

N. S. TRUBETZKOY

PRINCIPLES OF PHONOLOGY

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TRANSLATOR'S FOREWORD

Trubetzkoy's *Grundzüge*, like de Saussure's *Cours* and Bloomfield's *Language*, ranks as a classic in linguistic literature. Just as the name Bloomfield in American linguistics is associated with such terms as behaviorism and mechanism, so is the name Trubetzkoy in European linguistics associated with such terms as functionalism and structuralism. It may not even be an exaggeration to say that for some linguists the words Trubetzkoy and *Grundzüge* are almost synonymous with Prague phonology.

Yet, despite his great contributions to linguistics as a compiler, systematizer, and theoretician, Trubetzkoy's works have remained relatively inaccessible to many English readers. *Grundzüge* in particular, originally published in German, is a difficult book to read. It has become somewhat more accessible through Cantineau's French translation. More recently, a Russian translation has also become available.

When I was a graduate student in linguistics at the University of California, Los Angeles, I conceived the idea of translating *Grundzüge* into English. Professor Jaan Puhvel, who was director of the Center for Research in Languages and Linguistics, lent the project his active support. I was thus able to undertake the translation soon thereafter.

Grundzüge is Trubetzkoy's major work. It represents the culmination of the author's prior work in synchronic phonology and phonological theory. The book may be regarded as more than a summation of personal accomplishments, however; it may also be considered a final synthesis of phonological ideas and linguistic trends that existed before the disruptive forces of World War II took their toll of an unfolding linguistic community.

In deciding to translate *Grundzüge*, I felt that the book held considerably more than historical interest. A shift in linguistic goals and concerns in recent years has placed many of Trubetzkoy's accomplishments directly in the present. It was he, for example, who first reduced vowel systems to a few oppositions. His oppositions were not entirely binary, however. Many of the problems studied now were first recognized and investigated by Trubetzkoy, and notions first elaborated by him now take a central place in linguistic theory. As examples we might take the concept of neutralization and the theory of markedness as it is now being expanded in generative grammar.

Closely linked with the name of Trubetzkoy is that of Roman Jakobson, his friend and collaborator. He was to become the principal exponent of Prague phonology in the United States. His theory of "distinctive features" in many ways parallels Trubetzkoy's theory of distinctive oppositions. A constant interchange of ideas existed between the two scholars. However, Jakobson had not quite convinced the author of *Grundzüge* of his theory of binarism at the time Trubetzkoy was writing his book.

Approximately twenty pages were still needed to complete *Grundzüge* when Trubetzkoy died at the age of forty-eight. It was Roman Jakobson who after the author's untimely death saw to it that *Grundzüge* was published. He made a hurried attempt at editing it. The confusion and conditions created by the outbreak of World War II and Germany's invasion of Czechoslovakia caused fear that the book might be lost or confiscated. Rather than run such a risk, Jakobson made hurried preparations for publication in the book's existing state. Thus the book was left almost completely unedited.

There is no question that the relevance of Trubetzkoy's ideas to present phonological theory needs detailed discussion. But such a discussion would lead us too far afield and would certainly date this translation. These questions are explored separately in my dissertation ("Trubetzkoy and the Theory of Distinctive Features"; University of California, Los Angeles, 1970), in which I examine the feature concept and the notions of opposition, phoneme, archiphoneme, morphophoneme, neutralization, markedness, and the relationship of phonology to phonetics, as they were conceived of in their original linguistic and philosophical contexts and as they relate to present-day phonological theory. In examining the development of the theory of distinctive features, I trace the origins, evolution, and fate of the individual features to the present time. I further discuss in detail the similarities and differences in the Trubetzkoyan and Jakobsonian conceptions and explore the relative contributions of these authors to feature theory as it exists in the generative framework today.

Several decisions basic to the task of translating *Grundzüge* had to be taken. Because of the immensity of the task, I did not feel I could edit the book, nor did I think it was my function as translator to do so, except to correct minor printing errors. The unevenness of the prose and the shifting of style are indicative of the unedited character of the original. They are, in particular, a reflection of the book as a synthesis that contains large portions of text taken almost verbatim from Trubetzkoy's earlier publications of varying attitude and style. What made the task of translation especially difficult was the apparent switching between what seemed to be impressionistic and what seemed to be scientific in observation and terminology.

In my choice of terms, I made an effort to stay within the terminology current at publication of the original, or still current with respect to the Prague School. For example, the terms *interchangeable* (vertauschbar) and *noninterchangeable* (unvertauschbar) were preferred over *commutable* and *noncommutable*. Although commutation was a basic operation in Prague phonology, the term itself was not used by members of that school and was originally associated with glossematics. Again, the terms *combinatory variant* (kombinatorische Variante) and *facultative variant* (fakultative Variante) were selected over *allophone* and *free variant* because of association of usage. The term *phonology* (Phonologie) as in the work's title was chosen over *phonemics* despite the author's own suggestion, because of the association of the former term with the Prague School.

Some of the terms used by Trubetzkoy were without an established form in English. It was therefore necessary to decide on equivalent terms. Where these terms were descriptive in nature, I chose to give a direct "descriptive" translation, which is not always elegant in English but which I hope will convey the author's intentions. For example, for the term "*Überwindungsarteigenschaften*," a direct descriptive translation into *properties based on the manner of overcoming an obstruction* was chosen.

The terms *binary* and *distinctive feature* were purposely avoided, as it was Roman Jakobson who gave these terms their specific meaning in the United States. Where it was thought helpful, terms that seemed to need an explanation were footnoted in the translation.

Previous publications in English of the Prague School, or publications concerning the School, as well as Josef Vachek's *Dictionnaire de linguistique de l'École de Prague*, served as helpful sources for the terminology.

A comprehensive bibliography of Trubetzkoy's publications, which also comprises topics other than linguistics, is included as an appendix to the translation. I felt that inclusion of such a bibliography would give the

reader a better idea of the wide range of Trubetzkoy's interests, and perhaps afford him easier access to source material.

I would like to thank Professor Roman Jakobson for his valuable aid and assistance in terminology and background information and for his help with the Russian bibliographical material. I am also indebted to Professor Josef Vachek for his kind suggestions, and to Professors Henřík Birnbaum, Frantiřek Daneř, Paul Schachter, and Peter Ladefoged.

My very special thanks go to Professor Jaan Puhvel for reading a draft of the translation and for his valuable comments and support throughout.

Christiane A. M. Baltaxe

FOREWORD TO THE FIRST GERMAN EDITION

BY THE PRAGUE LINGUISTIC CIRCLE

The present book, on which N. S. Trubetzkoy worked untiringly until the final weeks of his life, remains unfinished. According to the late author's estimation, approximately another twenty printed pages were still to follow. They would probably have contained a chapter on boundary signals for sentences and a conclusion. The text of the book has not had a final revision. In particular the author had intended to expand the bibliographical footnotes, revise, supplement, and formulate individual chapters with more precision, and dedicate the book to Roman Jakobson.

In the course of the preparation for this work Trubetzkoy studied approximately two hundred phonological systems, and he intended to use part of the collected data for illustrations of the theses of his principal work in the form of a series of supplementary expositions under the general heading *Extracts from My Phonological Dossier*. Although Trubetzkoy worked out these sketches in detail in his mind, only the beginning of the first—on the phonological system of the Dungan language—was dictated from his deathbed and taken down for Volume VIII of the *Travaux du Cercle linguistique de Prague*.

The author also had plans to work on a second volume of *Principles of Phonology*, in which the major questions of historical phonology, linguistic geography, and morphonology, as well as orthography and its relation to the phonological structure of language, were to be discussed. Originally it

had been intended to develop a uniform system of symbols for phonological transcription and to use it in this book. This plan was not realized, however, and in most cases the phonemic symbols that were customary for the description of the various language groups were retained.

For Roman Jakobson

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INTRODUCTION

1 PHONOLOGY AND PHONETICS

Each time that someone says something to someone else there exists an *act of speech*. An act of speech is always concrete and takes place in a specific locale at a specific time. Its prerequisites are a specific speaker (a "sender"), a specific addressee (a "receiver"), and a specific subject matter to which the act relates. All three of these elements—sender, receiver, and subject matter—vary from one act of speech to another. But an act of speech has still another prerequisite: so that the addressee may understand the speaker, both must speak the same language; and the existence of a language in the consciousness of the members of a speech community is the prerequisite for each and every act of speech. In contrast with the act of speech, which is always unique, language, or the system of language, is something general and constant. The system of language exists in the consciousness of all members of a particular speech community and forms the basis for innumerable concrete acts of speech. At the same time, the system of language has no other reason for existence than to make the acts of speech possible. It exists only insofar as the concrete acts of speech relate to it, that is, insofar as it is actualized in concrete speech events. Without concrete acts of speech, the system of language would not exist. Speech event and system of language accordingly presuppose each other. They are inseparably linked and should be considered as two interrelated aspects of the same phenomenon "language." Still, they are quite different in nature and must, therefore, be studied separately.

