some other languages, but not rightly so. In most of these cases quantity was confused with tone movement (*Tonerlauf*). For example, at the beginning of the nineteenth century the Croatian grammarian Š. Starčević claimed that his native language contained three degrees of quantity for accented syllables: in addition to a "short accent," Illyrian, as Croatian was called at that time, was said to have also had a "somewhat lengthened" and a "completely lengthened" accent. But if one examines the examples given by Starčević, it becomes clear that by a "somewhat lengthened" accent he meant a long falling accent and by a "completely lengthened" one the long rising accent of Serbo-Croatian.²³¹ He had interpreted the opposition of tone movement (falling-rising) as an opposition of quantity (shorter-longer), or better, he had regarded a phonologically unimportant side phenomenon, that is, the somewhat greater length of a rising accented syllable, as distinctive.²³² A similar situation seems to exist in Northern Albanian (Geg), for which usually three quantities are posited for stressed vowels—short, long, and overlong²³³—and where in reality an opposition of tone movement exists between "length and overlength" which should probably be regarded as phonologically distinctive.²³⁴ In Estonian four quantities are found with respect to the vowels of the first syllable. The stem syllable of many nouns, such as "piim" (milk), "tuul" (wind), etc., shows the second

degree of quantity in the genitive, the third in the partitive, and the fourth in the illative. Closer examination reveals, however, that the tone movement of the syllable nucleus also changes in parallel manner with the degree of quantity: the second degree of quantity shows a clearly falling tone movement, the third a level tone (followed by an abruptly falling tone of the following syllable), the fourth a falling-rising tone movement, in which the rising part is prominent. And since the corresponding forms of the diphthongal stem syllables, such as "poeg" (son), do not show any differences in quantity but only the associated differences in tone movement (falling, level, falling-rising),²³⁵ it may well be assumed that these differences of tone movement are phonologically distinctive, while the differences of quantity are merely phonetic side phenomena.²³⁶ More than two degrees of quantity are also found in the descriptions of different investigators for the syllable nuclei in some Lapp dialects. In reality Lapp is a "moric language" since long vowels occur only in the same environments as clearly biphonemic diphthongs. It only has the phonological contrast between syllable nuclei with one mora and syllable nuclei with two morae. But, as we already indicated (p. 164), Lapp has a bundlelike combination of the correlation of consonantal gemination and the correlation of consonantal intensity, geminated consonants being longer than nongeminated consonants, heavy consonants longer than light consonants (and, dialectally, falling geminated consonants longer than rising geminated consonants). Since the phonetic length of vowels stands in an inverse relation to the phonetic length of the following consonants, five to eight different degrees of length result for vowels in the various Lapp dialects. But this is only a phonetic phenomenon. Phonemically, only two distinctive types of syllable nuclei occur before each type of consonant, namely, those with one mora and those with two morae. (In some dialects this opposition is neutralized before heavy geminated consonants.)

Apart from the completely isolated case of Hopi, where a peculiar combination of the correlation of prosodic gemination and the correlation of close contact is present, all cases in which allegedly three or more degrees of quantity are distinguished for syllable nuclei thus prove erroneous. Some mora-counting languages that have distinctive differences of tone also have three- and four-mora nuclei in addition to syllable nuclei with one and two morae. The number of morae is then expressed primarily by means of the distribution of tones within the syllables. But it may also be that in some such languages the greater number of morae of a syllable is characterized by a greater length of that syllable. This can, of course, only be regarded as a phonologically irrelevant side phenomenon.

C Prosodic Differential Properties

a. *Classification.* An examination of the prosodic relations of quantity thus brings us to the conclusion that the *syllable*, or more precisely the syllable nucleus, is the smallest prosodic unit for some languages, while for others it is the *mora*. Accordingly languages can be divided into languages counting syllables and languages counting morae. The smallest prosodic unit of a given language, in other words, the syllable in syllable-counting languages and the mora in mora-counting languages, we call a *prosodeme*.

Prosodic properties can be divided into differential properties and properties based on the type of contact (*Differenzierungs- und Anschlussart-eigenschaften*). Differential properties distinguish among the prosodemes themselves, while the properties based on type of contact do not characterize the prosodemes themselves but merely their type of contact with the following phonological element.

In syllable-counting languages the prosodemes are differentiated by intensity, in mora-counting languages by pitch. In cases where the differentiation of the prosodemes has only a distinctive function, each prosodeme has its own differential property. In a word that contains several prosodemes, all prosodemes may thus either be identical in this regard, or non-identical prosodemes may follow each other in different order. This means that in a syllable-counting language of this type all syllables in a polysyllabic word can be intensive (e.g., Czech "řikání" [talk]), or they can all be unintensive (e.g., Czech "lopata" [shovel]), or intensive and unintensive in different sequence (e.g., Czech "kabátek" [dress coat], "zásada" [principle], "znamení" [sign], "mámení" [deception], "pořádný" [orderly], "bídáci" [the miserable ones]). Similarly, in a mora-counting language of this type morae with different pitch may occur within a word in different sequences: for example, Ibo "o-si-si" (stick), "n-ke-ta" (dog), "i-ji-ji" (fly), "n-ka-ta" (conversation), "o-lo-ma" (orange), "an-wen-ta" (mosquito), "n-ne-ne" (bird), "o-to-bo" (rhinoceros), "n-de-de" (scrape), "ε-ti-ti" (middle one), "u-do-do" (spider).²³⁷ However, in those languages where the differentiation of prosodemes does not only have a distinctive function (i.e., a function-differentiating meaning), the prosodemes are distributed in such a way that each word has only a single prosodeme which by virtue of its differential property stands out among all others. The remaining prosodemes of the same word show the opposite differential property. For example, in a syllable-counting language such as Russian only the third syllable in a word such as "sāmāvar" (samovar) is intensive, only the second in "būmagā" (paper), and only the first in "patākā" (syrup). All other syllables in these words are un-

intensive. In a mora-counting language, such as Lithuanian, only the first mora of the first syllable is "high" in a word such as "lōva" (·lo.o.va [bed]), only the second mora of the first syllable in "lōstas" (·lo·ostas [type]), only the first mora of the second syllable in "lošėjas" (·loo·še.ejas [gambler]), only the second mora of the second syllable in "lovỹs" (·loo.vi.is [trough]). The remaining morae of the same words are "low." Prosodemes in such cases are basically differentiated by a lengthening of the culminative syllable in syllable-counting languages, and by a rise in pitch of the culminative mora in mora-counting languages. But other factors also play a role, especially the expiratory increase in force of the culminative prosodeme. This is very frequently also accompanied by a rise in pitch of the culminative syllable or a lengthening of the culminative mora. What is phonologically important here is only a general prominence of the culminative prosodeme, that is, the fact that this prosodeme stands out among all others. The means for achieving this prominence, on the other hand, belong to the realm of phonetics. Culminative prominence is commonly called "accentuation" or "accent." There is no reason to replace this term. We designate the correlative opposition between "accented" and "unaccented" prosodemes as *correlation of accent*. The correlative opposition that is created through the accentuation or non-accentuation of a mora in a bimoric syllable nucleus in the mora-counting languages (e.g., the opposition between "acute accent" and "circumflex accent" in Lithuanian), this we designate as *correlation of tone movement*.

Distinctive prosodic oppositions can accordingly be divided into culminative and nonculminative oppositions. The correlation of accent and, as a subclass, the correlation of tone movement belong to the culminative type. Among the nonculminative distinctive oppositions belongs the correlation of prosodic intensity in the syllable-counting languages and the correlation of tone or register in the mora-counting languages. This entire classification is based on the concept of the prosodeme. In syllable-counting languages, where the prosodeme is equal to the syllable nucleus, the differentiation of the prosodemes can, of course, only occur in the two forms of accent and lengthening. But in the mora-counting languages still another distinctive opposition occurs in addition to the correlation of accent, the correlation of tone movement, and the correlation of tone register. This is the correlation of prosodic gemination, that is, the difference between syllable nuclei embracing one and two morae. This correlation is an essential characteristic of mora-counting languages and can combine with the other differential properties. In cases where it occurs alone, that is, without the correlation of tone register, accent, and tone

movement, it can easily be confused with the correlation of prosodic intensity. This, incidentally, is also true of the correlation of consonantal gemination, which sometimes can only be distinguished with difficulty from the correlation of consonantal intensity.

b. The correlation of prosodic intensity and gemination. The correlations of prosodic intensity and gemination were already discussed above (pp. 173 ff.). Five criteria were listed which presented proof for the evaluation of long syllable nuclei as bimoric, and consequently for the evaluation of the opposition between long and short syllable nuclei as a correlation of prosodic gemination. Where these criteria are absent there is no reason to interpret the long syllable nuclei as bimoric. The opposition between long and short syllable nuclei must then be interpreted as correlation of intensity. It may be noted that the (nonculminative) correlation of intensity is a comparatively rare phenomenon. In any event, the correlation of prosodic gemination occurs much more frequently. (Incidentally, the same relationship also exists between the correlation of consonantal intensity and the correlation of consonantal gemination.)

Further, we have already noted that length is not the only possible phonetic expression of prosodic gemination (presence of two morae) and that in certain languages the number of morae in a syllable nucleus is not expressed by length but by change of pitch within the nucleus.

c. The correlation of tone register. Distinctive oppositions of tone register are a prosodic phenomenon that is completely foreign to the languages of Europe. This phenomenon is rather widespread, however, in non-European languages. Distinctive oppositions of tone register must not be confused with the so-called musical accent. In languages that have such distinctive oppositions, each syllable, or more precisely each mora—since all these languages are mora-counting—is characterized not only by its phonemes but also by a specific relative tone or register. In languages with a so-called musical accent each word must contain a musical peak. This is not at all necessary, however, in languages with distinctive oppositions of tone register: a polysyllabic word may consist entirely of musically high morae or musically low morae, or of high and low morae in any sequence. The tone of each mora depends only on the meaning. For example, in Lonkundo, a language of the Congo: “_bā_kā_ŋgā” (back) ~ “_bā_kā_ŋgā” (sand) ~ “_bā_kā_ŋgā” (a proper name); “_lo_ko_lo” (palm fruit) ~ “_lo_ko_lo” (exorcism).²³⁸ Just as in other languages various grammatical forms of the same word can be distinguished by a change in phonemes (e.g., German “sieh” ~ “sah” [see, saw]; “verbinden” ~ “verbunden” ~ “verbunden” [connect, connected, connected]; French “allez” ~ “allait” ~ “alla”; Russian “vīno” [wine] ~ “vīna” ~ “vi-

nu” ~ “vīne”; “l’ak” [lie down] ~ “l’ok” [he lay down]; “kārovī” [the cows] ~ “kārovī” [to the cow]), so in languages that have distinctive tonal variation the grammatical distinction often depends only on the tone of the individual morae. For example, Lonkundo: “_a-ta_o_ma” (you have not killed today) ~ “_a-ta_o_m_” (you did not kill yesterday). In Efik²³⁹ verbal roots always have two morae. These are either both high or both low, or the first is low and the second high. For example, aorist first person singular: “-N-ke-re” (I think), “-N-do-ri” (I lay), “-N-fe-he” (I run). In the subjunctive, however, all roots receive high tone on the first mora and low tone on the second: first person singular -N-ke-re, -N-do-ri, -N-fe-he. In Ibo²⁴⁰ the relationship between determinatum and determinator, such as between noun and adjective, verb and object, etc., is expressed by means of a rise in pitch of the final mora of the determinatum and the first mora of the determinator, and so on.

If one examines languages with distinctive tonal variation more closely, one finds that these languages distinguish either two or three tones phonologically. Lonkundo, in the Congo, and Achumawi, in North America,²⁴¹ for example, have only two tones, while Efik, Ibo, Lamba,²⁴² etc., have three.

Where more than three tone registers are indicated, this proves upon closer examination to be erroneous, at least from a phonological point of view. For example, Ethel G. Aginsky claims that Mende, a language she described, has four tones.²⁴³ She admits, however, that the lowest of these tones (indicated by a 1) can be lowered arbitrarily, depending on the degree of emphasis desired. However, a closer look at the data offered by Mrs. Aginsky reveals that the “first” or lowest tone occurs in verb forms but not in nouns, pronouns, and adjectives, while the “fourth” or highest tone appears very frequently in nouns, pronouns, and adjectives, but never in verb forms. The solution to this puzzle is given by the text printed at the end of the grammar: the “first” tone occurs nine times, and in all nine cases at the end of the sentence before a period: (38) ve₃la₁. (61) li₂la₃ a₁. (77) ye₃e₁. (167) na₁. (there), compare (81) na₂ (there) sentence internally, (176) gbē₃e₂ŋga₁. (189) = (224) hū₁. (in), compare (87) hū₂ (142) hū₂ (175) hū₂ (197) hū₂ (203) hū₂ (214) hū₂ (in, inside) sentence-internally. It can therefore be assumed that, as in Ewe, Efik, Ibo, etc., only three distinctive tones exist in Mende, but that sentence-finally the pitch of all words is lowered, so that in this position all tones are shifted by one level (without, however, changing their relative pitch within the word), and the lowest tone attains an otherwise unusual depth. This low tone affects the verb forms since, as a rule, they occur sentence-finally.²⁴⁴ Clement

M. Doke, the meritorious student of South African languages, lists nine tones for Zulu.²⁴⁵ It seems, however, that the tone of the syllable nuclei is frequently affected by the consonantal environment as well as by the tone of the neighboring syllables. It is very difficult to isolate these external influences and to determine the number of distinctive tones in each position. Doke himself unfortunately neglected to do so; and since he did not include a word list in his study, it is also impossible for the reader to do this work. The data supplied by Doke nevertheless shows that the number of distinctive tones in Zulu must in all probability be reduced from nine to three. Doke distinguishes among different "tone types" (nuclei) of words. For example, trisyllabic words are divided into six such tone types. Types I, II, III, and VI are characterized by low tone ("9") on the final syllable. Types IV and V, on the other hand, show a middle tone in the final syllable. In Type I the first syllable is lower than the second syllable—the first may be falling, the second rising—but both are higher than the third syllable. In Type II the second syllable is either as low as the third or it is only slightly higher in its onset (i.e., falling from tone "8" to "9"). The first syllable, on the other hand, is much higher than the other two. Type III is characterized by an abruptly falling (or possibly rising-falling) change of pitch in the second syllable. The first syllable is relatively high. In Type VI the first syllable is higher than the second syllable, but both are much higher than the third. In Type IV the first and the third syllable have approximately the same middle tone, while the second is falling ("2"—"4" or "3"—"5"). In Type V the first syllable is higher than the third, and both these syllables are higher than the second. Similar tone types are also indicated for disyllabic words and words with four syllables, etc. Doke gives a rather long list of word pairs that are distinguished exclusively by the tone (or tonal variation) of the syllables. The list shows that the corresponding words always belong to two different "tone types." For example, a trisyllabic word that has tones "5," "3," and "9" (tone Type I) can be distinguished from a word "containing the same phonemes" with the tones "2," "7," and "4" (= tone Type V) or "3," "3" to "8," and "9" (= tone Type III), etc. But it cannot be distinguished from such a word with the tones "4," "2," and "9" because such a word would belong to the same "tone Type I." In other words, not the nine tones but only the *tone types* are distinctive in Zulu. The tone types, on the other hand, are only certain combinations of the three tone levels. Thus one also gets for Zulu a system of three tone levels or distinctive registers. Another example: Gweabo, a language of Liberia, already mentioned on several previous occasions, is said to have four distinctive registers, according to information given by E. Sapir.²⁴⁶ The examples given by Sapir clearly show

that these are actually distinctive units and not merely phonetic variants, as in the case of the nine tones of Zulu. However, on page 35 it develops that Gweabo has a special correlation of resonance, in which the "pure" vowels show the so-called normal or second tone, while the remaining three tones are characteristic for the "throaty" or "impure" vowels. Since the purely musical difference between the "second" ("normal") and the "third" ("middle") register cannot be very significant, and since the "normal" register is always related to pure voice, while the "middle" register is always related to impure voice, the contrast between "normal" and "middle" register should probably be considered an irrelevant side phenomenon of the opposition between pure and impure voice. The "high" as well as the "low" tone, on the other hand, are always related to impure voice in Gweabo, so that this is something that is taken matter-of-factly and that is phonologically irrelevant for the extreme tones. Gweabo, therefore, does not have four but three distinctive tone registers: a high, a middle, and a low register. Furthermore, the "correlation of muffling" is present in the vowels of the middle register, in which the pure vowels have a somewhat higher tone than the corresponding impure vowels. Thus we have not come across any sure examples so far of languages that would have more than three distinctive tone registers.²⁴⁷

An explanation of this fact must be sought in the nature of tone oppositions. It is clear, of course, that absolute pitch cannot be of importance here. For, as O. Gjerdman²⁴⁸ observed quite correctly, language is not created only for people with absolute hearing. But the concept of relative pitch must also be strictly delimited. This was recognized by Gjerdman, too. For what may be "low" for a female voice is high for a male voice. Yet oppositions of tone exist for all members of the respective speech community. Each hearer understands immediately which "tone" was meant by the speaker, even though he may never have heard the speaker. Lastly, Gjerdman rightly points out that language was not created only for loud speech but also for whispering. The Swedish phonetician concludes from all this—and rightly so, in my opinion—that for oppositions of tone the relevant factors are changes in vowel and voice quality connected with a change in pitch. If one agrees with this assumption, one may perhaps also get an explanation for the phonological presence of two or three levels fundamental to oppositions of tone. For it is impossible to distinguish among many different tones in whispering, even with the aid of the accompanying qualitative nuances in voice. In loud speech this is only possible for people with a special ear for music. On the other hand, anyone can immediately recognize from the quality of the vowels and the voice of a speaker whether he is speaking in a normal ("middle") pitch or in a

pitch that is higher or lower than his normal one. Thus at the most three registers would result therefrom.