The distinction between act of speech (*parole*) and system of language (*langue*) was first recognized most clearly by the Swiss linguist Ferdinand de Saussure* (see his *Cours de linguistique générale* [Lausanne, 1916]). Among subsequent writings on the same subject, mentioned here are only Alan H. Gardiner, *Speech and Language* (Oxford, 1932), and particularly K. Bühler, "Axiomatik der Sprachwissenschaft" (*Kant-Studien*, XXXVIII) and *Sprachtheorie* (Jena, 1934), in which additional literature is listed. We will use the term *glottic* proposed by Otto Jespersen (*Linguistica* [Copenhagen, 1931]) to signify "pertaining to the system of language."

Anything that is part of language, that is, the act of speech as well as the system of language, has two aspects, according to Ferdinand de Saussure: *le signifiant* (the signifier) and *le signifié* (the signified).† Language is thus always a combination or an interrelation of the signified and the signifier. In the act of speech the signified is always a concrete communication, meaningful only as a whole, while the signified in the system of language consists of abstract syntactic, phraseological, morphological, and lexical rules. For even the meanings of words as they exist in the system of language are nothing but abstract rules or conceptual schemes to which the concrete meanings that appear in the act of speech relate. The signifier aspect of the act of speech is the concrete sound flow, a physical phenomenon that can be perceived aurally. What then is the signifier aspect of the system of language? If the signified aspect of the system of language consists of rules according to which the world of meanings is cut into pieces and the resulting pieces are ordered, the signifier aspect of the system of language can consist only of rules according to which the phonic aspect of the act of speech is ordered.

* *Translator's note:* The terms *Sprachgebilde* and *Sprechakt* are often rendered in English by Saussure's original terms *langue* and *parole* (cf. N. Chomsky, *Current Issues in Linguistic Theory* [The Hague, 1966], pp. 23, 26). For *langue* "system of language" and "language system" are also used (cf. J. Vachek, *The Linguistic School of Prague* [Bloomington, 1966], pp. 22-26). *Langue* is sometimes also rendered by "linguistic pattern" (cf. Paul Garvin, *A Prague Reader on Esthetics, Literary Structure and Style* [Washington, 1958], pp. vii, 52) and "linguistic system." For *parole* the terms "act of speech" (cf. Paul Garvin, *op. cit.*, p. 1), "speech act," "speech event," and "utterance" are also found. Among other terms for *langue* and *parole* used in English are "language" and "speaking" (cf. W. Baskin, trans. de Saussure, *Course in General Linguistics* [New York, 1959], pp. 17 ff.), "language" and "speech" (cf. A. H. Gardiner, *Speech and Language* [Oxford, 1932]), and "code" and "message" (cf. R. Jakobson, *Selected Writings* 1, 465 [The Hague, 1962]).

† *Translator's note:* The terms *das Bezeichnete* (*le signifié*) and *das Bezeichnende* (*le signifiant*) are rendered variously in English. The translations "signified" and "signifier" used here are rather common (cf. W. Baskin, trans. de Saussure, *Course in General Linguistics*, pp. 65-70). The original *le signifié* and *le signifiant* are retained quite often as well (cf. S. Ullmann, *The Principles of Semantics*, 1959, p. 31). Also found are *significatum* and *significans* (cf. E. Palmer, trans. A. Martinet, *Elements of General Linguistics*, p. 24) and *signatum* and *signans* (cf. R. Jakobson, *Selected Writings*, 1, 292 f., 295 ff.).

The number of different concrete concepts and ideas which can be expressed in the various speech events is infinite. But the number of lexical meanings that exist in the system of language is limited, and "mastery of a language" consists precisely in being able to express all concrete concepts, ideas, and their combinations by an always limited number of semantic and grammatical means made available by the system of language. In contrast with the signified aspect of the act of speech, the signified aspect of the system of language thus consists of a finite (enumerable), limited number of units. But this same relationship between system of language and act of speech also obtains for the signifier aspect. The articulatory movements, and the phonations corresponding to them which occur in the different acts of speech, are infinitely varied. The phonic norms, however, which constitute the units of the signifier aspect of the system of language, are finite (enumerable) and limited in number.

Since *langue* consists of rules or norms, it is a system, or better, several partial systems, which *parole* is not. The grammatical categories form a grammatical system, the semantic categories various semantic systems. All these systems are properly balanced, so that all parts lend support to one another, complement one another, and relate to one another. It is only for this reason that it is possible to relate the infinite variety of concepts and ideas that appear in the act of speech to the components of the subsystems of the language system. This is also true for the signifier aspect. The sound flow of the concrete speech event is an uninterrupted, seemingly unordered sequence of sound movements merging into each other. The units of the signifier aspect of the language system, on the other hand, form an ordered system. And due to the fact that individual elements or moments of the sound flow realized in the speech event can be related to individual units of that system, the sound flow is ordered.

As can be seen from what has been said, the various aspects of the speech process are so disparate that their study must be divided into several subspecies. It is particularly clear that the signified and the signifier aspects of speech must be assigned to different disciplines. The "study of sound," that is, the science concerned with the elements of the signifier, has therefore always formed a special branch of linguistics, carefully differentiated from the "study of meaning." But we have seen above that the signifier of the system of language is something quite different from that of the act of speech. Accordingly it would be advisable to institute in place of a single "study of sound" two different studies, one directed toward the act of speech, the other toward the language system. According to their subject matter, the two studies would have to use quite

different methods of investigation: the study of sound pertaining to the act of speech, which is concerned with concrete physical phenomena, would have to use the methods of the natural sciences, while the study of sound pertaining to the system of language would use only the methods of linguistics, or the humanities, or the social sciences. We designate the study of sound pertaining to the act of speech by the term *phonetics*, the study of sound pertaining to the system of language by the term *phonology*.

Linguists arrived only gradually at the separation of phonetics and phonology. J. Winteler, in his well-known work *Die Kerenzer Mundart des Canton Glarus* (Leipzig, 1876),¹ seems to have been the first to recognize correctly that there are phonic oppositions that are used to differentiate the meaning of words, in a given language, and others that cannot be used for this purpose. But he did not as yet conclude from this fact that the study of sound should be divided into two separate sciences. To reach this conclusion was even less possible for Winteler's contemporaries; although his book attracted attention and received recognition as a first attempt to describe a dialect with phonetic precision, his thoughts on distinguishing two types of phonic oppositions were not taken up, and possibly even went unnoticed. Subsequently, and it appears independently of Winteler, the famous English phonetician Sweet expressed the same idea on several occasions and passed it on to his students. This insight was stressed in particular by Otto Jespersen, the most outstanding of Sweet's students. Yet Sweet as well as his students treated all phonic oppositions in the same manner, regardless of whether these oppositions served to distinguish meaning or not. The method used was that of scientific observation. Ferdinand de Saussure, who recognized and clearly formulated the importance of the difference between *langue* and *parole*, also recognized, as he himself expressed it, the intangible nature of the signifier pertaining to *langue*. Nevertheless, he did not expressly insist on the necessity of distinguishing between the study of sound pertaining to the act of speech (*parole*) and that pertaining to the system of language (*langue*). In his *Cours de linguistique générale* this thought is merely hinted at. It seems that the founder of the Geneva School considered the distinction between the study of sound pertaining to *parole* and the study of sound pertaining to *langue* as being less important than the distinction between the descriptive and the historical study of sound. (Incidentally, the distinction between the study of sound pertaining to *parole* and the study of sound pertaining to *langue* was subsequently stressed sufficiently clearly by some of de Saussure's students, in particular by A. Meillet, Ch. Bally, and A. Sechehaye.) Baudouin de Courtenay, however, was the first to arrive

at the idea that there should be two distinct types of descriptive sound study, depending on whether concrete sounds were to be investigated as physical phenomena or as phonic signals used by a speech community for purposes of communication. Baudouin de Courtenay's students were principally Russian, but there were also some Poles. He himself was Polish, although he spent most of his life teaching at Russian universities, first in Kazan, then in St. Petersburg. Among these students L. Ščerba and E. Polivanov especially must be credited with broadening and spreading the ideas of their teacher on the phonological aspect of languages. Outside this limited circle of disciples, however, Baudouin de Courtenay's views on general linguistics were little known and little appreciated. It thus happened that the distinction between two separate branches of sound study did not gain any followers prior to the First World War. This idea began to become popular only in the postwar period. At the First International Congress of Linguists in The Hague in 1928 three Russian scholars, none of whom happened to be from the school of J. Baudouin de Courtenay, formulated a short program in which the distinction between the study of sound pertaining to the act of speech and the study of sound pertaining to the system of language was clearly and distinctly set forth. These scholars, further, called for a holistic point of view, a study of the structural laws of the phonological systems, and an extension of these principles not only to the descriptive but also to the historical study of sound. They were R. Jakobson, S. Karcevskij, and the present writer. The program met with warm approval. Several linguists from various countries joined in it. The Prague Linguistic Circle (*Cercle linguistique de Prague—Pražský lingvistický kroužek*), which had been founded in 1926 and which already prior to the congress in The Hague had some eager proponents of this new idea, was especially active in this direction.² In 1929 the first two volumes of the *Travaux du Cercle linguistique de Prague* appeared. They were devoted to phonology in the sense of study of sound pertaining to the system of language. A year later a phonological conference was organized in Prague, in which representatives of nine countries participated.³ It was decided to found an international association for phonological studies. At the Second International Congress of Linguists in Geneva in 1931 a plenary session was devoted to "phonology" in the above sense, which revealed that this new science held the interest of wide circles. Today the International Association for Phonology has members in numerous countries.⁴