But it is not always easy to determine whether a given case involves the correlation of tone register (*Registerkorrelation*) or the correlation of tone movement (*Tonverlaufskorrelation*). Where a low-toned syllable occurs between two high-toned syllables in the same word (as in trisyllabic Type V in Zulu or in the above-mentioned Lonkundo ("_a_ā_tā_o_ā_ma")), there can be no doubt about the presence of the correlation of tone register since the correlation of tone movement presupposes word accentuation, that is, "the prominence" in each word of some syllable or mora respectively. In those languages, however, where words in principle cannot contain more than two morae, this criterion is inapplicable. But in practice these languages, too, furnish certain indications that make an unambiguous decision possible. Southern Chinese, for example, the Canton dialect, distinguishes six "tones" for bimoric syllable nuclei, a low-level, a high-level, a low-falling, a high-falling, a low-rising, and a high-rising tone.²⁴⁹ It is clear that this system can only be explained by the assumption of a system with three-tone registers. (The syllable "fan," which has six meanings, depending on "tone," would therefore have to be understood as follows: "fan" [share], "fān" [to sleep], "fān" [powder], "fan" [to get annoyed], "fān" [to divide], "fan" [to burn].) The two "short" (one-mora) tones here should therefore not be interpreted as accented or unaccented, but as "high" and "low." In Northern Chinese, on the other hand, which has only four "tones" (two longer tones, i.e., two bimoric tones, and two shorter ones, i.e., two one-mora tones), it is not necessary to assume registers: in this case an "accent" is present, which in the case of bimoric words puts into relief either the first or the second mora. In the case of one-mora words it is either present or absent.

d. *The correlation of accent (Betonungskorrelation)*. In this chapter, which is devoted to the distinctive functions of sound, only the so-called free accent can of course be discussed. In other words, only that type of accent will be discussed for which position in a word is not conditioned externally, and which could, under certain circumstances, differentiate the meaning of words (e.g., Russian "mūkā" [torture]: "mūkā" [flour]). Accent may be defined as the *culminative prominence* of a prosodeme. Phonetically this prominence can be realized in different ways: by expiratory increase in force, rise in pitch, lengthening, or more precise and more emphatic articulation of the vowels or consonants involved. For languages with a free accent it is phonologically relevant first of all that such prominence occurs only in a single position in every word. The particular prosodeme, or the particular segment of the word, then, stands out from

all other prosodemes and is not second in prominence to any other prosodeme of the same word. Second, it is phonologically relevant that in words with the same number of prosodemes it is not always the same prosodeme that is prominent, so that it is possible to have word pairs that are distinguished from each other exclusively by the position of the peak.

Free accent takes on rather different forms in different languages. The distinction between syllable-counting languages and mora-counting languages is very important here. The situation is probably least complicated in those syllable-counting languages where the correlation of accent occurs as the only prosodic correlation. Portuguese, Spanish, Italian, Modern Greek, Bulgarian, Romanian, Ukrainian, and Russian belong to this type in Europe. In some of these languages accented vowels are lengthened, while unaccented vowels are reduced in quantity and articulation. The situation is more complicated in the syllable-counting languages that, in addition to free accent, also have a prosodic correlation based on type of contact, i.e., the correlation of close contact, e.g., German, Dutch, and English. In these cases two prosodic correlations intersect. Both show a certain relationship to duration in their phonetic realization: an accented syllable nucleus is longer than an unaccented one, an unchecked (*vollablaufender*) syllable nucleus is longer than a checked (*abgeschnittener*) one. To this is added the presence of grammatically conditioned secondary accents, which especially complicates the prosodic picture. These never seem to be present in syllable-counting languages that do not have the correlation of close contact.

In mora-counting languages with a free accent the word peak can be formed by either a one-mora syllable or the first mora of a bimoric syllable, or by the last mora of a bimoric syllable. Accordingly "short" syllables (one-mora syllables) are here divided into accented and unaccented syllables, "long" (bimoric) syllables, on the other hand, into syllables with a falling accent, syllables with a rising accent, and unaccented syllables. It is usually maintained in such cases that short syllables have only "one accent," while long syllables have two types of accent. The opposition between the two types of accent on bimoric syllables may be called opposition of tone movement or *correlation of tone movement (Tonverlaufskorrelation)*. This is a privative opposition. One of the two types of tone movement is therefore "unmarked." In addition to its distinctly nonlevel (falling or rising) realization, it may have a "level tone movement" as an optional variant. Which of the two types of tone movement is unmarked depends entirely on the language in question.

In addition to the languages with five syllable types, that is, with accented one-mora syllables, unaccented one-mora syllables, unaccented

bimoric syllables, and two types of accented bimoric syllables, there are languages with only four syllable types. In these either all accented syllables embrace two morae, such as the Slovincian dialect of Kashub,²⁵⁰ or all unaccented syllables embrace one mora, as, for example, in Slovenian. Accordingly the following systems are the result: in the latter case, a system of low-toned one-mora syllables, high-toned one-mora syllables, bimoric syllables with a positive tone movement (*positiv verlaufend*), and bimoric syllables with a negative tone movement (*negativ verlaufend*); in the former case, a system of always unaccented one-mora syllables, bimoric syllables with prominence of either the first or the second mora, and bimoric syllables in which neither mora is prominent. It is clear that the *absence* of prominence of both morae in a bimoric syllable is essentially equivalent to an *even* prominence of both morae in a bimoric syllable. The Slovincian prosodic inventory thus is in principle identical with that of Estonian described above (see p. 180). It may also be the case, however, that a bimoric syllable with even prominence of both morae is put into distinctive opposition with a bimoric syllable in which neither mora is prominent, and in such a way that both are in a relationship of distinctive opposition with bimoric syllables with a rising accent and bimoric syllables with a falling accent. In this way systems with six prosodically different types of syllables are formed. They are represented in certain Chinese dialects, for example.

The correlation of tone movement need not necessarily be present in all mora-counting languages that have a free accent. There are mora-counting languages that have a free accent, but in which, nevertheless, only one type of accent is present in long (bimoric) nuclei. The clearest examples known to us are Danish on the one hand, and Hopi, which was mentioned above, on the other. It is, perhaps, no coincidence that these languages have a free accent in addition to the prosodic correlation based on type of contact (the correlation of *stød* [*Stosskorrelation*] in Danish; and the correlation of close contact [*Silbenschnittkorrelation*] in Hopi).

As already mentioned, culminative prominence may extend to both morae of a bimoric syllable, and in some very rare cases may extend over an entire sequence of morae without regard to syllable boundaries. Cases of this type are found in the West Japanese dialects.²⁵¹ In the Kyoto dialect such a sequence of high-toned syllables (morae) can only occur word-initially, that is, it may include the stem and possibly the prosodically dependent suffixes immediately following the stem. For example, "úši" (cow), nominative "úšigá" (but the limitative "úsimáde"). But in the Tosa dialect such a sequence of high-toned morae may occur in any position in the word. For example, "áságá" (hemp, nom.). The sample text of West Japa-

nese presented by E. D. Polivanov (*op. cit.*, pp. 135 ff.) shows that such sequences of high-toned morae may sometimes be rather long (up to seven morae).²⁵² However, word peaks of this type which consist of several prosodic units are only attested in a very small number of languages of the world. They are unthinkable, at least for syllable-counting languages.

Since culminative prominence, as was just shown, can sometimes comprise several morae in sequence, one may ask whether conversely it may include only a fraction or a specific portion of a mora. Is it possible to have distinctive differences of tone movement embracing one mora in the presence of free accent? We believe that we can answer this question in the negative. In cases where such oppositions of tone movement over one mora have been observed, they prove to be the realization of the opposition between accented and unaccented mora. The following two examples are especially characteristic: the above-mentioned Kyoto dialect of Western Japan distinguishes an even full-mora accent (transcribed by E. D. Polivanov by a ¹ to the left of the corresponding mora) and a falling one-mora accent (transcribed by Polivanov by a ⁰ over the corresponding vowel symbol). For example: "1a¹sa" (hemp); "1a⁰sá" (evening); "1ka¹me" (vase); "1kamê" (turtle); "1ku¹zu" (old stuff); "1ku⁰zú" (flour). It develops, however, that an even moric prominence in this dialect either occurs word-initially (in which case it embraces either only the first mora of the word or an entire sequence of morae) or it embraces the final mora of a word. In the latter case it may disappear before a word that begins with an accented mora. Optionally it may also occur on the final syllable of a longer word with an accented first syllable (see E. D. Polivanov, *op. cit.*, p. 136, nn. 16 and 20, with respect to "1a¹tamani¹wa" and "1koku¹mocu¹wo"). Such an even accent becomes obligatory for the final mora of a stem with noninitial accent, if a so-called low-toned suffix is added (e.g., the suffix "-mo" of the additive. See the forms "1cót¹to¹mo ki: 1de¹mo," and "nan¹de¹mo" in the sample text given by Polivanov *loc. cit.*). If, on the other hand, a prosodically neutral suffix is added to a stem with non-initial accent, the even accent is shifted to the final syllable, that is, to the suffix syllable of the entire word. For example, "1a¹sa" (hemp): nominative "1asa¹ŋa." All these facts provide proof that the even accent is only distinctive on the initial mora (or sequence of morae) of a word, and that in all other positions it occurs only with a delimitative function. In contrast, the falling one-mora accent always occurs only on the second syllable of certain stems and retains this position regardless of the suffixes added (see in the above-mentioned text such words as "madôwo," "arâsimahen," "hayêsimahen"). In other words, this accent fulfills exactly the same function on the second syllable as the even accent fulfills on the first syllable of a

word. The short falling accent in the Kyoto dialect can therefore only be regarded as a combinatory variant of the distinctive high tone on the non-initial mora of a word. On the other hand, the even one-mora accent on the noninitial mora (insofar as it is not the final member of a polysyllabic word peak) must be regarded as a combinatory variant of absence of tone with the function of a boundary signal: it indicates the boundary between an unaccented morphological unit and the following unit with an initial unaccented mora. In the Kin-chow-fu dialect of China the two so-called shorter tones of Northern Chinese are realized in such a way that the "second" is rising and the "fourth" is falling. This involves only the realization of "one-mora prominence" versus "one-mora nonprominence," however. This is evident from the fact that in the same dialect the "first" tone, which embraces two morae and in which otherwise the onset is prominent while the end is not, is realized as rising-falling. Also, that the "third" tone, which is usually characterized by the prominence of its end and the absence of such prominence on its onset, is realized as falling-rising.²⁵³

"Freedom" of accent is not always without limitation. Restrictions are found in syllable-counting languages as well as in mora-counting languages with a free accent. In K'ürì (Lezghian), Artshi, and certain other syllable-counting languages of the Eastern Caucasus the accent may occur either only on the first or only on the second syllable of a word. The same limitation also holds true for a mora-counting language such as Hopi. In Modern Greek and Italian, which belong to the syllable-counting languages, the accent can occur only on one of the three word-final syllables. In Classical Greek (Ionic-Attic), too, the accent could occur only on one of the last three syllables of a word. But since Classical Greek was a mora-counting language, the formula in reality was somewhat more complicated. According to R. Jakobson, the rule for the accent in Attic can be formulated as follows: the interval between the accented mora and the final mora of a word must not exceed the scope of one syllable.²⁵⁴ Combinations such as $\acute{\omicron}\omicron$ ($\sigma\tau\acute{\epsilon}\rho\alpha\nu\omicron\varsigma$) and $\acute{\omicron}-\omicron$ ($\delta\acute{\epsilon}\delta\omega\chi\alpha$) therefore were possible, but the combination $\acute{\omicron}\acute{\omicron}$ (in which a syllable + one mora would occur between the accented mora and the final mora) was impossible. In Latvian it is always the first syllable that is accented, but long syllable nuclei in this position have a correlation of tone movement. In other words, only one of the first two morae of a word may be accented, and only if it belongs to the first syllable. In Estonian where, as already mentioned, three long accents (degrees of length), that is, a falling, a level, and a rising accent, are distinguished in addition to a short accent, basically the same rule applies as in the case of Latvian. But here the second syllable is ac-

cented in some loanwords with short initial syllable, so that from the point of view of the present-day language not only the two morae of the first syllable, but one of the two first morae of the word in general, regardless of whether these belong to the same or different syllables, may be prominent. In the so-called monosyllabic languages, where the word, or more precisely, the morpheme²⁵⁵ cannot have less than one or more than two morae within a syllable, this fact also acts as a restriction on free accent, should such an accent exist in these languages. Here belong, for example, Northern Chinese,²⁵⁶ Siamese, and Burmese.

Languages having a correlation of distinctive (free) accent need not accentuate a specific prosodeme in each word. Apart from unaccented proclitic and enclitic particles that exist in almost every language, and that are also "dependent" with respect to their grammatical function, many languages also have grammatically "normal" independent words which do not contain a single accented syllable. Such words can only receive a particular accent optionally in a syntactic context. This accent must be considered a combinatory variant of the absence of accent with a demarcative function. For example, in Classical Greek, the "acute" accent was placed on the final mora of a word in certain word combinations and syntactic positions. In all other cases it was replaced by the "grave" accent, that is, by the absence of accent. The even accent on the final mora of a polysyllabic word in the Kyoto dialect of Western Japan is likewise only a combinatory variant of the absence of accent (see p. 191). In Standard Slovenian, in words that do not have any bimoric syllables, the final (one-mora) syllable bears the accent. If it is an open syllable, the accent may optionally be retracted to the penultimate (also one-mora) syllable. However, statistics of accent distribution in Slovenian poetry teach us that the short accented syllables are treated as unaccented.²⁵⁷ This is a natural consequence of the fact that the position of the short accented syllables in a word is not free but externally determined, so that it is not capable of differentiation between two words with the same quantitative structure.²⁵⁸

The accentual situation of those Štokavian dialects that form the basis of the Serbo-Croatian standard language can also be interpreted in this way. The presence of two kinds of short accent in these dialects is striking in itself. We already know that, wherever the short syllable nuclei show differences in tone movement, one of the two "short accents" must be considered a (combinatory or noncombinatory) realization of the absence of accent.²⁵⁹ In standard Serbo-Croatian the truly "free" accent is musically rising on short as well as on long syllables. The onset of the following syllable then has the same musical pitch as the end of the accented syllable. This involvement of the following syllable is absolutely essential for the

phonetic realization of free accent in Serbo-Croatian. Freedom of accent is therefore limited by the fact that it cannot occur on a word-final syllable. As a rule, the free ("rising") accent can take any position on long as well as on short syllables in polysyllabic words. Many word pairs are differentiated only by the position of this accent. For example: "malina" (raspberry): "malina" (small number); "pjèvačica" (cuckoo): "pjèvačica" (songstress); "razložiti" (to judge): "razložiti" (to take apart); "imanje" (credit): "imanje" (property). The position of this accent within the word is completely independent of syntactic context. The situation is entirely different with respect to the so-called short and long falling accents. In contrast with the "rising" accent, which is characterized almost entirely by its musical quality, and which, insofar as it does not occur in word-initial syllable, is not associated with any significant expiratory increment, the "falling" accent is primarily expiratory. The falling musical movement is only perceptible more or less clearly if the syllable on which it occurs is long. The "short-falling" accent, on the other hand, is very often realized only as an expiratory increment, with the tone movement being musically level on a relatively low register. While syllables that follow a "rising" accent sound rather loud, syllables after a "falling" accent are pronounced in a quite low voice, which is almost a whisper. This clearly underlines the loudness, that is, the expiratory increment of the falling accent. What characterizes the "falling" accent especially in contrast with the "rising" accent, however, is its lack of freedom. The "falling" accent of standard Serbo-Croatian can occur only on the first syllable of a word, or of a close-knit word combination. While the "rising" accent always keeps its position within the word regardless of syntactic context, the "falling" accent disappears from the word-initial syllable as soon as the word enters into a close relationship with a preceding word. For example: "jārica" (summer wheat): "za jāricu" (for the summer wheat); but "jārica" (young goat): "zā jāricu" (for the young goat); "prèdati" (deliver): "ne prèdati" (not deliver); but "prèdati" (to get frightened): "nè predati" (not to get frightened). The "falling" accent of standard Serbo-Croatian, i.e., long as well as short, is therefore only a combinatory variant of the absence of accent which fulfills a demarcative function. It signals that the particular word on which it occurs does not form a close unit with the preceding word. This also explains the fact that earlier Serbo-Croatian grammarians did not label the "short-falling" accent at all and used the same symbol for the "long-falling" accent as for unaccented length.²⁶⁰

In the cases discussed above, words not having a distinctive accent are put into opposition with words having a distinctive accent on some syllable or mora. But it was also noted that in some languages, such as the

dialects of Western Japan, accentual prominence can comprise a whole sequence of prosodemes, and that this prominent prosodeme sequence may comprise an entire word (e.g., in the Kyoto dialect "fušiga" [the cow], nom. and gen.). One could conceive of a language in which only two types of words exist: on the one hand, words in which all prosodemes are prominent, and on the other, words without such prosodeme prominence. Languages of this type actually appear to exist. The dialect of the Japanese village of Mie (Nagasaki Prefecture), described by E. D. Polivanov, must in our opinion be considered to belong in this category.²⁶¹ Polivanov himself does not speak of prominent and nonprominent words, but of oxytone and barytone words. For the former he considers the musically rising tone movement and for the latter the musically falling tone movement as important. But his description shows that the vowels, in particular *i* and *u*, in polysyllabic "barytone" words are very often realized as voiceless, and sometimes disappear completely in final position (kĭta [north], kĭku, kĭku [listen], hašĭ, haš [bridge]). In "oxytone" words this can never be the case. His description further shows that the musically rising movement does not always comprise the entire final mora of "oxytone" words, and that this mora often ends with a falling movement. In emphatic pronunciation, for example, in the imperative or in exclamation, it is even lower than the penultimate mora. We therefore believe that what is phonologically relevant for the two word types in the dialect of Mie is not the opposition of tone movement but the opposition between total prominence or total absence of prominence of the entire word. This opposition is here found in monosyllabic as well as polysyllabic words.