It would be wrong, however, to assume that the distinction between the study of sound pertaining to the act of speech and the study of sound pertaining to the system of language has at the present time become a generally accepted idea. There are many scholars who do not even

recognize the difference between act of speech and system of language. For some, such nonrecognition is based on conscious conviction rooted in a particular world view (so for W. Doroszewski; see his essay "Langue et parole," in *Prace filologiczne*, XIV [1930]). For others, and probably for most, such nonrecognition is simply a consequence of inertia, mental lethargy, and stubborn rejection of any new thought. Whatever the reason, it is quite natural that scholars who reject the distinction between act of speech and system of language cannot recognize phonetics and phonology in the above sense either. But there are also linguists who may recognize the difference between act of speech and system of language, as well as the difference between distinctive and nondistinctive phonic oppositions, who nevertheless do not want to separate phonology from phonetics. One likes to refer to the classic handbooks of the British school, to Sweet and Jespersen, who treated phonology and phonetics as a whole, although they were fully aware of the fundamental difference between phonic oppositions differentiating meaning and phonic oppositions not differentiating meaning. But similar arguments could be voiced against any advance in science. The absence of a sharp division between phonology and phonetics was a methodological shortcoming of the classic handbooks on phonology, which had the consequence of slowing down the development of phonetics as well as phonology; there is no reason to repeat this shortcoming in the future.

But there have also been more serious attempts to reconcile the difference between phonology and phonetics. E. Zwirner believed that he would be able to achieve this end by replacing the two sciences by a single new one to which he gave the name "phonometry."* In his view the study of individual concrete speech events as an end in itself is pointless and unnecessary "as the science of linguistics has never considered as its task to differentiate among the very clear acoustic differences of individual speakers of the same speech community" ("Aufgaben und Methoden der Sprachvergleichung durch Mass und Zahl, Phonometrie," in *Zeitschrift für Mundartforschung*, XII, 2, 78).⁵ "Not only is linguistics not interested in what a certain Mr. X spoke into a microphone or megaphone on a certain day in some laboratory . . . , but also what . . . was spoken by any person at any one time is of absolutely no scientific interest whatsoever" (*ibid.*, p. 69). Language for Zwirner is only "a system of norms, of audible signs

* *Translator's note:* In the preface to the second edition of *Grundfragen der Phonometrie* Zwirner denies that it has ever been his intention to replace the above two sciences by phonometry, and that this statement by Trubetzkoy is due to a misunderstanding on Trubetzkoy's part.

formed by the human organs and serving the purpose of communication . . . These norms can fulfill their task of serving communication only if both speaker and hearer relate to them within . . . the same speech community. . . . They are valid for the formation as well as for the perception of those signs; and their linguistic character is not due to their production by the vocal organs but to their reference to those traditional norms intended in speaking and hearing" (*ibid.*, p. 77). Thus, as is evident, Zwirner wants to understand via language only the system of language. Only the conventional and, given a particular speech situation, fixed norms can be the object of scientific study, not the "observable, unrepeatable (and innumerable!) realizations of these norms." But Zwirner draws an unexpected conclusion: "Since these conventionalized norms for the production of speech sounds cannot be realized twice in exactly the same way by the vocal organs, a shift from the study of these norms to the study of the speech event itself carries with it a shift from language history to a *statistical conception of speech variation* as related to language history" (*ibid.*, p. 77). By following a special procedure, the mean values of the individual sounds are determined. The variations of a sound, recorded mechanically with precision, are scattered around this mean value in accordance with the familiar Gaussian curve. On the basis of this curve, the mean values are closely examined, and only those mean values that have undergone such close examination would be of linguistic value. Here Zwirner is in error. What can be obtained by his phonometric method is not by any means the norm speakers relate to in the production or perception of a certain sound. They are "norms," but in a quite different sense: norms of a particular pronunciation, norms of realization, that is, in final analysis, norms of the speech event, not of the system of language. "Norms" of this type can, of course, only be mean values. They should, however, not be equated with the values of the system of language. "k" in German is articulated differently before consonants and before vowels, and differently before stressed vowels and before unstressed vowels; its timbre and articulation vary, depending on the quality of the vowel immediately preceding or following it. For each of these variants phonometric mean values can be computed, and the correct German pronunciation of each of these variants "is scattered" around this mean value in accordance with the Gaussian curve. But for "k in general" no such mean value can be determined. Before stressed vowels k is aspirated (and the degree of aspiration varies greatly). Before unstressed vowels it is unaspirated. If all occurrences of k in this text were to be studied carefully as to their degree of aspiration, if this degree were expressed numerically in each individual case, and the mean value of aspiration of k were then to be determined, the

resulting mean value would not correspond to reality: it would at most symbolize the relative frequency of occurrence of *k* before stressed vowels in a particular text. Unambiguous results could be obtained only if one would compute two different mean values: the one for *k* before stressed vowels, the other for *k* before unstressed vowels. But the norm to which speakers refer is "*k* in general," and this cannot be determined by measurements and computations. To be sure, an exact determination of the average normal pronunciation of a sound in a particular environment is indeed welcome, and the application of biostatistical methods, as used by Zwirner, is certainly to be hailed as great progress. But it would be erroneous to assume that all tasks of phonology would thereby be solved. The problems of phonology remain completely untouched because the system of language is outside the scope of "measurement and number." But neither are the objectives of phonetics exhausted by phonometry. In contrast with Zwirner, we must emphasize that the phonetician must deal not only with the norms valid for a speech community but also with individual differences between speakers and with modifications in the pronunciation of individual sounds resulting from a change in the speech situation. In this area, too, one must look for regularities of a special type. Linguistics must deal not only with the system of language but also with the speech event, that is, with the entire area of the speech event. It is important, however, to keep the two objects of linguistic study, the speech event and the system of language, strictly separate.

As regards the designations given to the study of sound pertaining to the act of speech and the study of sound pertaining to the system of language, it should be noted that the terms "phonetics" and "phonology" used by us are not used with the same meaning by all linguists. Ferdinand de Saussure, who himself had first suggested such a differentiation in terms, subsequently modified them so that the term "phonology" applied to the static (synchronic) or descriptive study of sound, and the term "phonetics" to the historical (diachronic) study of sound, that is, to the history of sound changes that have taken place in a language.⁶ It appears that, apart from M. Grammont, nobody followed his example. To the Swedish linguist Noreen, phonetics meant the "science of the acoustic, physiological, and anatomical prerequisites of language," while phonology meant "the science of the physical material of language, of the produced speech sounds," and this terminology was adopted by his colleagues. The English and Americans often use the term "phonology" to mean "historical study of sound" or "study of the use of sounds in a specific language"; whereas the term "phonetics" is always used to designate the study of the physical or physiological constitution of speech sounds. Of late the Anglo-Saxons

have employed the term "phonemics" in the sense in which we use the term "phonology." Since in English the term "phonology" has already received another meaning, the term "phonemics"* will be retained for English speakers. It would, perhaps, be useful to introduce this term into Swedish as well. But in other languages in which the term "phonology" does not have another meaning, it shall be used in the sense proposed by us. In any case, the term "psychophonetics" proposed by J. Baudouin de Courtenay must be rejected since phonetics (which Baudouin de Courtenay wanted to designate "physiophonetics") is much more concerned with psychic phenomena than is phonology, the latter dealing with supra-individual social values.

Not all is said by defining phonology as the study of sound pertaining to the system of language, and phonetics as the study of sound pertaining to the act of speech. The difference between the two sciences must be shown in greater detail.

Since the signifier of the act of speech is a nonrecurring natural phenomenon, that is, a flow of sounds, the science in which it is studied must use the methods of the natural sciences. Depending on whether the object of study is the constitution or the production of sounds—though actually both aspects must be studied simultaneously—either the purely physical, acoustic aspect or the physiological articulatory aspect of the sound flow can be studied.

The two branches of phonetics, that is, acoustic and articulatory phonetics, need not be strictly kept apart. In "auditory phonetics," in which sounds are studied without the use of special instruments, but solely with the aid of the human senses subjected to special training, acoustic and articulatory phonetics are not kept separate: the "auditory phonetician" evaluates the acoustic value of the sound under study by ear. At the same time he investigates the manner in which it is produced with the aid of his eyes, his sense of touch, and by kinetics. A distinction between acoustic and articulatory phonetics is found only in what is called experimental (more precisely, instrumental) phonetics, and in that field also only as regards some methods that have lately been under frequent attack. A synthesis of acoustic and articulatory phonetics is reestablished by the X-ray method. An investigation into the nature and production of speech sounds accordingly constitutes not two separate tasks of phonetics, but a single one.

* *Translator's note:* Despite the author's suggestion, the term "phonology" has been chosen instead of "phonemics" to render *Phonologie* in the translation, since "phonology" is established usage in English with reference to the Prague School of Linguistics.

production, the direct effects, and the perception of language." It attempts to "gain full knowledge of the *component parts* of the system of language (*langue*)" (p. 34). This is clearly a misconception. It appears to be a result of the fact that Arvo Sotavalta considers the natural sciences, in which there is no equivalent for the dichotomy "system of language"/"act of speech," as a parallel. The elements of the act of speech alone can be produced and perceived. The system of language is neither produced nor perceived. It must already be present and serves as a frame of reference for both speaker and hearer. Those "more general concepts" which are arrived at in phonetics by observation of actual spoken sounds and sound sequences, and which can be compared with the various species of animals in zoology or with species of plants in botany, are the different types of sound or articulation. But phonetics can never reach its linguistic function if it chooses to remain a purely phenomenalist science. Phonetics will, therefore, always remain in the domain of the act of speech, while phonology, as conceded by Arvo Sotavalta, will always remain in the sphere of the system of language. The definitions are parallel: phonology is the study of sound pertaining to the system of language, phonetics the study of sound pertaining to the act of speech. Phonology, of necessity, is concerned with the linguistic function of the sounds of language, while phonetics deals with their phenomenalist aspect without regard to function. The basis for this distinction is that the system of language as a social institution constitutes a world of relations, functions, and values, the act of speech, on the other hand, a world of empirical phenomena. There is no parallel for this in the natural sciences, such as botany and zoology. Therefore, these cannot be considered for comparison. But the same type of relation is found in all the social sciences insofar as they deal with the social evaluation of material things. In all such cases the social institution *per se* must be strictly distinguished from the concrete acts in which it finds expression, so to speak, and which would not be possible without them. The institution must be examined with regard to its relations and functions, while its referent act must be examined in its phenomenalist aspect.

E. Otto's attempt to define phonology as the study of sound from an acoustic point of view, and phonetics as the study of sound from an articulatory point of view, must be considered completely mistaken.⁷ Strange as it may seem, Otto combines this view with the quite correct insight that phonology is the study of sound pertaining to the system of language, while phonetics is the study of sound pertaining to the act of speech. But Otto assumes that for the system of language, the acoustic aspect is the more important, while it is the articulatory aspect of speech sounds which is more important for the act of speech. Here he is definitely

wrong. In his above-mentioned book Arvo Sotavalta presents a very good outline of the various branches of phonetics, so that we do not have to go into detail here. In passing, it is merely noted that both the articulatory and the acoustic aspect of speech sounds are natural phenomena and can only be studied by the methods of the natural sciences. This places both in the sphere of phonetics. The data for the study of the articulatory as well as the acoustic aspect of speech sounds can only be gathered from concrete speech events. In contrast, the linguistic values of sounds to be examined by phonology are abstract in nature. They are above all *relations*, oppositions, etc., quite intangible things, which can be neither perceived nor studied with the aid of the sense of hearing or touch.

A clear distinction between phonology and phonetics is necessary in principle and feasible in practice. Such a distinction is in the interests of both sciences. This should not prevent, of course, either one from profiting from the findings of the other. But limits should be recognized. This, unfortunately, is not always the case.

The sound flow studied by the phonetician is a continuum that can be divided into an arbitrary number of segments. The endeavor of some phoneticians to isolate "speech sounds" within this continuum had its basis in the phonological projection of the written letter. Since in reality it is very difficult to isolate speech sounds, some phoneticians arrived at the concept of "nuclear sounds," and "transitional sounds" which are found between nuclear sounds. The nuclear sounds that corresponded to phonological elements were described in detail, while the transitional sounds were usually not described since they were obviously regarded as less important or even as quite unimportant. Such a segmentation of the elements of the flow of speech cannot be justified from a purely phonetic point of view. It is based on an incorrect application of phonological concepts to the field of phonetics. Some elements of the sound flow are indeed unimportant for the phonologist. But among these are not only "transitional sounds" but also individual properties and marks of "nuclear sounds." The phonetician, on the other hand, cannot take this view. On the meaning of the act of speech is of no importance to him, while all other elements or segments of the flow of human speech are equally essential and important. The phonetician will, of course, always consider certain typical positions of the vocal organs or their respective acoustic phenomena as base elements of phonation. Consequently he will adhere to describing typical articulatory positions and sounds (*Schallgebilde*—see note, p. 36) taken from the articulatory and sound continuum. But this is only true as regards the study of the base elements of his science. Another part must follow, in which the structure of larger phonetic entities is investigated. It is quite natural that in

The sole task of phonetics is to deal with the question of speech production. This question can be answered only by stating exactly how the sounds are perceived (or, translated into physical terms, into what sound fractions, sound waves, etc., a specific sound complex can be broken down), and in what manner, that is, by what movements of the vocal organs, a particular acoustic effect is achieved. Sound is a physical phenomenon perceptible by the sense of hearing; and in studying the acoustic aspect of a speech event the field of phonetics borders on the psychology of perception. The production of speech sounds is a semiautomatic, but intentional, centrally controlled activity; and in investigating the articulatory aspect of the speech event phonetics borders on the psychology of reflex actions. But even though the area of phonetics actually lies in the domain of psychology, the methods of phonetics are purely those of the natural sciences: this is related to the fact that the adjacent areas of experimental psychology also employ the methods of the natural sciences as they involve rudimentary, rather than higher, psychic processes. For phonetics the natural science approach is absolutely necessary.

Particularly characteristic of phonetics is the complete exclusion of any reference to the lexical meaning of the sound complexes under study. The special training of ear and sense of touch which a good "auditory phonetician" has to undergo consists in getting accustomed to listening to sentences and words and to probing his vocal organs during the production of sentences and words without regard to their meaning, that is, he must get accustomed to perceiving only their phonic or articulatory aspect, as a foreigner would who does not understand the particular language. Phonetics may therefore be defined as the *science concerned with the material aspect (of sounds) of human speech*.

Goal

The signifier of the system of language consists of a number of elements whose essential function it is to distinguish themselves from each other. Each word must distinguish itself by some element from all other words of the same system of language. The system of language, however, possesses only a limited number of such differential means, and since their number is smaller than the number of words, the words must consist of combinations of discriminative elements ("marks" in K. Bühler's terminology). Moreover, not all conceivable combinations of discriminative elements are permissible. Their combination is subject to specific rules, which are different for each language. It is the task of phonology to study which differences in sound are related to differences in meaning in a given language, in which way the discriminative elements (or marks) are related to each other, and the rules according to which they may be combined into words and sentences. It is clear that these objectives cannot be attained by the methods of

the natural sciences. Rather, phonology must use the same methods as are used in the study of the grammatical system of languages.

The speech sounds that must be studied in phonetics possess a large number of acoustic and articulatory properties. All of these are important for the phonetician since it is possible to answer correctly the question of how a specific sound is produced only if all of these properties are taken into consideration. Yet most of these properties are quite unimportant for the phonologist. The latter needs to consider only that aspect of sound which fulfills a specific function in the system of language.

This orientation toward function is in stark contrast to the point of view taken in phonetics, according to which, as elaborated above, any reference to meaning of the act of speech (i.e., any reference to signifier) must be carefully eliminated. This fact also prevents phonetics and phonology from being grouped together, even though both sciences appear to deal with similar matters. To repeat a fitting comparison by R. Jakobson, phonology is to phonetics what national economy is to market research, or financing to statistics.

In addition to the definition of phonetics as the study of sound pertaining to the speech event, and phonology as the study of sound pertaining to the system of language, another definition could be given in which phonetics would be a purely phenomenological study of speech sounds, with phonology the study pertaining to the linguistic function of the same sounds. In a book titled *Die Phonetik und ihre Beziehungen zu den Grenzwissenschaften* (Publicationes Instituti Phonetici Universitatis Helsingforsiensis, no. 4—*Annales Academiae Scientiarum Fennicae*, XXXI, 3 [Helsinki, 1936]), which, incidentally, is highly recommendable reading, Arvo Sotavalta tried to show that the latter definition, already accepted in 1930 by the Prague Conference on Phonology and reprinted in the "Projet de terminologie phonologique standardisée" (*TCLP*, IV), is the only correct one. He concedes that phonology moves exclusively within the realm of the system of language; yet he believes that the relationship of phonetics to the act of speech is not as essential. The "starting point" for phonetics "is concrete, namely, it is human speech. . . . But this is true of any scientific study: individual animals serve as the basis for zoology, individual plants for botany, etc. In spite of this fact, it is not the knowledge and the study of these individual objects that is the proper objective of science: what is important are the general concepts that are to be reached by means of these objects." Similarly "phonetics," which has the act of speech (*parole*) as its basis, endeavors "to grasp the essence of a concept more general than that of the act of speech, namely, that of the system of language (*langue*)." Phonetics investigates "the immediate prerequisites, the

describing the phonetic structure of a language its phonological system is taken into consideration with regard to the base phonetic elements, inasmuch as phonologically distinctive oppositions of sound are treated in more detail than the nondistinctive ones.