While, as was shown above, some languages with free accent may sometimes have words without an accented syllable, there are certain other languages in which some words have several accented syllables. Naturally, only one of these syllables can be regarded as the word peak, the rest only being *secondary accents*. What is meant here are, of course, only phonologically relevant secondary accents. In any language with a free accent not all unaccented syllables are equally weak or musically low. But in most languages the dynamic or chromatic gradation of unaccented syllables is quite automatically determined by a specific rhythm, mostly in such a way that the even prosodemes, counted backward or forward from the culminative prosodeme, are somewhat more prominent than the uneven ones, or that the word-final or word-initial syllable receives a secondary ictus, etc. All these phenomena have no distinctive force. However, there are languages in which the position of secondary accents is not determined automatically but "etymologically," and hence has distinctive force. For example, in German, compounded words in addition to a primary accent have secondary

accents on every root syllable ("Eisenbahn" [railroad], "Hochschule" [high school]). Certain prefixes and suffixes are also treated as root syllables ("ündernemen" [undertake], "Judentum" [Jewry], "Botschaft" [message], etc.). Insofar as the accent is free in German, that is, insofar as the position of the primary stress can differentiate two words, it is always the opposition "primary stress"/"secondary stress" that is involved (e.g., "übersetzen"/"übersetzen" [to transfer/to translate]). A similar situation is also present with respect to other Germanic languages, insofar as they have a "free" accent. Etymological secondary accents are unknown, on the other hand, in the Romance, Slavic, and Baltic languages which have a free accent. In contrast, this is a common phenomenon in certain American languages, such as Hopi, Tiva, etc. Since among all modern Indo-European languages the Germanic languages are the ones that show the greatest propensity for compounding words, while American languages are famous for their "polysynthetism," one may probably regard this greater utilization of stem composition as a prerequisite for the presence of distinctive secondary accents. The entire phenomenon must be examined in connection with the culminative function.

In conclusion, some remarks on the question of the phonetic realization of accent are in order. In principle, the accent in mora-counting languages is related to a rise in musical pitch, in syllable-counting languages to lengthening. However, a rise in pitch in accented syllables is found also in many syllable-counting languages in addition to lengthening and expiratory increment. Indeed, in many syllable-counting languages a difference in length between accented and unaccented syllables is not present at all. And, conversely, in some mora-counting languages the difference in tone movement in accented syllables is expiratory rather than musical in nature. Many such languages lengthen the accented syllable (or mora). In North Kashubian and Lithuanian unaccented bimoric syllable nuclei are realized as shorter than accented ("semilong") syllable nuclei. In the diphthongal syllable nuclei of Lithuanian the first component is longer than the second in the presence of falling ("acute," *gestossener*) accent, but shorter in the presence of rising ("circumflex," *geschliffener*) accent. In Estonian the realization of differences in tone movement is associated with a gradation in quantity for monophthongal nuclei. All these examples show that the realization of the culminative prominence of prosodemes need not necessarily be in accord with the oppositions valid for nonculminative differentiation of the prosodemes (in which this differentiation is realized by pitch for morae, by intensity for syllables). If a language has a free accent in addition to the nonculminative differentiation of prosodemes, it cannot employ the means utilized for this differentiation for the realization of

accent as well. This rule explains the prosodic situation in standard Serbo-Croatian, for the above representation reveals that free accent in that language is realized almost entirely by a musical heightening of the accented syllable.²⁶² On the other hand, Serbo-Croatian is not a mora-counting language. It does not possess any of the six features by which mora-counting languages are recognized. (The presence of differences in tone movement as in "vrâta" [neck, gen.]: "vrâta" [door] proves nothing since the same distinction also exists for short syllable nuclei; cf. "jârîca" [young goat]: "jârîca" [summer wheat].) Serbo-Croatian may therefore be considered a syllable-counting language. The circumstance that free accent in this language has an entirely musical realization appears to be due to the fact that Serbo-Croatian, in addition to free accent, also has a nonculminative differentiation of prosodemes (syllable nuclei). As in any other syllable-counting language, the latter is realized through the prosodic correlation of intensity. We do not know of any other examples which show the coexistence of free accent with a correlation of nonculminative differentiation.

D Prosodic Oppositions Based on Type of Contact

a. *The correlation of stød (Stosskorrelation).* There are two kinds of prosodic oppositions based on type of contact: the correlation of tone interruption (*Tonbruchkorrelation*), or better the correlation of stød (*Stosskorrelation*), and the correlation of close contact (*Silbenschnittkorrelation*). Both have already been mentioned earlier in a different context (pp. 175 ff.) but must be examined here somewhat more closely.

Above all, a warning must be sounded against the confusion of the correlation of stød with some other phenomena that are phonetically quite similar but phonologically very different. Not every combination of a vowel with a complete or incomplete glottal closure can be considered a "vowel with stød" in the sense of the correlation of stød. In languages where the glottal occlusive exists as an independent phoneme, such a combination is simply to be regarded as a phoneme cluster (i.e., as biphonemic). The sequence *ada* in such a language consists of two syllables. Further, the correlation of stød does not exist in languages such as Achumawi, where a type of glottal catch ("rearticulation") occurs whenever the second mora of a bimoric vowel does not show the same register as the first mora.²⁶³ The glottal closure here is a purely phonetic side phenomenon of register change within a bimoric syllable nucleus. In languages such as Burmese, too, no true correlation of stød is present: here the two "shorter" or one-mora tonemes end in a glottal closure in contrast with the two "longer" tonemes. In the case of the short high tone

the glottal closure is formed more vigorously than in the case of the low tone.²⁶⁴ In this case the glottal closure must be regarded as an ancillary signal of one-mora character.

If one ignores these and similar cases, there still remain a considerable number of languages and dialects with a genuine prosodic correlation of *stød*. There are languages in which this correlation is found only in bimoric syllable nuclei. In other languages it occurs in bimoric syllable nuclei as well as in one-mora nuclei. However, it seems that there are no languages in which the correlation of *stød* exists only for short (i.e., one-mora) syllable nuclei, but not for long (bimoric) nuclei. Nor do we know of any languages that have the correlation of *stød* but no differences of quantity. And since quantity differences in connection with the correlation of *stød* must be construed as the correlation of prosodic gemination, it follows that the correlation of *stød* occurs only in languages that have a correlation of prosodic gemination, that is, in mora-counting languages.

For the bimoric syllable nuclei the correlation of *stød* signifies an opposition in the type of contact between two "morae." In the syllable nuclei with *stød* the first portion is separated from the second by either a complete or incomplete closure of the glottis. This gives the acoustic impression of two consecutive sounds, or of a sudden transition within the same sound from normal voice to a murmur or whisper. In syllable nuclei without *stød*, on the other hand, the transition from the initial to the final portion is gradual and direct without any perceptible interruption. For one-mora syllable nuclei the correlation of *stød* represents an opposition based on the type of contact between the nucleus and the following consonant. The one-mora nucleus (normally a short vowel) may either be separated from the following consonant by a complete closure of the glottis, and hence by a complete pause, or the short vowel may be in direct contact with the following consonant.²⁶⁵ Accordingly, in the case of bimoric nuclei the *stød* always occurs within the nucleus itself, while in the case of one-mora nuclei it occurs only at its end. In either case the nuclei with *stød* are put into opposition with the nuclei with normal articulation, that is, without any such interruption in the middle or at the end of the vowel. Accordingly, what is involved is always the type of contact of a mora with the following element, that is, either with the second mora of a bimoric nucleus (a long vowel, a diphthong, or a combination of vowel plus sonorant) or with the following consonant standing outside of the syllable nucleus. More specifically it bears on the question of whether this contact is direct or whether it is marked by an abrupt glottal closure, that is, a sharp interruption.

b. The correlation of close contact (Silbenschnittkorrelation). It is clear that the correlation of close contact (or syllable break) is also a prosodic opposition based on the type of contact. Actually it is nothing more than an opposition between the so-called close and open contact of a vocalic syllable nucleus with the following consonant. If the vowel with "close" contact appears to be shorter than the vowel with "open" contact, this is merely a phonetic side phenomenon. In the case of close contact the consonant begins at a moment when the articulation of the vowel has not yet passed the peak of its normally rising-falling course, while in the case of open contact the articulation of the vowel is fully developed before the onset of the consonant. The close contact, so to speak, "checks" the end of the vowel. The vowel that is "checked" in this fashion must therefore be shorter than the normal unchecked vowel. The correlation of close contact is accordingly based on a privative opposition. Its unmarked member is the "unchecked" vowel with a fully developed articulatory movement which is not in close contact with the following consonant. This also explains the results of neutralization of this correlation: it is neutralized in final position or before vowels. Of course, only the (phonetically long or semilong) unchecked vowel phonemes are found in the position of neutralization (e.g., English, Dutch, German, Norwegian, Swedish, Scottish-Gaelic, Hopi). The fact that vowel length is here phonologically irrelevant can be seen from those cases in which the archiphoneme is realized by a short vowel with open contact, as in unstressed syllables in German ("le-béndig" [live], "Ho-lúnder" [elder tree], "spa-zieren" [to take a walk], "Ka-pi-tä'n" [captain], etc.).

While the correlation of *stød* occurs only in mora-counting languages, the relationship of the correlation of close contact to the classification of languages into mora-counting and syllable-counting languages is less clear. German, Dutch, and English, in which the correlation of close contact is found in syllables with primary and secondary stress, are obviously syllable-counting languages. They do not have any of the characteristic features of mora-counting languages. Hopi, on the other hand, where the correlation of close contact is also found in syllables with primary and secondary stress, is a mora-counting language. The correlation of close contact here occurs only in one-mora nuclei (vowels) with primary or secondary stress, while the bimoric nuclei stand outside of this correlation. The correlation of close contact and the correlation of prosodic gemination thus form a three-member bundle in this language: "one-mora nuclei with close contact," "one-mora nuclei without close contact," and "bimoric nuclei (without close contact)." In unaccented syllables the entire bundle is neutralized.

Further, a combination into a bundle of the correlation based on close contact and the correlation of prosodic gemination also seems to be present in Norwegian and Swedish. Carl H. Borgström, to whom we owe an excellent phonological description of standard Norwegian,²⁶⁶ contends that "standard Norwegian does not divide syllable nuclei into morae" (*op. cit.*, p. 261). However, we believe that this can be questioned. The presence of distinctive oppositions of tone movement in Norwegian speaks in favor of a mora-counting language; for example, "ly'se" (light) with a rising accent, "ly'se" (shine) with a falling-rising accent. True, this correlation of tone movement is found not only with long vowels but also with short vowels. This also seems to be the main reason for the above-mentioned contention of Borgström. However, this obstacle is easily overcome. Borgström recognized quite correctly that accented syllable nuclei in Norwegian are governed by the correlation of close contact; further, that from an objective point of view accented syllables in Norwegian are *always long* "because they either contain a short vowel and a long consonant, or a long vowel and a short consonant" (*op. cit.*, pp. 264 f.). On the other hand, Borgström admits that in accented syllables with a "short" (i.e., checked) vowel the tone movement comprises not only the vowel but also the following consonant. "A short vowel with a following voiceless consonant gives the impression that only a part of the tone movement without voice is intimated. The opposition nevertheless remains clear: where the consonant is voiced, as in 'bønner' (farmer): 'bønner' (beans), part of the tone movement is clearly carried by the consonant" (p. 261). The tone movement is thus carried either by an "unchecked" vowel or diphthong or by a combination of a "checked" vowel and the implosion of the following consonant. The latter—and herein lies the peculiarity of the Swedish-Norwegian type—need not necessarily be a sonorant but may also be an obstruent. All three of these types of accented syllable nuclei may be considered *bimoric*. The presence of two morae is clearly indicated by the correlation of tone movement. In unaccented syllables all of the three types of bimoric nuclei noted occur, as well as *one-mora* nuclei, that is, "short" vowels without close contact with the following consonant (*op. cit.*, pp. 265 ff.). Norwegian thus has the same combination of four possible syllable types as North Kashubian (Slovincian), but in conjunction with the correlation of close contact it has "unaccented one-mora syllables," "unaccented bimoric syllables," "accented bimoric syllables with unmarked tone movement," "accented bimoric syllables with marked tone movement." The correlation of close contact in Norwegian is present only in bimoric syllable nuclei, the final portion of such syllable nuclei coinciding either with the final portion of the unchecked vowel or with the

onset of the consonant that is in close contact with the preceding vowel. Thus, the combination of the correlation based on close contact with the correlation of prosodic gemination here also results in a three-member bundle. However, its structure is different from that of Hopi since the correlation of close contact in this language is not found in one-mora syllable nuclei, but just the opposite, in bimoric nuclei. As for Swedish, the same phonological prosodic situation as in Norwegian seems to prevail, but with a somewhat different phonetic realization.²⁶⁷

It is not always easy to decide whether the correlation of close contact or the correlation of consonantal gemination is present in a particular language. In languages such as Finnish, Hungarian, or Tamil, where the opposition between long and short vowels is distinctive before simple as well as geminated consonants, there can, of course, be no question of a correlation of close contact. Such a question could, however, be raised with respect to Italian, where accented vowels are always long before a vowel or before a simple intervocalic consonant, but always short before a geminated consonant. But the opposition between geminated and simple consonants exists not only after accented but also after unaccented vowels, and the unaccented vowels before simple consonants are not longer than before geminated consonants. Therefore it is clear that in Italian the correlation of consonantal gemination must be regarded as an independent phenomenon, not as a side phenomenon of the correlation of close contact. Accented vowels in Italian, on the other hand, are short not only before geminated consonants but also before all consonant clusters, except "consonant + r, w, j," and in final position. Differences in vowel quantity are thus conditioned externally, and length in accented vowels before ungeminated consonants, as well as before "consonants + r, w, j," and before heterosyllabic vowels, can be regarded as a combinatory variant. There can be no question of the correlation of close contact in Italian.

On the other hand, the opposition between geminated and simple consonants in languages that have the correlation of close contact is only a phonologically irrelevant side phenomenon. In these languages one should actually not speak of geminated consonants but only of consonants that are in close contact with the preceding vowel, their greater relative length being only a phonetic consequence of this type of contact.

E Prosodic Oppositions Differentiating Sentences

While the distinctive consonantal and vocalic properties are utilized only to differentiate words, prosodic properties serve to differentiate not

only the meaning of words but also of entire combinations of words and sentences. Serving this purpose are the oppositions of tone movement (sentence intonation), change of register, sentence stress, and the pauses.

At the present stage of investigation it is impossible to treat sentence phonology with the same certainty and detail as word phonology. Far too little material is available, and what is available is mostly unreliable. In most available descriptions of "sentence phonetics" the representative function, the appeal function, and the expressive function of sound are generally not even distinguished. Even where such a distinction is made, it is not always in accordance with rigorously applied principles; and in most cases the descriptions are made with definite practical purposes in mind. They are primarily intended for actors, performers, and speakers, for whom a sharp separation of the representative function from the appeal function is of little significance. All these unfavorable circumstances make it difficult to examine the role of prosodic oppositions from the point of view of the representational phonology of the sentence.²⁶⁸ We will therefore have to content ourselves with only a few remarks on the matter.

Above all, a basic distinction must be made on the basis of whether or not a prosodic opposition that is utilized to differentiate sentences in a particular language also serves to differentiate words. In cases where an opposition that differentiates sentences does not also have the function of differentiating words, its use does not require any particular limitation. But where a syntactically distinctive opposition also serves to differentiate words at the same time, a rather complicated situation arises at times, due to the intersection of these two functions and the subordination of the one to the other.

a. Sentence intonation. Since most European languages do not have oppositions based on tone movement which differentiate words,²⁶⁹ "intonation" in these languages is a phonological means that is used solely to differentiate sentences. Most often used for this purpose is the contrast between rising and falling intonation. Rising intonation usually fulfills a "nonterminal" function, that is, it indicates that the sentence has not yet been completed, while falling intonation has a "terminal" function. Usually each intonation is realized only with respect to the last word before a pause since only in that position is it important to indicate whether or not the sentence is completed.

In languages with oppositions of tone movement which serve to differentiate words, these oppositions must be modified correspondingly before a pause in order to be subordinated to sentence intonation. For example, in Swedish, where word-differentiating oppositions of tone movement are characterized by the entire tone profile of the accented syllables as well as

the posttonic syllables, these tone profiles are realized differently, depending on the character of the sentence intonation. The syllable with the primary accent, provided it is not a final syllable, has a falling tone movement in "grave words" and a level (or slightly rising) tone movement in "acute words." However, posttonic syllables in "grave words" have a rising tone movement in the case of nonterminal sentence intonation and a rising-falling tone movement in the case of terminal sentence intonation, while in "acute words" they show a slightly falling tone movement for nonterminal sentence intonation and an abruptly falling tone movement for terminal sentence intonation.²⁷⁰ In the Čakavian-Croatian dialect of Kastav (Kastav), where two types of tone movement are phonologically distinguished for accented bimoric syllable nuclei, a falling accent on a final syllable always remains falling regardless of sentence intonation. The etymologically long rising accent on a final syllable, on the other hand, is actually rising only in the presence of nonterminal sentence intonation before a pause (or if a word receives special emphasis). It is realized as a musically even long accent in the middle of a sentence (i.e., not before a pause). In the absence of emphasis, and in the case of terminal intonation before a pause, it changes to a falling accent, although from the available description by the poet Ante Dukić one cannot determine whether the two long accents coalesce in this position or whether they are still distinguished. As for the "short" accent on final one-mora syllables, the tone movement of which is not important for the differentiation of words, it is rising in the case of nonterminal sentence intonation and falling for terminal intonation.²⁷¹ Unfortunately there are no satisfactory data, let alone systematic descriptions, available on sentence intonation in other European languages that have a correlation of tone movement for the differentiation of words. Sentence intonation in non-European languages, especially in languages that have a correlation of tone for the differentiation of words, have been studied even less. The above (pp. 185 f.) example of Mende shows the types of complications that can arise in languages of this kind in the fitting of the tone profile of words into the tone profile of the sentence. In Mende the tone of all morae in a word in sentence-final position was lowered by one degree, a fact obviously related to a special type of falling terminal sentence intonation.

In addition to the nonterminal and terminal sentence intonation, an *enumerative* intonation is frequently found, which is different from the other two and which has distinctive force. The distinctive opposition between enumerative and nonterminal intonation can be noted particularly in languages such as Russian, in which the so-called nominal clause is quite a common syntactic structure. For example, "l'ud'i," "zver'i,"

“pt'ici” (men, animals, birds) on the one hand, and “l'ud'i-zver'i” (man is an animal) on the other.

All other cases where special sentence intonations are posited for European languages involve a confusion of the representational function with the appeal function or the expressive function. The differences produced by these syntactically distinctive intonations do not lie in the conceptual signification but in the emotional content of sentences or combinations of words. It is, of course, not impossible that quite a different situation exists in certain “exotic” languages. But data on sentence intonation from these languages must be used with extreme caution. Observers usually not only fail to distinguish between Bühler's three functions but further, in the sphere of the representative function, also confuse oppositions of tone movement that are distinctive for words with oppositions of tone movement that are distinctive for sentences. It should be stressed that languages with a correlation of tone register distinctive for words use differences of tone register (and consequently also differences of tone movement) for the formation of grammatical forms, just as German uses original vowel gradation or vowel gradation resulting from umlaut for this purpose. In cases such as the German “gib” (give): “gab” (gave), “geben” (to give): “gaben” (gave), “Bruder” (brother): “Brüder” (brothers), the vocalic oppositions cannot be considered distinctive for sentences but only for words. Likewise, in cases such as Fante (Ašanti) -ɔ_hwe (he looks, is looking): -ɔ_hwe-ε (looked),²⁷² one can also only speak of word-differentiating oppositions of tone movement and not of “syntactic tones”—as was unfortunately done even in a valuable handbook for students.

b. Differences of tone distinctive for sentences. Oppositions of tone that are distinctive for sentences must not be confused with sentence intonations. Since oppositions of tone that are distinctive for words are foreign to most languages of the world, there is nothing that would prevent the use of oppositions of tone for the differentiation of sentences. In most languages, nevertheless, this possibility is used either not at all or only sparingly.

Very many languages have a musically rising intonation in yes-no questions (in contrast with information questions). This rising intonation is usually distinguished from nonterminal intonation by a higher pitch only. It generally begins only at the sentence constituent that is put in question.²⁷³ The height of the pitch thus serves here to distinguish an interrogative sentence from a still incomplete declarative sentence. For example, German “er soll kommen?” (he shall come?) and “er soll kommen . . . und sich selbst ueberzeugen” (he shall come and convince

himself). Or Russian “on l'ub'it i'grat' f-karty?” (he likes to play cards?) and “on l'ub'it i'grat' f-kartj . . . no tol'ka n'i-nā-den'gi” (he likes to play cards . . . but not for money).

The pitch is usually lowered below the normal level in the case of interpolated clauses, and also in the case of words (such as direct address, etc.) which are external to the syntactic context. The following clauses will serve as examples: “ich kann nicht kommen, *sagte er*, denn ich bin zu Hause beschäftigt” (I cannot come, *he said*, for I am busy at home), “sehr gerne, *Herr Doktor*” (with pleasure. *Doctor*). (See Karcevskij, *op. cit.*, pp. 217 ff.)²⁷⁴ By a lowering in pitch a difference is made between the interpolated clause and the normal sentence. But a lowering in pitch is by no means the only indication of an interpolated clause. In such cases it is also associated with a special “level” intonation (i.e., neither falling nor rising) and with an accelerated tempo of speech.

The change of pitch that discriminates between sentences thus never seems to be quite independent in the European languages. It always seems to be related to a particular sentence intonation. An independent change of pitch in European languages occurs only in the sphere of the appeal function or of the expressive function. This circumstance probably also explains its relatively rare use for sentence discrimination.

c. Sentence stress. The expiratory increment of a stressed syllable in many languages is also used to discriminate among sentences. The word that is to be put into relief with respect to its content receives the expiratory increase in force. The matter is relatively simple in those languages where the position of the expiratory accent does not also have the function of differentiating words. In Czech, for example, each of the four words in a sentence such as “tvoje sestra přinesla knihu” (your sister brought a book) can be put into relief by means of stronger expiratory stress on the first syllable. The meaning of the sentence thus receives four different nuances: “*your* sister, not my sister,” “*your sister*, not your mother,” “. . . already *brought* the book and did not forget it,” “brought *the book*, not another object.” The remaining words receive less stress on their first syllable, thus in each case creating a hierarchy of stress; one primary stress and as many secondary stresses as the sentence contains words. Only in cases where the principal clause is combined with a subordinate clause (or with several subordinate clauses) may a somewhat more complicated three-level gradation occur. In any event, what is involved in each case is nothing more than a gradation in expiratory force.

In German, too, sentence stress is distinguished only by its degree of force. Word stress is subordinated to sentence stress by means of a gradation in force. As far as German is concerned, the situation is complicated

only by the fact that individual compounded words may have secondary stresses in addition to the primary word stress. Fundamentally the situation is not as different from Czech as might be supposed. In Czech the position of stress within the word is nondistinctive, but the position of the primary stress within the sentence is distinctive. In German compounded words can be differentiated only by the position of primary stress ("übersetzen"/"übersetzen" [to transfer/to translate]). This always involves the opposition "primary stress/secondary stress." The same opposition is also valid for the sentence in German. The force of stress in German thus depends on the meaning of the sentence (i.e., the word complex) and on the meaning of the compounded word (i.e., the stem complex).

A fundamentally different picture is presented by languages such as Russian, where word stress is really completely free (even within the framework of noncompounded words), and where oppositions based on position of stress are very much utilized for lexical purposes, but where secondary accents have no phonemic value. In Russian the force of the stress is dependent on the meaning of the sentence. In other words, the meaning of a sentence can be changed by increasing the stress on a particular word and by weakening the stress on the remaining constituents of the sentence. Sentence constituents not affected by sentence stress generally do not show any expiratory increment on etymologically accented syllables. These syllables nevertheless remain distinct from etymologically unaccented syllables, on the one hand because they are somewhat longer, and on the other because their vowels are not subject to qualitative reduction. It can therefore be said that the qualitative and quantitative difference between vowels of accented and unaccented syllables is phonologically relevant for word stress in Russian, but that differences in expiratory force between the accented syllables of individual syntactic constituents are phonologically relevant for sentence stress.²⁷⁵ Word stress in Russian is absolute. Russian does not have distinctive secondary accents within a compounded word. But in a sentence primary and secondary stress is distinguished: "iván pãjd'ót" (Ivan will go) with secondary stress on the subject, "iván pãjd'ót" (Ivan will go) without secondary stress, "iván pãjd'ót" (Ivan will go) with primary stress on the subject and secondary stress on the predicate. Sentence stress in Russian is thus clearly distinguished from word stress. In German, on the other hand, this is not the case. German has distinctive secondary stresses in the sentence and in the word. There is no objective stress feature that would only be relevant for sentence stress or only relevant for word stress.

These few examples may suffice to demonstrate how varied the treatment of sentence stress can be in different languages.²⁷⁶

d. Sentence pauses. Pause is probably the only means for differentiating sentences for which there is no exact counterpart among the prosodic properties used to differentiate words, unless one would want to equate the opposition "with pause"/"without pause" with the correlation of *stød*. Sentence pause, in any event, is a prosodic means like all other means for differentiating sentences and may be counted among the prosodic properties based on type of contact. Sentence pause usually serves to delimit individual sentences or parts of sentences. In other words, it primarily fulfills a boundary (delimitative) function. But the opposition "with pause"/"without pause" frequently also has distinctive value. For example: Russian "ruskaj|arminin|i gruzin" (the Russian, the Armenian, and the Georgian): "ruskaj arminin|i gruzin" (the Russian Armenian and the Georgian).

e. General remarks. In summary it may be said that, although the same phonic properties that furnish prosodic correlations for the differentiation of words are also employed to differentiate sentences, the means used for differentiating sentences are basically different not only from the prosodic phonological properties but also from all other means used to differentiate words. This fundamental difference probably lies in the fact that phonemes and prosodic properties that differentiate words are never *linguistic signs* in themselves but only *parts of linguistic signs*. The phoneme *m* does not have any sign value in itself. It does not designate or signify anything. It is merely a part of different linguistic signs (words, morphemes) such as "Mann" (man), "Mutter" (mother), "Mist" (dung), "dumm" (stupid), "dem" (def. art., masc. sing., dat.), "immer" (always), "Imker" (beekeeper), etc. Means that differentiate sentences, on the other hand, are independent linguistic signs. Nonterminal intonation *signifies* that the sentence has not yet been completed. Lowering of tone *signifies* that the particular speech segment is not related to what preceded or to what followed, etc. In this respect elements that differentiate sentences, that is, syntactically distinctive elements, are comparable to the delimitative and culminative means.²⁷⁷

6 ANOMALOUS DISTINCTIVE ELEMENTS

In addition to the normal phonological system, many languages have still other, special phonological elements which occur with very special functions.

To these belong, in particular, the "foreign sounds," that is, the phonemes that are borrowed from the phonological system of a foreign language. They occur primarily in loanwords, thus underlining the foreign

origin of a particular word. In standard German, especially in its southern variety, the nasalized vowels and the voiced (or lenis) equivalent of ʒ are among these, and in Czech there is the phoneme g , and in Serbo-Croatian the phoneme ǰ (dǰ). It should be noted that usually these foreign phonemes are not realized in exactly the same way in the particular foreign language, but are assimilated to the native system. For example, the ʒ in German (especially in Vienna) is not a voiced but a voiceless lenis consonant since High German does not have any voiced obstruents. Conversely, the g in Czech is a true voiced occlusive, although in many instances it is intended to render the voiceless lenis g of High German. Furthermore, it may be noted that such "foreign sounds" are not always pronounced in their "proper place" once they have entered the language. They are a sign of foreignism. Accordingly they may occur in a word that is regarded as foreign, regardless of whether or not the sounds are justified in such a word. For example, the loanword "Telephon" is very often pronounced with a nasalized vowel in Vienna (telefö). Speakers of Czech replace k with g in such loanwords as "plakat" (poster), "balkon" (balcony).²⁷⁸ It frequently happens that the feeling a word is of foreign origin vanishes and the foreign sounds are incorporated into the native system. It is even possible that new native words are formed with these phonemes. This is the case, for example, with the phonemes f and f' in Russian. Originally they occurred only in loanwords. Today they are also found in such words as "prästäf'il'ä" (simpleton), "füfajkä" (warm jacket), etc. However, since the loanwords have been "acclimatized" relatively recently, the domain of their use is limited to argot expressions only. These phonemes thus, nevertheless, retain a special function: they signal the alien character and special familiar expressivity that is common to argot vocabulary.

Phonemes that have a special function also occur in interjections, onomatopoeic expressions, and in commands or calls directed toward animals. Words of this type do not have a representative function in the proper sense. Hence they form a special part of the vocabulary, for which the ordinary phonological system is not valid. Even in European languages there are special sounds that are used only in this type of word: for example, the interjection "hmm," the clicks used to set horses moving, the labial r used to stop horses, or the interjection "brrr!" used to express a shudder. In certain "exotic" languages such phonemes, which are external to the phonological system, are very numerous. For example, the Bantu languages have a large number of words that designate the calls or movement of animals. In many of these cases there can hardly be a question of true onomatopoeic expressions. (For example, the roar of a lion is designated by a syllabic palatal n .) In these words there also occur special

phonemes that are not found elsewhere in these languages. In the animal fables of the Takelma Indians a voiceless lateral spirant is prefixed to each word in the speech of the grizzly bear, a sound that does not occur elsewhere in Takelma.²⁷⁹

¹ L. Hjelmslev, "On principles of phonematics," in *Proceedings of the Second International Congress of Phonetic Sciences* (1935), p. 52.

² L. Hjelmslev, "Accent, intonation, quantité," in *Studi Baltici*, VI (1936-1937), 27.

³ Even in French, where each vowel can form a word by itself (*ou, a, ai, est, y, eu, eux, on, an, un*), we find an interjection *rrr!* (command to stop a horse). Thus Hjelmslev's definition proves untenable for this language as well.

⁴ P. Menzerath, "Neue Untersuchungen zur Steuerung und Koartikulation," in *Proceedings of the Second International Congress of Phonetic Sciences*, p. 220.

⁵ For another definition of the difference between vowels and consonants, cf. p. 222 n. 213.

⁶ This has been stressed with particular clarity by Raymond Herbert Stetson, who contributed greatly to the investigation of the phonetic nature of the syllable. See his "Motor Phonetics," in *Archives néerlandaises de phonétique expérimentale* (1928), "Speech Movements in Action," in *Transactions of the American Laryngological Association*, IV (1933), 29 ff. (in particular pp. 39 ff.), and in summary "The relation of the phoneme and the Syllable," in *Proceedings of the Second International Congress of Phonetic Sciences*, pp. 245 ff.