As regards phonology, it is clear that it must make use of certain phonetic concepts. For instance, the claim that in Russian the contrast between voiced and voiceless obstruents is used to differentiate between words, belongs to the field of phonology. The terms "voiced" and "voiceless" and "obstruents" themselves, however, are actually phonetic. In starting any phonological description the distinctive sound oppositions in the language in question have to be uncovered. The phonetic transcription of the particular language must be taken as a point of departure and serve as data, though further higher levels of the phonological description, that is, the systemic study and the study of combinations, are quite independent of phonetics.

Despite their fundamental independence, a certain amount of contact between phonology and phonetics is therefore inevitable and absolutely necessary. But only the introductory sections (i.e., the sections on the base elements) of a phonological and a phonetic description should take each other into account. Here, too, the limit of what is absolutely necessary should not be overstepped.⁸

2 PHONOLOGY AND PHONOSTYLISTICS

Since the prerequisites for human speech are always a speaker, one or several hearers, and a topic to be discussed, each linguistic utterance has three aspects: it is at once a *manifestation* (or an expression) of the speaker, an *appeal* to the hearer or hearers, and a *representation* of the topic. It is to the great merit of Karl Bühler that this apparently simple, yet so long overlooked, fact was put into its true perspective.⁹

Bühler's scheme also holds for the phonic aspect of speech. When we hear somebody speak, we perceive *who* is speaking, his *intonation* and *pitch*, and *what* he says. In reality only one single acoustic impression is given. But we divide it into its components. We always do this from the point of view of Bühler's three functions of speech: we interpret certain properties of the sound we perceive as a manifestation or characteristic of the speaker (e.g., his pitch). We consider certain other properties as means of evoking a certain response on the part of the hearer, and still others as marks by which words and their specific meanings as well as the sentences composed of these words are recognized. Likewise, we project the various

properties of the speech sounds we perceive onto three different planes: the plane of expression, the plane of appeal, and the plane of representation.

Whether it is the task of phonology to study all three of these planes is problematic. It becomes immediately clear, however, that the representation plane belongs to the sphere of phonology. The content of an observed sentence can be understood only if its constituent words are related to the lexical and grammatical elements of the system of language; and the signifier aspect of these elements necessarily consists of phonological units. The relationship between the expression plane and appeal plane to phonology is less certain. At first glance these planes seem to lie exclusively in the domain of the act of speech, and therefore appear to be suited only for phonetic, not phonological, study. Yet upon closer examination this view proves mistaken. Among the acoustic impressions by which we recognize the identity of the speaker, as well as the emotional impression he intends to make upon the hearer, there are also those impressions that must be related to the norms established in the particular language in order to be interpreted correctly. These norms must be regarded as linguistic values; they are part of the system of language and must therefore be dealt with in phonology.

In the early phonological studies little attention was paid to the expression plane and the appeal plane. In general there prevailed a tendency to overestimate the role of phonetics in this area.¹⁰ Julius v. Laziczius was apparently the first expressly to call attention to the inadequacy of this view. Since phonology, in contrast with phonetics, must deal with the functions of the phonic aspect of human speech, it cannot be limited to the representative function.* According to Laziczius, it should also investigate the expressive and the appeal function of sound. In this connection the Hungarian phonologist pointed out that the use of individual phonations with an expressive or an appeal function is just as fixed and conventionalized as their use for purposes of differentiating meaning: a means of expression or appeal that fulfills precisely such a function in a specific language cannot simply be transferred to another language.¹¹

What seems to follow from this argument of Julius v. Laziczius is that now two new subdivisions of phonology are to be created, namely, a phonology of expression and a phonology of appeal. The creation of such subdivisions is certainly associated with great difficulties, especially in view

* *Translator's note: Darstellungsfunktion.* Other terms used in English for this function are "communicative function," "referential function," and "ideational function"; for *Appellfunktion* (appeal function) another term used is "conative function." Cf. Josef Vachek, *The Linguistic School of Prague*, p. 34.

of the lack of reliable collected data. Only in very rare cases can information on the means of expression and appeal in a particular language be found in a detailed description of the sound system of that language. Some such data could be gleaned from works on elocution. However, since such writings are generally oriented toward purely practical goals and, of course, do not differentiate between the act of speech and the system of language, they cannot be used indiscriminately. Upon closer inspection, it usually turns out that the material offered is of little value. In view of the present state of research, only little can thus be said with regard to the phonology of the expression and the appeal plane. Only a few general thoughts will be offered.

The expressive function of human speech consists in characterizing the speaker. Anything in speech that serves to characterize the speaker fulfills an expressive function. The elements performing this function can therefore be very diverse. For example, the circumstance that the speaker belongs to a particular human type, his physical and mental characteristics, etc., all these are recognizable from his voice, his diction, and from the entire style of his speech, including choice of words and sentence structure. But we are only interested in phonological *means of expression*, that is, in means of expression belonging to the phonic aspect of the formal system of signs which constitutes the system of language.

A large part of the diagnostic phonic elements of human speech must therefore be excluded at the outset from our field of investigation. We must especially exclude natural characteristics and those features that are purely psychologically conditioned. It is quite possible to recognize by the voice of the speaker not only his sex and age but at times even his state of health. Indeed, it is possible to determine whether he is fat or skinny without actually seeing him. But all this has nothing to do with phonology. For, although perceptible to the ear, these features are not part of the formal system of signs of a particular language. They retain their distinctive force in extralinguistic vocal activities as well. This is also true of many properties of human speech from which conclusions as to the speaker's character can be drawn. Only conventionally determined means pertaining to the linguistic characterization of a speaker belong to the phonology of expression. And since language is, above all, a social institution, only those phonic means that characterize speakers as belonging to particular types or groups of persons, important for the existence of the particular speech community, are specified by convention. These means may indicate, for example, membership of the speaker in a particular age group or social class. They may further be indicative of his sex, degree of education, and the region of his origin. All these properties are important for the internal grouping of the

speech community and for the content and form of verbal interaction. The division of people into fat and skinny ones, into phlegmatics and sanguines, etc., is on the other hand of no significance for the life of the speech community as expressed in the different types of speech behavior. Accordingly it does not require any formal *linguistic* characterization ("glottic" in the sense of Otto Jespersen): if features of the latter type can be surmised from speech behavior, such a surmise involves an extralinguistic psychological process.

The phonology of expression may thus be compared to the study of costumes in folklore. The difference between fat and skinny or between tall and small people is very important to the tailor, whose job it is to make a particular costume. But from the point of view of folklore these differences are quite insignificant: only the conventionally specified form of the costume is important. The clothing of a sloppy person is dirty and rumpled. Absentminded persons do not always have all their buttons fastened. All these characteristics are of no significance for the study of costumes in folklore. Folklore is interested in every characteristic, however minute, by which in accordance with prevailing custom the dress of a married woman is distinguished from that of a single girl, etc. People belonging to groups customarily characterized by ethnologically relevant differences in dress are also often distinguished by linguistic ("glottic") characteristics and especially by peculiarities pertaining to the "phonology of expression." Compare, for example, sex and age groups, social classes or occupational groups, educational classes, city dwellers and peasants, and regional groups.¹²

The details naturally depend on the social structure of the particular people or speech community. In speech communities with little or no social stratification, the realization of individual speech sounds is particularly affected by differences in age and sex. In the Darchat dialect of Mongolian, the articulation of all back and central vowels is slightly fronted in female speech. *u*, *o*, and *a* of male speech correspond to female *ü*, *ö*, and *ä*, and *ü*, *ö*, and *ä* of male speech correspond to female *ii*, *ö*, and *ä*; further, the fricative *x* in male speech corresponds to the stop *k* in female pronunciation.¹³ VI. Bogoraz reports of the Chukchi (now Luorawetlans) on Kamchatka that a certain sound in their language is realized as *č'* (palatalized *č*) by adult males but as *c* (= *ts*)¹⁴ by women and children. According to V. Jochelson, there are some sounds in the language of the Yukaghir (now "Odules") in Northeastern Siberia which are realized as palatalized plosives *t* and *d* by adult males of hunting age, as affricates *c*, *ʒ* (*ts*, *dz*) by children and women of childbearing age, and as palatalized *č'* and *ʒ'* by old people.¹⁵ In all these cases the people are

male/female
speech

nomads or nomadic hunting (or fishing) tribes, in which sex groups (or sex and age groups) form very sharply delimited bodies, and where these groups practically constitute the only internal structure of society. But differences of speech in accordance with sex and age groups are also found in cases where peoples have a developed social structure, though they are usually less pronounced here. For instance, there is a general tendency in Russian, in articulating accented *o*, to increase its rounding initially and to decrease it toward the end, so that the vowel *o* always sounds like a kind of diphthong with decreasing lip rounding. But while the difference between the beginning and end of the *o* sound in standard male pronunciation is only very slight, in fact hardly noticeable, it is quite great in female speech. Some women actually say *uo* instead of *o*. This, however, is considered somewhat vulgar. The difference between male and female speech here consists only in the degree of diphthongization. When *o* is pronounced by a man with the degree of rounding considered normal for female speech his diction immediately stands out as effeminate and affected.¹⁶ Such subtle formal differences between male and female pronunciation can probably be discovered in almost any language when examined more closely. A detailed description of the phonological system of a language must take this circumstance into account. As regards formal differences in the pronunciation of different age groups, they too are found in most languages. Often they are expressly mentioned by observers. One must be careful, however, not to confuse formal differences with differences that are innate or developmental. In certain speech communities children substitute some sounds for others because they acquire the correct pronunciation of these sounds only gradually. However, this, as well as all cases of pathological speech defects, is not a matter to be dealt with in the phonology of expression. A phenomenon pertaining to the phonology of expression is present in those cases where a child is able to imitate the pronunciation of adults quite well, yet intentionally fails to do so, or where a young person, in order not to appear old-fashioned or ridiculous, purposely avoids the pronunciation of old people, though it would not otherwise cause him any difficulty. Sometimes this involves quite subtle nuances, such as "intonation," and so on.