⁷ In those languages in which the prosodic units consist entirely of vowels, the prosodic properties appear to be added to the vocalic properties. However, they always form a special group and must not be thrown together with the *properties of vocalic quality proper* in any classification.

⁸ In this connection cf. especially the praiseworthy work done by Georg Oskar Russel, "The Vowel," "Speech and Voice" (New York, 1931), and his summary paper "Synchronized X-ray, oscillograph, sound and movie experiments, showing the fallacy of vowel triangle and open-close theories," in *Proceedings of the Second International Congress of Phonetic Sciences*, pp. 198 ff.

⁹ Accordingly one should guard against assuming such conditions for reconstructed periods of a language, as unfortunately this is sometimes done.

¹⁰ In connection with what follows, cf. N. S. Trubetzkoy, "Zur allgemeinen Theorie der phonologischen Vokalsysteme," in *TCLP*, I, 39 ff. Incidentally, this article is by now out of date in some respects.

¹¹ These terms may be retained, subject to the above reservation, as long as no satisfactory acoustic terms have been coined for these concepts.

¹² Cf. M. Rešetar, "Der štokavische Dialekt" (*Schriften der Balkankommission der k. k. Akademie der Wissenschaften in Wien*).

¹³ Cf. P. Jaworek in *Materyaly i prace komisji jezykowej*, VII. By ü an intermediary sound between u and o is to be understood, by y a vowel of the central series which according to degree of aperture lies between i and e ; o and e are close before nasals, and open elsewhere. The fact that only the opposition based on lip rounding has distinctive force in this system also affects the realization of the

individual phonemes. For example, *y* is not a front vowel but an unrounded vowel of the central series, *o* and *u* begin with a *y* glide especially after gutturals and labials and in initial position. In many Polish dialects with similarly structured vowel systems the element of rounding is separated, as it were, from the vowels of the class of rounded timbre, so that these vowels are realized as diphthongs: *âu*, *ue*, *uy*.

¹⁴ E. D. Polivanov, "Uzbekskaja dialektologija i uzbekskij literaturnyj jazyk" (Taškent, 1933), p. 14.

¹⁵ This also affects pronunciation in that in the case of *o* lip rounding is detached as a special element: hence the almost diphthongal realization of Russian "o" as *ov*, *uó*, *ue*, particularly in the speech of Russian women.

¹⁶ N. S. Trubetzkoy, "Die Konsonantensysteme der ostkaukasischen Sprachen," in *Caucasica*, VIII (1931), 44.

¹⁷ Related to this is the feature that the tongue position in the case of *u*, *o*, and *a* is fronted in specific environments (in the vicinity of *h* and *ʃ*). Cf. A. Dirr, "Arčinskij jazyk," in *Sbornik materialov dlja opisanija mestnostej i plemen Kavkaza*, XXXIV (1908), 1.

¹⁸ W. Steinitz, "Chantyjskij (ostjackij) jazyk," in *Jazyki i pis'mennost' narodov Severa*, I (1937), 200-201.

¹⁹ Under these conditions it is probably understandable why Japanese *u* (it seems, in most cases) is realized completely without any lip rounding.

²⁰ Cf. N. S. Trubetzkoy, "Polabische Studien," in *Sitzb. Wien. Akad., Phil.-hist. Kl.*, CCXI, no. 4, pp. 128 ff.

²¹ Certain peculiarities in the realization of the Polabian vowel phonemes seem to be related to this. For example, Polabian *α* appears to have been pronounced as a back vowel without lip rounding (cf. N. S. Trubetzkoy, "Polabische Studien," pp. 42 ff.). *ü* and *ö*, on the other hand, were pronounced with "uneven rounding," in other words, approximately like *üi* and *öe*, thus lending special emphasis to the element of rounding (see *ibid.*, pp. 50 ff.).

²² Cf. G. S. Lytkin, "Zyr'anskij kraj pri episkopach permskich i zyrjanskij jazyk" (St. Petersburg, 1889).

²³ Alfred Bouchet, "Cours élémentaire d'annamite" (Hanoi-Haiphong, 1908).

²⁴ P. K. Uskar, *Etnografija Kavkaza*, Č. I, "Jazykoznanije," vyp. 6 (*Kjurinskij jazyk*) (Tiflis, 1896).

²⁵ Walter Trittel, "Einführung in das Siamesische," in *Lehrb. d. Semin. f. oriental. Sprachen zu Berlin*, XXXIV (1930).

²⁶ Cf. A. J. Emel'anov, "Grammatika votjackogo jazyka" (Leningrad, 1927).

²⁷ Cf. V. L. Ščerba, "Vostočnolužickoje narečije" (1915).

²⁸ Cf. Ödön Beke, "Texte zur Religion der Osttscheremissen," in *Anthropos*, XXIX (1934).

²⁹ Neutralization takes place in word-noninitial syllable, the choice of the archiphoneme representative being conditioned externally (by the vowel of the preceding syllable). For example, after a syllable containing *u*, *o*, *a*, and *ä*, *a* occurs as the maximally open vowel. After a syllable containing *ü*, *ö*, and *ä*, only *ä* can occur of the maximally open vowels. After a syllable containing *e* and *i*, the maximally open vowel is represented by *ä*, etc.

³⁰ Cf. G. N. Prokof'ev, "Sel'kupskij (ostjacko-samojedskij) jazyk," in *Naučno-issled. Asociacija Instituta Narodov Severa, Trudy po lingvistije*, IV, vyp. 1 (Leningrad, 1935).

³¹ J. van Ginneken, *De ontwikkelingsgeschiedenis van de systemen der menschelijke taalklanken* (Amsterdam, 1932), p. 5.

³² Cf. P. K. Uskar, *Etnografija Kavkaza*, Č. I, "Jazykoznanie," Vyp. IV (*Lakskij jazyk*) (Tiflis, 1890), pp. 4-5. However, the description of the pronunciation of the vowels is extremely unclear. Our statements are based on our own observations. It must be stressed, however, that the letters *ä*, *e*, and *ö* are used only in a quite conventional sense.

³³ Incidentally, J. van Ginneken does not seem to deny this: in *op. cit.*, p. 6, he cites Arabic and Modern Persian as examples of triangular systems.

³⁴ Cf. W. H. T. Gairdner, "The Phonetics of Arabic," in *The American University of Cairo Oriental Studies* (Humphrey Milford, Oxford University Press, 1935), Chaps. VI (The Vowels Described) and VII (Influence of Consonants on Vowels).

³⁵ Incidentally, the difference in quality between long and short vowels in Modern Persian is so great that one might be inclined to posit a single quadrangular system consisting of six vowel phonemes (*i*, *o*, *ɔ*, *æ*, *e*, and *i*) and to consider length in *u*(:), *ɔ*(:), and *i*(:) as unimportant. However, this would be in contradiction to the principles of Persian metrics.

³⁶ On both languages, cf. John R. Swanton in *Bulletin of the Bureau of American Ethnology*, XL (= *Handbook of American Indian Languages*, by Franz Boas I).

³⁷ Cf. Harry Hoijer in *Handbook of American Indian Languages* (University of Chicago Press), Vol. III.

³⁸ More precisely, in present-day standard Lezghian and in the dialect studied by Baron P. K. Uskar ("Etnografija Kavkaza," I, in *Jazykoznanije*, Vyp. VI [*K'urinskij jazyk*] [Tiflis, 1896]), where *o* is only an optional combinatory variant of *u*, and where *ä* is on the one hand a combinatory variant of *e*, and on the other the archiphoneme representative of the opposition *a-e* before the pharyngeal occlusive.

³⁹ In K'ürü certain consonantal oppositions are neutralized in the vicinity of the close vowels *u*, *ü*, and *i*. Since a "contextually conditioned" neutralization usually takes place in the vicinity of the marked members of an opposition (see Chap. V, 2d), the close vowels (*u*, *ü*, and *i*) may be considered as marked in K'ürü, and the open vowels (*a* and *e*) as unmarked. On Bulgarian, see pp. 114 f.

⁴⁰ Cf. Carl Hjalmar Borgström, "The Dialect of Barra in the Outer Hebrides," in *Norsk Tidsskrift for Sprogvidenskap*, VII (1935).

⁴¹ A. Martinet, "La phonologie du mot en danois" (Paris, 1937), pp. 17-19 (*BSL*, XXXVIII [1937], 2).

⁴² Cf. Ida C. Ward, *An Introduction to the Ibo Language* (Cambridge, 1936).

⁴³ It is to be noted that the unrounded vowels are here realized much more "open" than the corresponding rounded vowels. From a purely phonetic viewpoint, this system is therefore by no means symmetrical. Dr. Ida C. Ward transcribes the rounded vowel of the second degree of aperture by Θ . We took the liberty of replacing this symbol by *u*.

⁴⁴ Cf. J. Winteler, *Die Kerenzer Mundart des Canton Glarus* (Leipzig, 1876).

⁴⁵ Cf. D. Westermann and Ida C. Ward, *Practical Phonetics for Students of African Languages* (London, 1933), pp. 172 ff.

⁴⁶ Edward Sapir, "Notes on the Gweabo Language of Liberia," in *Language*, VII (1931), pp. 31 ff.

⁴⁷ Cf. A. Thumb, "Handbuch der neugriechischen Volkssprache," p. 6, and B. Havránek in *Proceedings of the International Congress of Phonetic Sciences*, I, 33.

⁴⁸ Cf. R. Jakobson in *TCLP*, II, 89.

⁴⁹ Cf. A. V. Burdukov, "Rusko-mongol'skij slovar' razgovornogo jazyka, s predislovijem i grammatičeskim očerkom N. N. Poppe" (Leningrad, 1935), as well as N. N. Poppe, "Stroj chalcha-mongol'skogo jazyka" (= *Stroj jazykov*, no. 3) (Leningrad, 1935), pp. 8-10.

⁵⁰ Carl Hjalmar Borgström, "Zur Phonologie der norwegischen Schriftsprache," in *Norsk Tidsskrift for Sprogvidenskap*, IX (1937), p. 251.

⁵¹ Charles F. Voegelin, "Tübatulabal Grammar" (*University of California Publications in American Archeology and Ethnology*, XXXIV, no. 2, pp. 55 ff.).

⁵² The realization of *U* and *A* is conditioned by the quality of the vowel of the preceding syllable, *U* is realized as *u* after back vowels and after *a*, and as *ü* after *ü*, *ö*, and *e*; *A* is realized as *a* after *u* and *a*, as *o* after *o*, as *e* after *ü* and *e*, and as *ö* after *ö*. Cf. N. N. Poppe, "Stroj chalcha-mongol'skogo jazyka," pp. 10-11.

⁵³ Cf. V. Brøndal, "La structure des systèmes vocaliques," in *TCLP*, VI, 65.

⁵⁴ Cf. R. Jakobson in *TCLP*, II, 78, and B. Havránek in *Proceedings of the International Congress of Phonetic Sciences*, I, 28 ff.

⁵⁵ Cf. B. Havránek in *Proceedings*, I, 31 ff.; A. Rosetti in *Bulletin linguistique*, II (1934), 21 ff.

⁵⁶ A. Isačenko, "Les parlers slovènes du Podjunje en Carinthie, description phonologique," in *Revue des études slaves*, XV (1935), 59.

⁵⁷ For Dutch, W. A. de Groot has already suggested a similar classification of the vowel phonemes into diphthongs and monophthongs. See *TCLP*, IV, 118.

⁵⁸ Cf. Daniel Jones, *An Outline of English Phonetics*, 3d ed. (Leipzig, 1932), and *English Pronouncing Dictionary* (Leipzig).

⁵⁹ "Über die phonologische Interpretation der Diphthonge," in *Práce z vědeckých ústavů*, XXXIII.

⁶⁰ "A Phonological Analysis of Present-day Standard English," in *ibid.*, XXXVII.

⁶¹ "Some Observations on the Phonology of the English Vowels," in *Proceedings of the Second International Congress of Phonetic Sciences*, pp. 131 ff.

⁶² "Phonemes and Phonemic Correlation in Current English," in *English Studies*, XVIII (The Hague, 1936), 159 ff.

⁶³ Compare the term "centring diphthongs" proposed by H. E. Palmer and adopted by Daniel Jones.

⁶⁴ It follows from what has been said that the class of timbre of the vowel phonemes with an articulatory movement toward the center must be determined on the basis of their point of departure, while that of the vowel phonemes with an articulatory movement away from the center must be determined on the basis of their end point. This should dispose of the doubts raised by A. C. Lawrenson against classifying the phoneme "au" with the dark class of timbre (on *oi* see below).

⁶⁵ It is true, of course, that only monosyllabic "aə" and "aɔ" can be considered monophonemic. In poetry they are treated as monosyllabic combinations (Daniel Jones, *An Outline of English Phonetics*, p. 59). Anglicists may decide to what extent such a monosyllabic pronunciation is normal today. Should it not be normal, the category of vowel phonemes with an articulatory movement toward the center would have only three degrees of sonority.

⁶⁶ It would be advisable to adopt a more suitable transcription for the individual phonemes, corresponding to phonological facts. Since *o* and *e* function only as a point of departure for vowel phonemes with an articulatory movement away from the center, and *ɔ* and *ɛ* only as points of departure of vowel phonemes with an articulatory movement toward the center, it makes no sense to distinguish them graphically: transcribing them by *o^u*, *o^ɔ*, *eⁱ*, and *e^ɔ* would be completely unambiguous. For the third degree of sonority, the transcriptions *a^u*, *a^ɔ*, *aⁱ*, and *a^ɔ* could be used, and the first degree should accordingly also be transcribed by *u^u*, *u^ɔ*, *iⁱ*, and *i^ɔ*. The direction of articulatory movement would then be unambiguously indicated by the exponents *u*, *i*, and *ɔ*, the degree of sonority and the class of timbre by the symbols *u*, *o*, *a*, *a*, *e*, and *i*.

⁶⁷ In this connection compare A. Isačenko, "A propos des voyelles nasales," in *BSL*, XXXVIII (1937), pp. 267 ff.

⁶⁸ J. R. Firth, "Alphabets and Phonology in India and Burma," in *Bull. of the School of Oriental Studies*, VIII, 534.

⁶⁹ Carl Hjalmar Borgström, "The Dialect of Barra in the Outer Hebrides," in *Norsk Tidsskrift for Sprogvidenskap*, VIII.

⁷⁰ G. S. Lowmann, "The Phonetics of Albanian," in *Language*, VIII (1932), 281 ff.

⁷¹ Cf. A. Isačenko, "Les dialectes slovènes du Podjunje en Carinthie," in *Revue des études slaves*, XV, 57 ff.

⁷² The rule posited by A. Isačenko, according to which such cases are only found in languages with quadrangular systems of nonnasalized vowels (*BSL*, XXXVIII [1937], 269 ff.), must for the present be regarded as a not yet sufficiently tested hypothesis. This hypothesis has something to it, yet the data available to us are still too slight to prove its validity.

⁷³ Cf. E. N. and A. A. Dragunov, "K latinizaciji dialektov central'nogo Kitaja," in *Bull. de l'Acad. des Sciences de l'U.d.R.S.S., Classe des Sciences Sociales* (1932), no. 3, pp. 239 ff. The above diagram is based on the phonetic description by Dragunov. Most vowels are realized as diphthongs. *u* is a very close *o* with increasing closeness. After sibilants and apicals it is completely unrounded; in other environments it is only rounded in its beginning. *o* and *e* are more open in their final portion than in their initial portion (*oo*, *ee*). *v* and *ü* are the characteristic gingival vowels that occur in many Chinese dialects.

⁷⁴ Cf. Anton Pfalz, "Die Mundart des Marchfeldes," in *Sitzb. Wien. Akad., Phil.-hist. Kl.*, CLXX, no. 6 (1912); see also N. S. Trubetzkoy, *TCLP*, IV, 101 ff.

⁷⁵ For example, V. G. Bogoraz, who had observed such "muffled" vowels in Chukchi (on Kamchatka), states that these vowels are pronounced with "laryngeal intensification," which "corresponds to a more pronounced intonation" (*Jazyki i pis'mennost' narodov Severa*, III, 12).

⁷⁶ A. N. Tucker, "The Function of Voice Quality of the Nilotic Languages," in *Proceedings of the Second International Congress of Phonetic Sciences*, pp. 125 ff.

⁷⁷ Ida C. Ward, "Phonetic Phenomena in African Languages," in *Archiv. für vergl. Phonet.*, I (1937), 51.

⁷⁸ J. R. Firth, "Phonological Features of Some Indian Languages," in *Proceedings of the Second International Congress of Phonetic Sciences*, p. 181.

⁷⁹ A. Dirr, "Grammatičeskij očerk Tabassanskogo jazyka," in *Materialy dlja opisanija mēstnostej i plemen Kavkaza*, N. 1 (1905), otd. III, 2.