In speech communities with a marked social stratification, differences in pronunciation that are due to class or professional structure, or to the cultural structure of society, are quite prominent. They exist not only in the languages of India, where they are anchored in the caste system (e.g., in Tamil the same speech sound is said to be pronounced as either *č* or *s*, depending on the caste of the speaker), but are found in other parts of the world as well. Colloquial Viennese in the mouth of a government official

is quite different from that spoken by a salesman. In prerevolutionary Russia the spirantized pronunciation of *g* (as *γ*) was characteristic of members of the priesthood, although in other respects they spoke pure standard Russian. Further, there existed a special pronunciation of standard Russian as spoken by the nobility, and another as used by the merchant class. Differences in the pronunciation of city and country dwellers, or in the speech of the well educated and the uneducated, probably exist in all languages. One frequently also finds a special "stylish" pronunciation, used by dandies and fops of all kinds, which is characterized by sloppy enunciation.

Regional differences in pronunciation are likewise found in all languages. People at a country fair are sometimes able to recognize the native village of a particular speaker by these differences. As for the more cultured speaker of a normalized written language, it is probably impossible to make precise predictions as to his place of origin. But even in the case of those speakers it is possible, along general lines, to surmise what part of a language area they come from.

Conventional phonic means of expression do not always characterize what the speaker is in reality, but often only how he would like to appear at a given moment. For many people the pronunciation used in public address is highly distinct from that of normal conversation. There are special marks that are characteristic of a sweetly pious and flattering pronunciation. The affectedly naive, twittering way of speech of some ladies shows a number of formal sound marks. All phonological means of expression that, within a speech community, serve to characterize a specific group of speakers, form a system. Their sum total may be designated as the style of expression of the respective group. A speaker need not always use the same style of expression. He may sometimes use the one, sometimes the other, depending on the content of the conversation, or the nature of the hearer. In short, his usage conforms to the prevailing customs of the speech community in question.

A special type of phonological means of expression is represented by "permissible sound substitution." In addition to the normal sounds used by all "average speakers," every language has some sounds that are only used by a few speakers as substitutes for certain normal sounds for which they have a dislike. The reason for such a "dislike" is sometimes a particularly common speech defect, sometimes a kind of fad. The difference between "substitute" and "normal sound" may be big or small: sometimes, as in the case of the various *r* substitutions in many European languages, it can be noticed by any observer; sometimes a well-trained ear is needed. It is significant that these sound substitutions are *permitted* by the

speech community, that is, that they are not pushed aside but continue to exist side by side with the normal sounds. Insofar as individual speakers adopt such substitute sounds and always, or almost always, use them, these sounds become the personal means of expression of these speakers.

Besides those means with a purely expressive function, there are also others that additionally fulfill a specific representational function. The speech of a group of speakers may frequently be distinguished from the usual speech pattern in that it neglects a distinctive phonological opposition (i.e., an opposition relevant to the representational plane) or, vice versa, in that it shows distinctiveness where this is not found in the speech of other groups of speakers. An example would be the nondistinctiveness of the opposition *tenues* and *mediae*, even for speakers of standard German, which is characteristic of some parts of the German-speaking area; further, the coalescence of *š* and *s*, and *ž* and *z* characteristic of the inhabitants of Marseille, and the distinction between unaccented *o* and *a* which characterized the pronunciation of the older generation of priests in prerevolutionary Russia. (This was, of course, especially pronounced in the regions of Central and South Great Russia where the distinction between unaccented *o* and *a* was lost for the other social strata.) From the standpoint of representational function, the cases cited involve different dialectal phonological (or phonetic) systems. From the viewpoint of the expressive function, they involve different expressive forms of the same system. Nevertheless, these cases need to be carefully distinguished from others in which specific socially or regionally distinct groups of speakers are characterized solely by a difference in the realization of the same phonemes and not by the number of differentiated phonemes.

From the phonological means of expression, it is necessary to distinguish the phonological *means of appeal* or the *conative means*. The means of appeal or conative means serve to evoke or "release" certain emotions in the hearer. Ostensibly the speaker often experiences these emotions himself. It is important, however, that the hearer be infected. Whether the speaker actually experiences these emotions or whether he only simulates them is not significant. It is not the intent of the speaker to manifest his own feelings but to provoke these or corresponding feelings on the part of the hearer.

The phonological means of appeal must therefore again be carefully distinguished from any natural expressions of emotion, even where these are only simulated. When a speaker stutters out of actual or imagined fear or excitement, or when his speech is interrupted by his sobs, this has nothing to do with phonology. These are symptoms that occur even in

extralinguistic behavior. Phenomena such as the exaggerated lengthening of consonant and vowel in the German word "schschöön!" uttered in rapture, on the other hand, are obviously linguistic (glottic). First, they can be observed only in linguistic, not extralinguistic, expressions; second, they have a definite function; and third, they are conventional in nature like all other linguistic means that fulfill definite functions. They are therefore part of the phonology of appeal. (They involve the evoking of a specific emotional response on the part of the hearer.)

At the present stage of research it is difficult to say what methods should be followed in a "phonology of appeal." From a theoretical viewpoint, a complete inventory of all phonological means of appeal, in other words, of all conventionalized means serving to evoke feelings and emotions, should be set up for every language. But it is not always clear what is to be considered as a single means of appeal, and how these means of appeal are to be delimited. The problem of distinguishing between language and speech, between system of language and act of speech in this context, is particularly ticklish and difficult. We have already mentioned the exaggerated lengthening of the stressed vowel and the pretonic consonant in German. The example given was "schschöön!" as it would be pronounced in rapture. The same means may, however, also be used to evoke different emotions. Pronounced in such a way, "schschöön!" need not only signal rapture but can also signal irony; "schschaamlos!" can signal indignation, "Illiieber Freund!" delight, irony, indignation, persuasion, grief, or regret, etc. In each case the intonation is different. However, the question remains as to how these different intonational nuances are to be interpreted. Are they all part of the phonology of appeal, and do they belong to the system of language at all? Or are they only part of the act of speech? And are they really conventionalized at all? Emotionally stressed intonation frequently also occurs in extralinguistic expressions, for example, in indeterminate arbitrarily articulated exclamations. The actual emotions intended to be evoked are easily recognizable. It seems that this type of extralinguistic intonation, intended as an appeal to emotion, has the same pitch and intensity structure as words of equivalent emotional signification, though this matter has never been examined closely. It can further be observed that many of these types of intonation with an appeal to emotions have the same connotation in the most distant languages of the world.¹⁷ The exaggerated lengthening of a stressed vowel and the preceding consonant, on the other hand, presupposes the presence of vowels and consonants as well as the presence of stressed and unstressed syllables. It is therefore by nature confined exclusively to purely linguistic expressions. Further, it is only valid for specific languages.

It appears that most phonological means of appeal are constituted in this way. Actually they do not bear any direct relation to the release of any specific emotion. They merely make the release of several different emotions possible. Their choice depends on the speech situation. The arousal of emotions is brought about by an innumerable variety of diverse unconventional vocal behavior. It is not within the task of the phonology of appeal to collect, describe, and systematically classify this type of emotional vocal behavior, and to assign it to actual specific emotions. Disregarding this type of vocal behavior, the task of the phonology of appeal is only to determine those conventional phonic marks by means of which emotionally tinged speech is distinguished from emotionally neutral, tranquil speech. Thus one can say that lengthening of stressed long vowels and pretonic consonants in German, lengthening of initial consonants and utterance of final vowels in Czech, lengthening of short vowels (under retention of their specific open lax quality) in Hungarian, lengthening of the first consonant of a word (accent d'insistance) in French, etc., are signs of emotional speech. They are phonological means of appeal, for the peculiarities mentioned in these languages occur only for purposes of arousing an emotion. Their use is not permissible in ordinary emotionally neutral speech. They are quite obviously conventional as contrasted, for example, with the intonation of terror. The latter is quite universal, so to speak, though in any given language it can only be used with those words already provided with conventional means of appeal (such as lengthening of the pretonic consonant in German).¹⁸

It is not always easy to distinguish the means of appeal from the means of expression. Some styles of expression are characterized by the increased use of the appeal function, others by its decreased use. In cases of this kind the degree of intensity of the appeal function becomes itself a means of expression. Compare, for example, the exaggerated, emotionally charged way of speech of an affected woman with the solemn, apathetic way of speech of an important elderly dignitary. Certainly both these styles of expression do have their individual specific characteristics which are exclusively part of the phonology of expression. But to be added to these characteristics is the way the means of appeal are used. It will probably be the task of future research to separate carefully the expressive function from the conative function within the various styles of speech. As yet this is not possible. For the present, data must be collected from as diverse languages as possible with this purpose in mind.

At any rate, one cannot permit that the possibility of distinguishing the means of expression from those of appeal be bypassed, as is done by J. v. Laziczius in the article referred to. Laziczius would like to keep separate

three types of elements belonging to the phonic aspect of the system of language: *the phonemes*, which have all three functions (expression, appeal, and representation), *the emphatics*, which have an expressive and a conative function, but lack the function of representation, and *the variants*, which, it is claimed, fulfill an expressive function only. Everything that we consider expressive and conative is regarded as "emphatics" by Laziczius. However grateful we may be to him for having called attention to the need for a phonological study of Bühler's three functions, we cannot agree with his conception of a distinction between phoneme "emphatic" and phoneme "variant." In the concrete speech event all three functions are interrelated and mixed. However, the hearer analyzes this complex into its components. Each of these components has only one function, and each of these functional elements relates to, and identifies with, a corresponding element of the system of language. As an example Laziczius cites the Hungarian word "ember" (human being). But let us assume that this word is pronounced by a sophisticated dandy in a "tone of reproach." In this particular case all five phonemes (*ε, m, b, ε, r*) are necessary for lexical distinction. None of them is substitutable without rendering the word unrecognizable or changing its meaning. The emphatic lengthening of the initial *ε* is a means of appeal having to do with the "tone of reproach." Its absence would change the emotional content (i.e., the content of appeal) of the utterance since the latter would then have to be made in a completely neutral tone. Finally, the characteristic nondescript degree of aperture of the vowels, the sloppy articulation of the consonants, and the uvular *r*, all are expressive means by which a dandy is recognized. Any utterance can be analyzed in this way. If, at times, it is easier to abstract the phonemes from the phonic properties with an expressive and a conative function than it is to separate the means of expression from the means of appeal, this should be no reason to relinquish such a separation.¹⁹

We therefore insist on a careful separation of the means of expression from the means of appeal. Accordingly two separate branches of phonology should be created, one dealing with the means of expression, the other with the means of appeal. To these a further and third branch should be added, constituting the part of phonology that deals with the phonological means of representation. Prior to the article by Laziczius it was this part of phonology that had been investigated almost exclusively in the studies of phonologists. However, if one compares these three branches with one another, one is struck particularly by the lack of proportion in their relationship. The "phonology of representation" would cover an enormous area, while each of the other two branches of phonology would only deal with a small amount of factual material. Further, the phonology of expression

and the phonology of appeal would share certain features that would distinguish them from the phonology of representation. The problem of keeping natural and conventional features apart actually exists with respect only to the phonology of appeal and expression. It plays no role whatsoever for the phonology of representation. Only direct imitations of sound, insofar as these do not consist of conventional speech sounds, could at most be considered as nature-given phonic properties of representation. However, insofar as these are really not conventional but natural, such imitations of sound do not come within the framework of language at all. If someone narrates a hunting adventure and, in order to illustrate his story, imitates some animal cry or some other natural sound, he must *interrupt* his speech at that point: the imitated sound of nature is a foreign particle which is external to normal representational human speech.²⁰ The situation is quite different with respect to the plane of expression or the plane of appeal of language, where conventional and natural means are interwoven. The conventional lengthening of consonants or vowels relevant to the plane of appeal occurs only in connection with a particular natural emotional intonation; the special pronunciation of some sounds traditionally proscribed for women in some languages always occurs together with the physiologically conditioned female voice, etc. It can probably be assumed that the number of conventional means of expression and appeal is always smaller than the number of natural means of expression and appeal. Thus, while the entire area of phonic means relevant to representation is studied by the "phonology of representation," the remaining two branches of phonology deal only with a small part of the phonic means pertaining to expression and appeal. Accordingly, on the one hand, the question may be raised whether one can really consider the above three branches of phonology of equal rank and importance. On the other hand, it may be asked whether it is expedient to separate the conventional from the natural means of expression and appeal and include them in the field of phonology.

These difficulties can probably be solved most easily if one assigns the investigation of the expressive and conative phonic means to a special branch of the science, namely, that of *phonostylistics*. This branch could then be subdivided into stylistics of expression and stylistics of appeal on the one hand, and stylistics of phonetics and stylistics of phonology on the other. In the phonological description of a language one must take into account the stylistics of phonology (of both the expressive and the conative function). However, the proper object of such a description must remain the phonological study of the "plane of representation." In this way phonology need not be divided into a phonology of expression, a phonology

of appeal, and a phonology of representation. The term "phonology," as before, can remain restricted to the study of sounds pertaining to the representational plane of the system of language, while "stylistics of phonology," which in itself is only part of "phonostylistics," takes care of the study of the expressive and conative phonic means of the system of language.

¹ Still earlier, in 1870, J. Baudouin de Courtenay had developed a similar concept in his Russian inaugural lecture. Although it was published, it remained inaccessible to most European linguists, primarily because it was written in Russian (see R. Jakobson, *Slav. Rundschau*, I, 810).

² Among those, in particular, the chairman of that circle, Vilém Mathesius, who as early as 1911 had published his notable treatise on the potentiality of linguistic phenomena ("O potenciálnosti jevů jazykových," in *Věstník Král. české společnosti nauk*), and R. Jakobson, whose phonologically oriented book on Czech verse as compared to Russian verse had appeared already in 1922 (Russian title: *O češkom stiche* [Berlin, 1923]; see N. S. Trubetzkoy, *Slavia*, II, 452 ff.).

³ The papers given at that conference and the ensuing discussions are published in Volume IV of the *Travaux du Cercle linguistique de Prague (TCLP)*.

⁴ On the historical development of modern phonology, see V. Mathesius, "Ziele und Aufgaben der modernen Phonologie," in *Xenia Pragensia* (1929), pp. 432 ff.; Laziczus Gy., "Bevezetés a fonológiába," in *A Magyar Nyelvtudományi Társaság Kiadványai*, no. 33 (1932), pp. 109 ff.; N. S. Trubetzkoy, "La phonologie actuelle," in *Journal de psychologie*, XXX (1933), translated into Japanese by H. Kobayasi, "Gendai no oninron," in *Kaiho*, no. 43 (August 1936); and J. Vachek, "What is Phonology?" in *English Studies*, XV (1933).

⁵ For more details, see E. Zwirner and K. Zwirner, *Grundfragen der Phonetik* (Berlin, 1936). [2d revised and enlarged ed., Basel, 1966.]

⁶ Cf. R. Jakobson, *TCLP*, II, 103.

⁷ E. Otto, "Grundfragen der Linguistik," in *Indogerm. Forsch.*, LII, 177 ff.

⁸ On the relationship between phonology and phonetics, cf. Karl Bühler, "Phonetik und Phonologie," in *TCLP*, IV, 22 ff.; Viggo Brøndal, "Sound and Phoneme," in *Proceedings of the Second International Congress of Phonetic Sciences*, pp. 40 ff.; J. Vachek, "Several Thoughts on Several Statements of the Phoneme Theory," in *American Speech*, X (1935); as well as the above book by Arvo Sotavalta, *Die Phonetik und ihre Beziehung zu den Grenzwissenschaften (Annales Academiae Scientiarum Fennicae, XXXI, 3* [Helsinki, 1936]).

⁹ Cf. Karl Bühler, "Axiomatik der Sprachwissenschaft," in *Kant-Studien*, XXXVIII, and *Sprachtheorie* (Jena, 1934).

¹⁰ A. W. de Groot in his paper "Phonologie und Phonetik als Funktionswissenschaften," in *TCLP*, IV, 116 ff., in particular pp. 124 ff., still treats the relations of phonology and phonetics to the different planes of the speech sound in this sense. But by merely calling attention to the problem, de Groot already did a great service.

¹¹ J. v. Laziczius, "Probleme der Phonologie," in *Ungarische Jahrbücher*, XV (1935), and *Proceedings of the Second International Congress of Phonetic Sciences* (London, 1935), p. 57. Also cf. L. Ščerba, "O raznych stil'ach proiznošenija," in *Zapiski Neofilolog. obščestva pri SPBU*, VIII (1915), and R. Jakobson, *O češskom stiche* (Berlin, 1923), pp. 40 ff.

¹² On the function of folk costumes, cf. the excellent study by P. Bogatyrev, "Funkcie kroja na Moravskom Slovensku," in *Spisy Národopisného Odboru Matice Slovenskej*, I (1937).

¹³ G. D. Sanže'ev, *Darxatskij govor i fol'klor* (Leningrad, Akad. Nauk SSSR, 1931), p. 17.