⁸⁰ A. Dirr, "Agul'skij jazyk," in *ibid.*, XXXVII (1907), otd. III, 2.

⁸¹ J. P. Grazzolaria, "Outlines of a Nuer Grammar," in *Linguistische Bibliothek "Anthropos,"* XIII (1933), 3.

⁸² The acoustic effects in the labial series are primarily produced by the impact of the airflow against the soft, wide, but relatively short surface of the lips; in the apical series, by the resonance of the cavity that is bordered from below by the flat, extended tongue, and from above and from the back by the hard and soft palate; in the guttural series, by the resonance of the cavity bordered from below and from the back by the roundish surface of the contracted tongue and the lower teeth, from above by the upper teeth, the hard palate, and possibly the front part of the soft palate.

⁸³ What is characteristic of this series is the creation of a resonant cavity sideways from the tongue. (The lateral consonants could accordingly be designated as "tongue-cheek sounds" [*Zungenwangenlaute*].) The tongue may either be flatly extended with its tip pointed toward the front of the oral cavity, or it may be contracted, its dorsum raised toward the center or the back of the oral cavity. The latter is irrelevant for the laterals as an independent series of localization. However, in cases where such an independent lateral series of localization is not present, the lateral resonating cavity of individual lateral sounds may in turn seem unimportant, such sounds being then evaluated as realizations of phonemes of the apical or guttural series.

⁸⁴ However, what is characteristic is always the contracted shape of the tongue and the frontal position of articulation. Acoustically it is possible to distinguish "more kj-like" or "more tj-like" palatals, or palatals that really lie completely between the "ki-" and the "ti-effect," or assimilated palatals, etc. Cf. E. Šramek, "Le parler de Boboščica, en Albanie," in *Revue des études slaves*, XIV (1934), 184 f. O. Broch gives a detailed phonetic classification in "Slavische Phonetik" (par. 15, pp. 20-22).

⁸⁵ Cf. N. S. Trubetzkoy, "Zur Entwicklung der Gutturale in den slavischen Sprachen," in *Miletic-Festschrift* (1933), pp. 267 ff. On Slovak *h*, see L'. Novák, "Fonologia a študium slovenčiny," in *Spisy jazykového odboru Matice slovenskej*, II (1934), 18.

⁸⁶ Cf. William Thalbitzer, "A Phonetical Study of the Eskimo Language," in *Meddelelser om Grønland*, XXXI, 81.

⁸⁷ Cf. Clement M. Doke, "A Comparative Study in Shona Phonetics" (Johannesburg, 1931).

⁸⁸ For example, in many African languages such as Swahili (Bambara dialect), Herero, etc. (see Carl Meinhof, *Grundriss einer Lautlehre der Bantusprachen* [Berlin, 1910]), as well as in most Indian languages, both Indo-European and Dravidian.

⁸⁹ For example, in Nuer and Dinka (Egyptian Sudan). Cf. J. P. Crazzolaria, "Outline of a Nuer Grammar," in *Linguistische Bibliothek "Anthropos,"* XIII, and A. N. Tucker, *The Comparative Phonetics of the Suto-Chuana Group of Bantu-Languages* (London, 1929).

⁹⁰ For example, in Czech or Hungarian (see below).

⁹¹ Cf. J. Schreiber, *Manuel de la langue Tigrāi* (Vienna, 1887).

⁹² Cf. E. N. and A. A. Dragunov, "K latinizacii dialektov central'nogo Kitaja," in *Bull. de l'Acad. des Sciences de l'U.d.R.S.S., Classe des Sciences Sociales* (1932), no. 3, pp. 239 ff.

⁹³ For the same reason it is also not possible to speak of an opposition between occlusives and spirants in French: certain positions of articulation are here related to a firmer closure of the articulatory organs involved (in particular the *p*, *t*, and *k* position), others to a loose stricture (in particular the *s*, *ʃ*, and *f* position). But it is impossible in French to regard the degree of occlusiveness independent of the position of articulation. We therefore believe that we must dispute the classification of the French consonant phonemes given by G. Gougenheim, *Éléments de phonologie française* (Strasbourg, 1935), pp. 41 ff.

⁹⁴ This probably also explains why even in cases where the basic series are not split, the spirant of the labial series is realized by *f*, that of the guttural series by *ʃ* (as, for example, in Dutch).

⁹⁵ Cf. *Bulletin of the Smithsonian Inst. of Ethnology*, XL.

⁹⁶ Cf. N. Jakovlev, "Tablicy fonetiki kabardinskogo jazyka," in *Trudy Podrazrjada issledovanija severokavkazskich jazykov pri Inst. Vostokovedenija*, I (1923).

⁹⁷ Cf. A. Schiefner, *Versuch über die Sprache der Uden* (St. Petersburg, 1863); A. Dirr, "Udinskaja Grammatika," in *Sborn. Mat. dlja opis. mēstn. i plemen Kavkaza*, XXXIII (1904).

⁹⁸ See K. E. Mucke, *Historische und vergleichende Laut- und Formenlehre der niedersorbischen Sprache* (Leipzig, 1891), pp. 151 ff.

⁹⁹ N. S. Trubetzkoy, "Konsonantensysteme der ostkaukasischen Sprachen," in *Caucasica*, 8.

¹⁰⁰ Cf. Clement M. Doke, *A Comparative Study in Shona Phonetics* (Johannesburg, 1931).

¹⁰¹ Incidentally, it is not impossible that the *ʃ* series in Shona is not a related series of the two other sibilant series, but an independent palatal series.

¹⁰² Cf. R. Jakobson, *K charakteristike evrazijskogo jazykovogo sojuza* (Paris, 1931), in which the Eurasian languages (i.e., the East European and North Asiatic languages) with the correlation of palatalization are enumerated; also Jakobson in *TCLP*, IV, 234 ff., and in *Actes du IV^{ème} Congrès International de Linguistes*.

¹⁰³ A good phonetic description of the palatalization process is given by A. Thomson, "Die Erweichung und Erhärtung der Labiale im Ukrainischen," in *Zapysky ist. fi. viddilu Ukr. Akad. Nauk.*, XIII-XIV (1927), 253-263.

¹⁰⁴ Cf. N. S. Trubetzkoy, "Die Konsonantensysteme der ostkaukasischen Sprachen," in *Caucasica*, VIII.

¹⁰⁵ Cf. W. H. T. Gairdner, *The Phonetics of Arabic* (Oxford, 1925).

¹⁰⁶ Cf. Franz Boas in *Bulletin of the Bureau for American Ethnology*, XL.

¹⁰⁷ Cf. N. F. Jakovlev, *Kratkaja grammatika adygejskogo (kjachskogo) jazyka dlja školy i samoobrazovanija* (1930).

¹⁰⁸ Cf. Gerhard Deeters, "Der abchasische Sprachbau," in *Nachr. v. d. Ges. d. Wiss. zu Göttingen, Phil. hist. Kl., Fachgr. III*, no. 2 (1931), pp. 290 ff.

¹⁰⁹ Cf. J. R. Firth in *Bull. of the School of Oriental Studies*, VIII, 532-533.

¹¹⁰ Cf. A. A. Cholodovič, "O latinizacii korejskogo pis'ma," in *Sovetskoje jazykoznanije*, I (1935), 147 ff. The combination "consonant + *w*" is here to be considered monophonematic.

¹¹¹ The situation in the Japanese dialect of Nagasaki, on the other hand, is to be interpreted differently. This dialect has four kinds of gutturals: velars, palatals, labiovelars, and labio-palatals. But since in this case the correlation of

labialization is not present in the other series of localization, while the correlation of palatalization comprises all series, one seems to be justified in considering the rounded gutturals (which sound almost like labials) as an autonomous related series ("labiovelar series") in which the correlation of palatalization takes place, just as it does in the other series.

¹¹² Roman Stopa, "Die Schnalze, ihre Natur, Entwicklung und Ursprung," in *Prace Komisji Językowej*, no. 23 (Kraków, 1935).

¹¹³ P. de V. Pienaar, "A Few Notes on Phonetic Aspect of Clicks," in *Bantu Studies* (March 1936), pp. 43 ff.

¹¹⁴ D. M. Beach, *The Phonetics of the Hottentot Language* (Cambridge, 1938).

¹¹⁵ Clement M. Doke, "The Phonetics of the Zulu Language," in *Bantu Studies*, II (1962), Special Number.

¹¹⁶ See pp. 155 f.

¹¹⁷ A. N. Tucker, *The Comparative Phonetics of the Suto-Chuana Group of Bantu-Languages* (London, 1929).

¹¹⁸ W. H. Bleek and L. C. Lloyd, *Specimens of Bushman Folklore* (London, 1911).

¹¹⁹ P. Meriggi, "Versuch einer Grammatik des χ am-Buschmännischen," in *Zeitschrift f. Eingeborenen Sprachen*, XIX.

¹²⁰ A few series also have voiceless spirants, and the labial series has an "implosive" media.

¹²¹ Clement M. Doke, *A Comparative Study in Shona Phonetics* (Johannesburg, 1931), p. 109, as well as pp. 110-119 and the palatograms, pp. 272 and 273.

¹²² Cf. pp. 72 f.

¹²³ Cf. William Thalbitzer, "A Phonetical Study of the Eskimo Language," in *Meddelelser om Grönland*, XXXI, 81.

¹²⁴ Cf. Ethel Aginsky, "A Grammar of Mende Language," in *Language Dissertations* (Ling. Soc. of America), no. 20 (1935).

¹²⁵ Cf. Mark H. Watkins, "A Grammar of Chichewa, a Bantu Language in British Central Africa," in *Language Dissertations* (Ling. Soc. of America), no. 24 (1937).

¹²⁶ Above we have mentioned Gilyak and Eskimo. In some Bantu languages the one liquid is a normal (alveolar) *l*, while the other is a retroflex *l* (which sometimes is *r*-like). In such languages both liquids are often "localizable," as, for example, in Swahili (Mombesa dialect) where a retroflex series is in opposition with the plain apical series; further in Pedi where the retroflex *l* clearly belongs to the apical series, while the dental *l* belongs to the lateral series. On the consonantal systems of these languages, cf. Carl Meinhof, *Grundriss einer Lautlehre der Bantu-Sprachen* (Berlin, 1910).

¹²⁷ Cf. A. Martinet, "La phonologie du mot en danois" (Paris, 1937) (*BSL*, XXXVIII [1937], 2).

¹²⁸ J. R. Firth, *A Short Outline of Tamil Pronunciation* (Appendix to the second edition of Arden's *Grammar of Common Tamil* [1934]).

¹²⁹ This special position of *r* in the Tamil consonant system has as a consequence that the *r* is the only sonorant after which other consonants may occur (*p*, *t*, *k*, *n*), and which not only occurs after vowels but also after consonants (especially after *t*). After *l*, *p*, and *v* are permitted, but it seems only in loanwords, for example, "reyilvee" (railway).

¹³⁰ In any event, English *h* can in no case be considered the spirant of the guttural series. (Here Kemp Malone and A. Martinet are correct in contrast to B. Trnka.) As for French, see above, p. 126.

¹³¹ Based on G. L. Trager in *Maitre phonétique*, 3^{me} série, no. 56.

¹³² In those North Čakavian dialects where, according to A. Belič and M. Malecki, the *j* originating from Proto-Slavic *j* (as in "jaje" [egg]) is distinguished from the *j* of different origin (as in "zaja" [thirst]); the former is no consonant phoneme from a phonological point of view, but a combinatory variant of the vowel phoneme *i* in direct contact with other vowels.

¹³³ Cf. A. N. Tucker, *op. cit.*

¹³⁴ Cf. R. Bošković, "O prirodni, razvitku i zamencima glasa *h u* govornima Črne Gore," in *Juž. Fil.*, XI (1931), pp. 179 ff.

¹³⁵ A. Martinet (*La phonologie du mot en danois*) considers Danish *v*, δ , and γ as spirants. However, he is wrong since these phonemes in Danish are treated like *r*, *l*, and *j*. True spirants in Danish are only *f* and *s*. But since these phonemes are not in opposition with any occlusives, and since they are the only representatives of the respective localization series (*f* of the labiodental series, and *s* of the sibilant series), their spirantal character is phonologically irrelevant. On the relationship *v-f*, cf. A. Martinet, *op. cit.*, p. 38.

¹³⁶ Various names have been proposed for these consonants. Probably most common is the term "consonants with glottal occlusion." This is somewhat ambiguous, however, since a glottal stop can also be an independent phoneme, and since the closure of the glottis is not a characteristic of these consonants alone. For the same reason one must reject the term "glottocclusive" which I had used in my article "Die Konsonantensysteme der ostkaukasischen Sprachen," in *Caucasica* VIII. The term "consonants of supraglottal expiration," suggested by N. Jakovlev (in his "Tablicy fonetiki kabardinskogo jazyka"), is clumsy and does not express the true nature of these consonants clearly enough. Their character is better described by the term "ejectives" used by English phoneticians (especially by Africanists). Meant hereby is the energetic thrust of the closed glottis which "ejects" the air above it like a piston. The present writer had the same in mind when he chose the term "recursives" for these consonants in 1922 in his article in *BSL*, XXIII. (Incidentally, the term had already been used earlier in Russian Caucasian studies.) The same term is used today in Indological literature; it was probably first used by R. L. Turner in *Bull. of the School of Orient. Stud.*, III, 301 ff. (but, it seems, with reference to "injective" occlusives), now also by the Indic linguist Suniti Kumar Chatterji (cf. his *Recursives in New-Indo-Aryan*, The Linguistic Society of India, Lahore, 1936).

¹³⁷ Meant here are those occlusives designated as "injectives" by the English phoneticians. After implosion, the glottis is closed and pushed down. This produces a rarefaction of air in the space between the oral and the glottal closure. The oral closure is then released without the aid of expiration, merely by means of the activity of the respective articulatory organs, and the air from the outside rushes into the oral cavity; but it is expelled immediately by the onset of normal expiration.

¹³⁸ Leonard Bloomfield interprets the preaspirated consonants of Fox as combinations (*hp*, *ht*, *hk*, *hč*) ("Notes on the Fox Language," in *International Journal of American Linguistics*, III, 219 ff.). In Hopi no long vowels are permitted before the preaspirated consonants (^h*p*, ^h*t*, ^h*k*, ^h*q*, ^h*c*). According to

the laws of Hopi, this seems to point to the fact that the "preaspirated consonants" must here also be considered consonant combinations.

¹³⁹ Cf. Benjamin Lee Whorf, "The Phonetic Value of Certain Characters in Maya Writing," in *Papers of the Peabody Museum of American Archeology and Ethnology, Harvard University*, XIII (1933), no. 2, n. 3.

¹⁴⁰ Cf. G. N. Prokofjev, "Neneckij (jurasko-samojedskij) jazyk," in *Jazyki i pis'mennost' narodov Severa*, I, 13.

¹⁴¹ Cf. Clement M. Doke, "A Study of Lamba Phonetics," in *Bantu Studies* (July 1928).

¹⁴² Whether Modern Greek belongs to this type as well is difficult to say. It depends on whether the Modern Greek voiced occlusives *b*, *d*, and *g* are to be considered special phonemes or merely combinatory variants. Medially they occur only before nasals. Neither π , τ , and κ nor the voiced fricatives β , δ , and γ are permitted in that position. Medially *b*, *d*, and *g* are only found in loanwords. It is difficult to say to what extent these have been assimilated.

¹⁴³ Carl H. Borgström, "The Dialect of Barra in the Outer Hebrides," in *Norsk Tidsskr. for Sprogvidenskap*, VIII (1935).

¹⁴⁴ Cf. G. S. Lowman in *Language*, VIII (1932), 271-293.

¹⁴⁵ Cf., e.g., Alf Sommerfelt, "The Dialect of Torr, Co. Donegal," I (Christiania, 1922).

¹⁴⁶ Cf. D. V. Bubrich, *Zvuki i formy erzjanskoj reči* (Moscow, 1930), and N. S. Trubetzkoy, "Das mordwinische phonologische System verglichen mit dem Russischen," in *Charisteria Guilelmo Mathesio* (Prague, 1932), pp. 21 ff.

¹⁴⁷ Cf. P. P. Schumacher in *Anthropos*, XXVI.

¹⁴⁸ In German the situation is more complicated: in the labiodental and sibilant series the weak occlusive is absent (β -*f-v*, *c-s-z*), while in the dorsal series the weak fricative is absent (*k-g-x*).

¹⁴⁹ E. N. and A. A. Dragunov, "K latinizacii dialektov central'nogo Kitaja," in *Bull. de l'Acad. des Sciences de l'U.d.S.S.R., Classe des Sciences Sociales* (1932), pp. 239 ff.

¹⁵⁰ Cf. R. J. Swanton in *Bull. of the Bureau of American Ethnology*, no. 40, pp. 210 ff.

¹⁵¹ Cf. G. P. Anagnostopoulos, "Tsakonische Grammatik," in *Texte und Forschungen zur Byzantinisch-neugriechischen Philologie*, no. 5 (Berlin-Athens, 1926).

¹⁵² Cf. H. A. Jäschke, "Tibetan Grammar," 2d ed., in *Trübners Collection of Simplified Grammars*, VIII (1883).

¹⁵³ Cf. Marcel Cohen, "Traité de langue amharique," in *Travaux et Mémoires de l'Institut d'Ethnologie*, XXIV (Paris, 1936), 30 ff.

¹⁵⁴ Mark Hanna Watkins, "A Grammar of Chichewa, a Bantu Language" (*Ling. Soc. of America, Language Dissertations*, no. 24 [1937]). The phoneme *b* is described by Watkins as a kind of fricative. However, according to its position in the system it is an occlusive (weak affricate?).

¹⁵⁵ Cf. N. Jakoblev, *Tablicy fonetiki kabardinskogo jazyka* (Moscow, 1932). The correlation of rounding is here disregarded with respect to the dorsal consonants.

¹⁵⁶ Cf. J. R. Firth, "Alphabet and Phonology in India and Burma," in *Bull. of the School of Oriental Studies* (1936), p. 533; however, we disregard the correlation of timbre.

¹⁵⁷ Cf. Franz Boas in *Bull. of the Bureau of American Ethnology*, XL, 291.

¹⁵⁸ In Shona (a Bantu language in Rhodesia) a three-member bundle is present with respect to the occlusives: "voiceless"—"voiced-plosive"—"voiced-injective" (*p-b-b'*, *t-d-d'*). With respect to the fricatives, only the correlation of voice is present; and no correlation based on the manner of overcoming an obstruction is found with respect to the sonorants (cf. Clement M. Doke, *A Comparative Study in Shona Phonetics* [Johannesburg, 1931]). The structure of this system is basically not different from the one discussed above. The same is also true of the consonant system of Fulful.

¹⁵⁹ For more details, cf. N. S. Trubetzkoy, "Die Konsonantensysteme der ostkaukasischen Sprachen," in *Caucasica*, VIII.

¹⁶⁰ Cf. N. Jakoblev, "Kurze Übersicht über die tscherkessischen (adyghischen) Dialekte und Sprachen," in *Caucasica*, VI (1930), 1 ff., as well as N. S. Trubetzkoy, "Erinnerungen an einen Aufenthalt bei den Tscherkessen des Kreises Tuapse," in *ibid.* II, 5, f.

¹⁶¹ Our assumption that in Tabarasan the sonorants participate in the correlation of intensity (*Caucasica*, VIII, 25 ff.) was based on an error. Involved here was actually the correlation of gemination. Morris Swadesh pointed this out to me.

¹⁶² Cf. Boas and Swanton in *Bull. of the Bureau of American Ethnology*, XL, 880. The correlation of aspiration went unnoticed by earlier observers of Dakota. This appears to point to the fact that aspiration in this language is very weak. Such weak aspiration is also characteristic of the unmarked member of the correlation of recursion and the correlation of intensity in the North Caucasian languages. It is therefore possible that what we find in Dakota is not the correlation of aspiration but a correlation of intensity.

¹⁶³ Cf. R. L. Turner, "The Sindhi Recursives or Voiced Stops Preceded by Glottal Closure," in *Bull. of the School of Oriental Studies*, III, 301 ff.

¹⁶⁴ Cf. Suniti Kumar Chatterjee, *Recursives in New-Indo-Aryan* (The Linguistic Society of India, Lahore).

¹⁶⁵ Cf. G. L. Trager, "ḏə ɛɛwɪj əv ḏə pweblow əv Taos (*nuw meksikow)," in *Le maître phonétique*, 3^{me} série, no. 56, pp. 59 ff.

¹⁶⁶ "Die Sandawe," in *Abhandlungen des Hamburger Kolonialinstituts*, XXXIV (1916).

¹⁶⁷ From a phonetic point of view, the production of clicks is completely independent of breathing (and consequently of expiration). However, clicks in Sandawe never occur in isolation: they are always accompanied by a "soft," i.e., voiced offset (which is in free variation with a type of *g*), or by aspiration, or by a "hard" offset. Since all these combinations also occur in initial position where no other consonant clusters are permitted, they must be regarded as monophonematic. In the "dental" and the "lateral" click series the aspirated click is in free variation with the combination "click + *k*." In the "retroflex" click series (which we designate as guttural) the aspirated click is realized exclusively by the combination "click + *k*."

¹⁶⁸ The consonantal differences of timbre are not taken into consideration: all obstruents except the labials are found in Sandawe in two varieties, rounded (*dw*, *kw*, *sw*, *lw*, etc.) and unrounded.

¹⁶⁹ *The Phonetics of the Hottentot Language* (Cambridge, 1938). We limit ourselves here to the Nama dialect (with which the dialect of the Bergdama is essentially in accord).

¹⁷⁰ After initial nasals, only the homorganic voiced occlusives with unrestricted expiration are permitted of the consonants. In initial position the combinations *mb*, *ŋg*, and *ndz* occur, but not the combination *nd*. This is proof that *n* belongs not to the apical but to the sibilant series.

¹⁷¹ For languages such as Hottentot, it would perhaps be appropriate to replace the term "apical" by "prelingual," and the term "guttural" by "postlingual," with respect to the opposition existing between the respective click series.

¹⁷² D. M. Beach does not comment here on the relationship of length between types (b) and (d). He merely notes that these two types of clicks have a greater length than those of type (a).

¹⁷³ In the correlation of consonant intensity the "weak" opposition members (i.e., the light consonants) are, of course, unmarked. The same can be said of the unaspirated consonants in the correlation of aspiration. This is in accord with the fact that D. M. Beach considers the clicks of type (a) "the simplest clicks of Hottentot" (p. 83) and does not mark them with any diacritics in his transcription.

¹⁷⁴ One may perhaps ask why it is that the postlingual affricative clicks have a lateral and not a "frontal" release in the case of retroflex tongue position. We would like to believe that such a realization would not be sufficiently distinct acoustically and could easily be confused with the prelingual affricative or the postlingual plosive click series. The lateral release thus seems to be the only possible solution to the phonetic problem of realizing a postlingual fricative click.

¹⁷⁵ A further peculiarity is represented by the fact that the apical and the guttural series, as the only lingual series, form a bilateral opposition which can even be neutralized: before *i*, *k* and *kx* are not permitted. In this position *t* and *ts* must be regarded as "lingual occlusives in general."

¹⁷⁶ Cf. N. S. Trubetzkoy, "Die phonologischen Grundlagen der sogenannten 'Quantität' in verschiedenen Sprachen," in *Scritti in onore di Alfredo Trombetti* (Milan, 1936), pp. 167 ff.; "Die Quantität als phonologisches Problem," in *Actes du IV^{ème} Congrès International de Linguistes* (Copenhagen, 1938), and Morris Swadesh, "The Phonemic Interpretation of Long Consonants," in *Language*, XIII (1937), 1 ff.

¹⁷⁷ Cf. N. S. Trubetzkoy, "Die Konsonantensysteme der ostkaukasischen Sprachen," in *Caucasica*, VIII.

¹⁷⁸ Cf. O. Pletner and E. Polivanov, *Grammatika japonskogo razgovornogo jazyka* (Moscow, 1930), p. 150.

¹⁷⁹ Cf. A. Cholodovič, "O latinizaciji korejskogo pisma," in *Sovetskoje azykoznanije*, I, pp. 147 ff.

¹⁸⁰ Cf. R. J. Firth, *op. cit.*, the geminated obstruents are here realized as unaspirated voiceless occlusives (with sustained closure); in other words, they have the same realization (only with a longer sustained closure) as the combinations "r + obstruent."

¹⁸¹ Cf. V. N. Černecov in *Jazyki i pis'mennost' narodov Severa*, I, 171.

¹⁸² Cf. W. Steinitz in *ibid.*, pp. 201 f.

¹⁸³ Cf. Morris Swadesh in *Language*, XIII, 5.

¹⁸⁴ This similarity is often even heightened by the fact that the geminated occlusives are unaspirated, while the corresponding ungeminated occlusives are aspirated. Cf., for example, Tamil and Artshi.

¹⁸⁵ Cf. N. S. Trubetzkoy in *Caucasica*, VIII.

¹⁸⁶ Cf. Paavo Ravila, *Das Quantitätssystem des seelappischen Dialekts von Mqattivuo* (Helsinki, 1932); no phonological but an excellent phonetic description.

¹⁸⁷ This seems to be the case in the dialect of Inari. Although it is not possible to arrive at the phonological system of this dialect on the basis of the description by Frans Äimäs, which is known for its phonetic exactness ("Phonetic und Lautlehre des Inarilappischen," in *Mémoires de la Société finno-ougrienne*, XLII and XLIII), it is possible to do so on the basis of the texts collected and edited by Paavo Ravila ("Reste lappischen Volksglaubens," in *Mém. de la Soc. finno-ougrienne*, XLVIII).

¹⁸⁸ Cf. E. Sapir, "Notes on the Gweabo-Language of Liberia," in *Language*, VII, 36 and 37, and N. S. Trubetzkoy in *Scritti in onore di Alfredo Trombetti* (Milan, 1936), pp. 169 ff.

¹⁸⁹ Cf. V. Jochel'son, "Unanganskij (aleutskij) jazyk," in *Jazyki i pis'mennost' narodov Severa*, III, 130 ff.

¹⁹⁰ Cf. Pline Earle Goddard in *Handbook of American Indian Languages*, I.

¹⁹¹ Cf. E. Sapir in *ibid.*, II, 9.

¹⁹² Cf. John R. Swanton in *Bull. of the Bureau of American Ethnology*, XL.

¹⁹³ More precisely, the Taz dialect of that language; cf. G. N. Prokofjev, "Sel'-jkupskaja (ostjakosamojedskaja) grammatika" (Leningrad, 1935), pp. 5 and 22 ff.

¹⁹⁴ Cf. E. Sapir in *Language*, VII, 37.

¹⁹⁵ Cf. Mark Hanna Watkins, "A Grammar of Chichewa," in *Language Dissertations*, no. 24.

¹⁹⁶ Cf. Franz Boas in *Handbook of American Indian Languages*, I, 289.

¹⁹⁷ Cf. Boas, *op. cit.*, p. 565.

¹⁹⁸ Cf. Boas, *op. cit.*, p. 429.

¹⁹⁹ Cf. Harry Hoijer, "Tonkawa, an Indian Language of Texas" (reprinted from *Handbook of American Indian Languages*, III), p. 3.

²⁰⁰ Cf. N. S. Trubetzkoy in *Caucasica*, VIII.

²⁰¹ Cf. N. S. Trubetzkoy in *ibid.*

²⁰² Cf. G. L. Trager in *Le maître phonétique*, 3^{me} série, no. 56, pp. 59 ff.

²⁰³ Cf. V. Jochel'son, *loc. cit.*

²⁰⁴ The matter is not quite clear. In any event, the opposition *n-ŋ* is much more marked in French and carries a much greater functional load than the opposition between *n* and a nonnasal (cf. Gougenheim, "Éléments de phonologie française" (1935), pp. 44 ff.).

²⁰⁵ Cf. P. K. Uslar, *Etnografija Kavkaza*, Č. I., "Jazykoznanije," vyp. 3 (*Avarskij jazyk*) (Tiflis, 1889), 9.

²⁰⁶ Cf. *ibid.* I, vyp. 4 (Lakskij jazyk) (Tiflis, 1890), 7. Uslar adds that final *n* is pronounced as an *m* before *b*. He notes: "It may be just an auditory deception, for even the natives are not sure of the pronunciation"—a characteristic feature in the neutralization of a distinctive opposition.

²⁰⁷ In the descriptions of living languages with which we are familiar, we have not found any such cases. In Yoruba (Southern Nigeria) nasalized *ɔ̃* and *ɔ̃w* seem to be only (optional?) variants of the palatal and labiovelar nasal (cf. D. Westermann and Ida Ward, *Practical Phonetics for Students of African Languages* [London, 1933], pp. 168 ff.). In certain Slovenian dialects a nasalized *j* (from Proto-Slavic palatal *ɲ*, standard Slovenian *ɲj*) occurs as an independent phoneme (cf.

A. Isačenko, "Les parlers slovènes du Podjunje en Carinthie," in *Revue des études slaves*, XV ([1935], p. 57). However, apart from this *j*, the particular dialects do not have any palatal nasal with a complete oral closure, with which *j* would be in a relationship of bilateral opposition.

²⁰⁸ Cf. D. Westermann, *Handbuch der Ful-Sprache* (Berlin, 1909), p. 197; Henri Gaden, *Le Poular, dialecte peul du Fouta Sénégalais (Collection de la Revue du monde musulman*, I [Paris, 1913]), p. 2. It is interesting to note that at morpheme boundary, the contact between *m* and *b* results neither in a *b* nor in an *mb* but in a geminated *bb* (H. Gaden, *op. cit.*, I, 8, 9, 15). The contact of the phonemes *l, d, t, b* with *b, d, g,* and *j*, on the other hand, results in the combinations *mb, nd, ng, nj* (*ibid.*, 9, par. 15, p. 6). After the nasals, the oppositions *b, d, g, j*—*b, d, g, j* are neutralized (archiphoneme representative: *b, d, g, j*). On the other hand, the oppositions *m, n, ŋ, ɲ*—*b, d, g, j* are neutralized before *b, d, g, j* (archiphoneme representative: *m, n, ŋ, ɲ*).

²⁰⁹ *TCLP*, I, 50 ff.

²¹⁰ Cf. N. S. Trubetzkoy, *Anleitung zu phonologischen Beschreibungen* (Brno, 1935), pp. 21 ff.

²¹¹ In *Bulletin de la Maison franco-japonaise*, VIII (1936), no. 1, pp. 126 ff. Cases such as Peking Chinese "14" (two) clearly speak against the above view by L. Hjelmslev (toward which B. Trnka, *TCLP*, VI, 62, also seems to tend), according to which a monophonemic word can only consist of one vowel: in contrast with German *s!*, French *rrr!*, and Russian *s! c!* Chinese 14 (two) is no interjection but a quite normal numeral.

²¹² This is true only of the standard language in its Stage German pronunciation. In the dialects and in dialectally colored standard German pronunciation, *i* and *j* are different phonemes. This is the case, for example, in those dialects where *ii* changed to *i* and where the combination *ji* is consequently permitted (*jijər* = *jünger*, *jidiš* = *jüdisch*); or in North German where *j* is only a combinatory variant of the spirant *γ* (before front vowels or after nonback vowels respectively).

²¹³ In those languages where the syllable nuclei are exclusively monophonematically evaluated vowel phonemes, the difference between vowel phonemes can be defined as follows: vowels are those phonemes capable of functioning as syllable nuclei, while consonants are those phonemes that cannot occur as syllable nuclei. One might be inclined to go even further in this direction: since there is no language in which the vowels would not occur as syllable nuclei, vowels could be defined as those phonemes that function as syllable nuclei either in the form of their basic variants or as unmarked members of a correlation of syllabicity, and consonants as those phonemes that are nonsyllabic in the form of their basic variants or as unmarked members of the correlation of syllabicity. This definition is defended by R. Jakobson. But several objections can be raised against it. First, it is not always possible to establish the basic variant objectively. Second, one can only speak of syllable nuclei in those languages that have distinctive prosodic properties. In languages such as Armenian or Georgian, which do not have any prosodic properties, the "syllable" is not a phonological but a phonetic concept which can only be defined by means of the "vowel" concept but which in no way can serve as basis for the definition of the vowel. The above definition (p. 94) of the difference between "vowel" and "consonant" must therefore be sustained.

²¹⁴ Cf. N. S. Trubetzkoy, "Die phonologischen Grundlagen der sogenannten Quantität in den verschiedenen Sprachen," in *Scritti in onore di Alfredo Trombetti* (Milan, 1936), pp. 155 ff.; Trubetzkoy's paper "Die Quantität als phonologisches Problem" (*Actes du IV^e Congrès International de Linguistes* [Copenhagen, 1938]); also R. Jakobson, "Über die Beschaffenheit der prosodischen Gegensätze," in *Mélanges offerts à J. van Ginneken* (Paris, 1937), pp. 24 ff.

²¹⁵ The "falling" diphthongs are, however, treated differently in Slovak; only their first vowel is considered a syllable nucleus. It is affected by the rhythmic law, only if it is long. Falling diphthongs in which the first vowel is short (e.g., *aj, au*) are considered combinations of a short vowel with a consonant. Accordingly they do not result in a shortening of the long vowels of the following syllable. Cf. R. Jakobson, "Z fonologie spisovné slovenštiny," in *Slovenská miscellanea* (Bratislava, 1931), pp. 156 ff.

²¹⁶ Cf. H. W. T. Gairdner, "The Phonetics of Arabic," in *The American University of Cairo Oriental Studies* (1925), p. 71.

²¹⁷ Cf. N. S. Trubetzkoy, "Polabische Studien," in *Sitzb. Wien Akad., Phil.-hist. Kl.*, CCXI, no. 4, pp. 126 ff.

²¹⁸ Edward Sapir, "Southern Paiute, a Shoshonean Language," in *Proceedings of the American Academy of Arts and Sciences*, 65, nos. 1-3, pp. 37 ff.

²¹⁹ Charles F. Voegelin, "Tübatulabal Grammar," in *University of California Publ. in Amer. Archeol. and Ethnol.*, 34, no. 2, pp. 75 ff. In long syllables only the first mora may be accented. If, based on iambic rhythmic law, a secondary accent falls on the second mora of a long vowel, it is shifted to the first mora of that vowel. The secondary accents then continue regularly in distances of one mora.

²²⁰ This can be seen from the data published by Roland B. Dixon in *Handbook of American Indian Languages*, I, 683 ff. (Rare deviations from this scheme can be explained without difficulty.) It seems that the secondary accents in Maidu are distributed in accordance with the same principle as those of Paiute: where R. B. Dixon indicates two accents in a word, the second always falls on one of the "even" morae (e.g., "kü'lü'nanamaā't" [toward evening], "basa'kömoscū'mdi" [at the end of the stick], etc.). In some cases R. B. Dixon heard only this secondary accent (cf. transcriptions such as "ünī'di," "ākā'nas," "ātsoia," "āā'nkano," "sāmō'estodi," etc.). Incidentally, the Northeast dialect of Maidu geographically borders on Paiute.

²²¹ In some North Chinese dialects the "short, low tone" is realized as falling, while the "short, high tone" is realized as rising. The "long, rising tone" accordingly has two peaks (i.e., falling-rising), while the "long, falling tone" is rising-falling, so that the longer syllables are still to be equated prosodically with the combination of two short syllables. Cf. E. D. Polivanov and N. Popov-Tativa, *Posobije po kitajskoj transkripcii* (Moscow, 1928), pp. 90 f., and E. Polivanov, *Vvedenje v jazykoznanije dl'a vostokovednyh vuzov* (Leningrad, 1928), pp. 118 f.

²²² Cf. R. Jakobson in *TCLP*, IV, 180 f.

²²³ *Mélanges . . . van Ginneken*, pp. 32 f.

²²⁴ Cf. Ida C. Ward, *The Phonetic and Tonal Structure of Efik* (Cambridge, 1933), p. 29: "A vowel on a rising or falling tone is generally longer than on a high or low level tone."

²²⁵ It is possible that this is the case in the Gē dialect of Ewe. The syllables

"with nonlevel tone" seem here to be somewhat short, even in those cases where they originated from contraction. For example: "eléy.i" (he is going [from "el.e," "ey.i"]). The long syllables, on the other hand, always seem to be level-toned, at least this is the impression one gains from reading the description of this dialect in D. Westermann and Ida C. Ward, *Practical Phonetics for Students of African Languages*, pp. 158-166, and from the examples and the sample text provided there.

²²⁶ In these languages the expiratory increment (the "dynamic accent") is bound to word-initial syllable. Accordingly it has no distinctive, only delimitative value.

²²⁷ A peculiarity in the realization of the vowels in Hopi should also be mentioned here. It has already been pointed out (in the discussion of the English vocalism, pp. 116 f.) that languages with a correlation of close contact tend to realize unchecked vowel phonemes as diphthongs of movement. A similar case seems to be on hand in Hopi. The maximally dark and maximally close vowel phoneme is here realized as *ou* in syllables of medium length and in long syllables, in short syllables, on the other hand, as *U*.

²²⁸ Though long vowels occur in this position, they do so only rarely. B. L. Whorf writes to us: "... three lengths do not occur in a word-final vowel. . . . If such a vowel is accentuated, its length is medium, *with very few cases of long*" (italics ours).

²²⁹ Neutralization of the opposition between long and medium-length vowels in closed syllables in Hopi, is, however, subject to certain restrictions. First, syllables ending in *y* and *w* are treated as open (in other words, before syllable-final *y* and *w* all "three vowel quantities" are distinguished). Second, in monosyllabic words of the type "consonant + vowel + consonant" all three quantities are permitted as well. One may probably assume that syllable-final *y* and *w* in Hopi are considered special syllables (*yi*, *wu*?), and that monosyllabic words (such as the above examples of "päs" [very], "pas" [field], "päs" [quiet]) are interpreted as having two syllables.

²³⁰ As for the expiratory accent, primary stress in Hopi falls on the initial syllable in bisyllabic words and on the initial or second syllable in words having more than two syllables. Secondary stress falls either on the first or on the second syllable following primary stress (depending on the grammatical category involved). The remaining accents follow at a distance of one syllable each. In syllables that do not have any accent (neither primary nor secondary), the correlation of close contact and the correlation of gemination are neutralized. The unaccented vowels are here somewhat shorter than the medium-length accented vowels.

²³¹ Cf. Stjepan Ivšić in *Rad Jugoslov. Akad.*, CXCIV, 67-68.

²³² Cf. R. Jakobson in *TCLP*, IV, 168.

²³³ Most recently by G. S. Lowman, "The Phonetics of Albanian," in *Language*, VIII (1932), 286.

²³⁴ Cf. Boh. Havránek, "Zur phonologischen Geographie," in *Archives néerlandaises de phonétique expérimentale*, VIII-IX (1933), 29, n. 7.

²³⁵ E. D. Polivanov gives a good description of the phonetic situation in Estonian, *Vvedeniye v jazykoznanije dlja vostokovednykh vuzov* (Leningrad, 1928), pp. 197-202. As for those cases in which genitive, partitive, and illative are differentiated by different degrees of quantity of the stem-final consonant (e.g.,

"tökk" [piece], gen. "tüki" with the second degree of quantity, part. "tükki" with the third degree of quantity, and illat. "tüski" with the fourth degree of quantity of long *k*), it is to be noted that not only quantity but the distribution of intensity of the consonant ("falling," "level," and "rising" geminate) and the accentual relationship between the stem syllable and the final syllable play a role as well.

²³⁶ Only the opposition between short (i.e., one-moric) and nonshort (i.e., bimoric) vowels may be considered truly "quantitative" (in an arithmetic sense).

²³⁷ Cf. Ida C. Ward, *An Introduction to the Ibo Language* (Cambridge, 1935), pp. 38-41.

²³⁸ Cf. G. Hulstaert, "Les tons en Lonkundo (Congo Belge)," in *Anthropos*, XXIX.

²³⁹ Cf. Ida C. Ward, *The Phonetic and Tonal Structure of Efik* (Cambridge, 1933).

²⁴⁰ Cf. Ida C. Ward, *An Introduction to the Ibo Language* (Cambridge, 1935).

²⁴¹ Cf. H. J. Uldall, "A Sketch of Achumawi Phonetics," in *Internat. Journ. of American Linguistics*, VIII (1933), 73 ff.

²⁴² Cf. Clement M. Doke, "A Study of Lamba Phonetics," in *Bantu Studies* (July 1928), pp. 5 ff.

²⁴³ Cf. Ethel G. Aginsky, "A Grammar of the Mende Language," in *Language Dissertations publ. by the Linguistic Society of America*, no. 20, p. 10.

²⁴⁴ The author herself seems to hint at this. On page 105 in her text analysis she says with respect to the word (77) *ye₃e₁* that this stem should actually be *ye₄e₂*: "lower tonal pattern here due to final position in sentence."

²⁴⁵ Cf. Clement M. Doke, "The Phonetics of the Zulu Language," in *Bantu Studies*, II (July 1926), Special Number.

²⁴⁶ *Language*, VII (1931), 33 ff.

²⁴⁷ This is not contradicted by tone register systems, such as in Nama Hottentot (cf. D. M. Beach, *The Phonetics of the Hottentot Language*, Chap. IX, 124-143), which have three tone registers but distinguish rising and falling "tones" in each of them. A high rising tone seems to presuppose a movement from the high register to an even higher one. The low falling tone (which in Nama is actually falling only in disyllabic words, and "level" elsewhere) likewise presupposes a movement from the low register to an even lower one. In reality each register should not be thought of as a point, but as a range within which either tone movement in Nama takes place. It is also significant that these movements comprise only quite small intervals: the high rising tone and the mid falling tone comprise one tone, the low rising tone and the high falling tone one half tone (cf. the table by D. M. Beach, *op. cit.*, pp. 131 and 141). Only the mid rising tone comprises a third (four half tones) and really shows a movement from the mid to the high register.

²⁴⁸ Cf. O. Gjerdman, "Critical Remarks on Intonation Research," in *Bull. of the School of Oriental Studies*, III, 495 ff.

²⁴⁹ Cf. Daniel Jones and Kwing Tong Woo, *A Cantonese Phonetic Reader* (University of London Press), as well as Liu Fu, *Études expérimentales sur les tons du Chinois* (Paris-Peking, 1925); now also Jaime de Angulo in *Le maître phonétique*, 3^e série, no. 60 (1937), p. 69.

²⁵⁰ Cf. F. Lorentz, *Slovinzische Grammatik* (St. Petersburg, Akad. der Wiss., 1903); N. S. Trubetzkoy in *TCLP*, I, 64.

²⁵¹ Cf. E. D. Polivanov, *Vvedenije v jazykoznanije dl'a vostokovednyh vuzov* (Leningrad, 1928), pp. 120 ff.

²⁵² Cf. R. Jakobson in *TCLP*, IV, 172 f.

²⁵³ Cf. E. D. Polivanov, *op. cit.*, pp. 118 ff.; also E. D. Polivanov and N. Popov-Tatja, *Posobije po kitajskoj transkripcii* (Moscow, 1928), pp. 90 f.

²⁵⁴ Cf. R. Jakobson, "Z zagadnieh prozodji starogreckiej," in *Prace ofiarowane Kaz. Wójcickiemu* (Wilno, 1937), pp. 73-88.

²⁵⁵ Cf. A. Ivanov and E. Polivanov, *Grammatika sovremennogo kitajskogo jazyka* (Moscow, 1930).

²⁵⁶ But not South Chinese! Compare what has been said about the dialect of Canton (p. 188).

²⁵⁷ Cf. A. V. Isačenko, "Der slovenische fünflüssige Jambus," in *Slavia* XIV, 45 ff. (particularly p. 53).

²⁵⁸ R. Jakobson in *TCLP*, IV, 173 f.

²⁵⁹ Cf. R. Jakobson, *op. cit.*, p. 174.

²⁶⁰ For more details, cf. the pioneer study by R. Jakobson, "Die Betonung und ihre Rolle in der Wort- und Syntagmaphonologie," in *TCLP*, IV, 164 ff. (particularly pp. 176 ff.).

²⁶¹ E. D. Polivanov, *Vvedenije v jazykoznanije dl'a vostokovednyh vuzov*, pp. 70 ff.

²⁶² The fact that the accented syllable is here not simply musically high but musically rising (at least in most cases) appears to have its basis in "syntagmatic phonology," i.e., in an effort to distinguish the free accent from the delimitative accent as clearly as possible. For the latter the expiratory force is what is most essential. But insofar as there is also a musical aspect to it, it is falling.

²⁶³ Cf. H. J. Uldall, "A Sketch of Achumawi Phonetics," in *Intern. Journ. of American Linguistics*, VIII (1933), 75 and 77.

²⁶⁴ Cf. J. R. Firth, "Notes on the Transcription of Burmese," in *Bull. of the School of Orient. Stud.*, VII, 137 ff.

²⁶⁵ Such short vowels with *stød* are found, among others, in certain Danish dialects. Prof. Dr. Christen Møller (Aarhus), whose native dialect has this peculiarity, was kind enough to give me some examples. I had the impression that the total length of the short vowel and the pause following the glottal closure corresponded approximately to one normal length. In the case of the bimoric syllable nuclei with *stød* no pause was audible in the pronunciation of Prof. Christen Møller. However, the syllable nucleus is clearly divided into a loud and a low part. The border between these two parts is very clearly marked. Their total duration corresponds again approximately to one normal length (i.e., to a length without *stød*). Lauri Kettunen presents a similar picture for Livonian ("Untersuchungen über die livische Sprache," in *Acta et Commentationes Universitatis Dorpatensis*, VII, 3 [Tartu, 1925], pp. 4 ff. and particularly the attached kymograms). R. Ekblom's observations on the acute accent (*Stossakzent*) in Latvian are also instructive (*Die lettischen Akzentarten* (Uppsala, 1933), especially pp. 23 f., 42, and 47 f.).

²⁶⁶ Carl Borgström, "Zur Phonologie der norwegischen Schriftsprache," in *Norsk Tidsskrift for Sprogvidenskap*, IX (1937), 250 ff. Of the phonetic descriptions of the Southeast Norwegian prosodic system, I would like to call special attention to the exemplary, clear, and precise presentation by Olaf Broch, "Rhythm in the Spoken Norwegian Language," in *Philological Society Transactions* (1935), pp. 80-112.

²⁶⁷ Cf. W. Stalling, *Das phonologische System des Schwedischen* (Nijmegen, 1934). A very good, though by no means phonological, but purely instrumental-phonetic study of Swedish intonation is presented under this misleading title.

²⁶⁸ Cf. S. Kareevskij, "Sur la phonologie de la phrase," in *TCLP*, IV, 188-228.

²⁶⁹ A correlation of tone movement differentiating words in Europe is found only in Norwegian, Swedish, Lithuanian, Latvian, North Kashubian (Slovincian), Slovenian, Serbo-Croatian, North Albanian (Geg), as well as in some German and Dutch dialects. Cf. R. Jakobson, "Sur la théorie des affinités phonologiques," in *Actes du IV^e Congrès International de Linguistes* (Copenhagen, 1938).

²⁷⁰ Cf. the above work by Stalling, *Das phonologische System des Schwedischen* (Nijmegen, 1934).

²⁷¹ Cf. Ante Dukić, *Marija devica čakavska pjesma* (Zagreb, 1935). A short description of the prosodic system of the dialect of the poet is given. Also cf. A. Belić, "O rečeničnom akcentu u kastavskom govoru," in *Juž. Fil.*, XIV (1935), 151 ff., including a rich collection of attestations from the poetic writings of Ante Dukić.

²⁷² D. Westermann and Ida C. Ward, *Practical Phonetics for Students of African Languages* (London, 1933), p. 178.

²⁷³ On question intonation in various languages, cf. P. Kretschmer, "Der Ursprung des Frage tons und Fragesatzes," in *Scritti in onore di Alfredo Trombetti* (Milan, 1936), pp. 29 ff.

²⁷⁴ As is known, interpolated vocatives were marked by low tone already in the Rg-Veda.

²⁷⁵ The accented syllable of an isolated word in Russian not only has its full (unreduced) quantitative and qualitative value, but it is also louder with respect to expiration than the unaccented syllables. This is explained by the fact that an isolated word must be regarded as an independent sentence.

²⁷⁶ Cf. also A. Belić, "L'accent de la phrase et l'accent du mot," in *TCLP*, IV, 183 ff.

²⁷⁷ Cf. R. Jakobson in *Mélanges offerts à Jacques van Ginneken* (Paris, 1937), pp. 26 ff., and in *Bulletin du Cercle ling. de Copenhague*, II (1936-1937), 7.

²⁷⁸ Cf. V. Mathesius, "K výslovnosti cizích slov v češtině," in *Slovo a slovesnost*, I, 36 f., and "Zur synchronischen Analyse fremden Sprachguts," in *English Studies* (1925), pp. 21-35.

²⁷⁹ E. Sapir, "The Takelma Language of South-western Oregon," in *Handbook of American Indian Languages*, II, 8 (and n. 2).

Translator's note: On p. 107, the terms "low/nonlow," "high/nonhigh" are translations of the German terms "breit" and "eng" (lit., "wide" and "narrow").

Otto v. Essen defines the German terms "weit" (here "breit") and "eng" as synonyms of "offen" and "geschlossen" (open and close). Trubetzkoy does not seem to use the terms "breit" and "eng" in this sense, at least not consistently. See especially pp. 109 and 110, where in addition to "breit" and "eng" (transl. "low" and "high") also the terms "offen" (open) and "geschlossen" (close) are used. But cf. p. 235, where "eng" in the sense of "geschlossen" (close) is in juxtaposition with "offen" (open).- Otto v. Essen, *Allgemeine und Angewandte Phonetik* (Berlin: Akademie-Verlag, 1962), p. 75.