¹⁴ In *Jazyki i pis'mennost' narodov Severa*, III, 13.

¹⁵ *Ibid.*, III, 158.

¹⁶ That this feature is purely conventional and not somehow physiologically conditioned, is also evident from the fact that for some women it occurs distinctly only in coquettish, affected speech, in other words, when they attempt to stress their femininity.

¹⁷ In any event, a European will understand the emotions a good Japanese actor wishes "to express," even though he is not able to understand a word of what the actor is saying. His understanding will come not only from the actor's pantomime but in part also from his intonation.

¹⁸ Conventionally determined means of appeal in any language must therefore be strictly distinguished from spontaneous expressions of emotions. In a dissertation by Elise Richter, titled "Das psychische Geschehen und die Artikulation," in *Archives néerlandaises de phonétique expérimentale*, XIII (1937), which contains a great amount of data, these concepts are unfortunately not kept apart.

¹⁹ Cf. pp. 207 ff. and 254 with respect to the special phonic structure of those words that have no representative, but only an expressive and appeal function (interjections, commands to animals, etc.).

²⁰ This, of course, does not include conventionalized imitations of sound which frequently bear very little resemblance to the imitated sound of nature (e.g., boom! cockadoodledoo!), and which are often incorporated into the grammatical system, so that they can be used without any interruption of speech, Cf. J. M. Kofínek, "Studie z oblasti onomatopoeje," in *Práce z vědeckých ústavů*, XXXVI (Prague, 1934).

PHONOLOGY

PRELIMINARY REMARKS

We have stated above that in the perception of human speech the individual properties of the sound impressions* are simultaneously projected onto three different planes, namely, the plane of expression, the plane of appeal, and the plane of representation. The attention of the hearer can be focused on any one of these three planes, to the exclusion of the other two. Thus it is possible to observe and consider sound impressions on the plane of representation quite independently of the plane of expression and the plane of appeal. But it would not be correct to assume that all sound impressions on the plane of representation fulfill the same function. It is true, of course, that they all serve to designate the lexical meaning of the sentence at hand, that is, they all relate to entities of the system of language having a specific lexical meaning. Nevertheless, it is possible to differentiate clearly three distinct functions on this plane. Some phonic properties have a *culminative* function, that is, they indicate how many "units" (words, combinations of words) are contained in a particular sentence. This includes, for example, primary stress in German. Other sound properties fulfill a *delimitative* function. They signal the boundary between two units (compounded words, words, morphemes). For German this includes, for example, initial glottal stop before vowels. Finally, still other sound properties have a meaning-differentiating or *distinctive* function, as they distinguish the individual units of meaning. For example: German "List"/"Mist"/"Mast"/"Macht" (list/junk/mast/might). Each

**Schalleindrücke.*

unit of language must contain phonic properties having a distinctive function, or else it cannot be distinguished from the other units of language. Individual linguistic units are distinguished exclusively by phonic properties having a distinctive function. Yet the phonic properties having a culminative and delimitative function are not indispensable for the units of language. There are sentences in which individual words are not delimited by any special phonic properties, and many words are used within the context of a sentence without express culminative properties. The possibility of pausing between the individual words of a sentence always exists. The phonic properties with a delimitative and culminative function serve as a kind of substitution for such pauses. These two functions are therefore always convenient ancillary devices, while the distinctive function is not only convenient but absolutely necessary and indispensable for communication. It follows that of the three sound functions, which can be distinguished on the plane of representation, the distinctive function is by far the most important.

In accordance with the three functions of sound on the representational plane, synchronic (descriptive) phonology can be divided into three main parts. It is clear that the section that must deal with the distinctive function has to be much larger than the other two devoted to the culminative and delimitative functions respectively.

PART I

THE THEORY OF DISTINCTIVENESS

The Distinctive or Meaning-differentiating Function of Sound

I BASIC NOTIONS

1 THE PHONOLOGICAL (DISTINCTIVE) OPPOSITION

The concept of distinctiveness presupposes the concept of *opposition*. One thing can be distinguished only from another thing: it can be distinguished only insofar as it is contrasted with or opposed to something else, that is, insofar as a relationship of contrast or opposition exists between the two. A phonic property can therefore only be distinctive in function insofar as it is opposed to another phonic property, that is, insofar as it is a member of an opposition of sound. Oppositions of sound capable of differentiating the lexical meaning of two words in a particular language are *phonological* or *phonologically distinctive* or *distinctive oppositions*.¹ In contrast, those oppositions of sound that do not have this property are *phonologically irrelevant* or *nondistinctive*. In German the opposition *o-i*, as in "so"/"sie" (thus, so/she, they), "Rose"/"Riese" (rose/giant) is phonological (distinctive). The opposition alveolar *r* and uvular *r*, on the other hand, is nondistinctive since in German there does not exist a single word pair that is differentiated by this opposition.

Sounds are *interchangeable* or *noninterchangeable*. Interchangeable

sounds can occur in the same phonic environment in a given language (as, for instance, *o* and *i* in German in the foregoing examples). Sounds that are not interchangeable, on the other hand, can never occur in the same phonic environment in the particular language. The *ich* and *ach* sounds in German, for example, belong to this category. The latter occurs only after *u*, *o*, *a*, and *au*, while the former occurs in all other positions, but never after *u*, *o*, *a*, and *au*. It follows that noninterchangeable sounds in principle cannot form phonological (distinctive) oppositions. They never occur in the same phonic environment. Accordingly they can never function as the sole distinctive elements of two units. The German words "dich" and "doch" (you, acc.; yet) are not only distinguished by the two *ch* sounds but also by the vowels. While the distinction between *i* and *o* in many other German word pairs occurs as an independent and sole distinctive factor ("stillen"/"Stollen" [to nurse/tunnel], "riss"/"Ross" [tore/horse], "Mitte"/"Motte" [middle/moth], "bin"/"Bonn" [(I) am/Bonn], "Hirt"/"Hort" [shepherd/treasure]), the opposition of *ich* and *ach* sounds in German occurs only in the presence of an opposition in the preceding vowels. It cannot occur as the *sole* discriminative means between two words. This is true for all oppositions of noninterchangeable sounds (but see p. 33). Interchangeable sounds can form distinctive as well as nondistinctive oppositions. It depends entirely on the function such sounds fulfill in a given language. For example, in German the relative pitch of vowels in a word is irrelevant for its meaning (i.e., for its representative function). Differences in the relative pitch of vowels in German can, at most, be used for the function of appeal. But the lexical meaning of a disyllabic word remains quite unchanged irrespective of whether the relative pitch of the vowel in the second syllable is higher or lower than that of the vowel in the first syllable, or whether the vowels are pronounced with the same tone. If we consider the low-tone *u* and the high-tone *u* as two separate sounds, we can say that these two sounds are interchangeable in German but do not form a distinctive opposition. On the other hand, *r* and *l* are also interchangeable in German, but do form a distinctive opposition; compare, for example, such pairs as "Rand"/"Land" (rim/land), "führen"/"fühlen" (lead/feel), "scharren"/"schallen" (to dig/to sound), "wirst"/"willst" (will/want), where the difference in meaning is manifested only by the opposition *r-l*. Conversely, in Japanese, though *r* and *l* are interchangeable, they are incapable of forming a distinctive opposition. *r* can be substituted for *l* in any word and vice versa, without a change in meaning. The relative pitch of individual syllables, on the other hand, is phonologically distinctive in Japanese. Low-tone *u* and high-tone *u* are interchangeable and form a distinctive opposition. A word like "tsuru," for example,

can thus have three distinct meanings, depending on the relative pitch of the two *u*'s: it means "climber" (bot.) when the tone of the first *u* is lower than that of the second; "crane" (zool.) when the tone of the first *u* is higher than that of the second; and "to fish" when both *u* vowels show the same tone.² Accordingly two types of interchangeable sounds can be distinguished: those that in a given language form distinctive oppositions and those that form nondistinctive oppositions only.

We have said above that noninterchangeable sounds do not form distinctive oppositions. This statement must, however, be qualified. Noninterchangeable sounds having no common phonic properties that would distinguish them from all other sounds of the same system do form distinctive oppositions. The opposition between the German *ich* and *ach* sounds is nondistinctive since these sounds are not interchangeable and their common phonic properties of voiceless dorsal spirants do not recur in any other sound of the German sound system. However, the opposition of the German *h* and *η* ("ng") sounds, which are also noninterchangeable, is nevertheless distinctive (*h* occurs only before vowels except before unstressed *e* and *i*; while *η* occurs only before unstressed *e* and *i* and consonants). The reason for this is that the only property these two sounds have in common, that is, their consonantal property, is by no means unique to them alone and does not distinguish them from the other consonants of German. To differentiate distinctive oppositions of this type from the usual oppositions existing between interchangeable sounds, we designate the former *indirectly distinctive* (or *indirectly phonological*) oppositions. For, while ordinary directly phonological oppositions (such as *o-i* and *r-l*) can be used directly to differentiate words, it is, of course, impossible to do so in the case of indirectly phonological oppositions. Members of indirectly phonological oppositions can, however, enter into a relationship of direct phonological opposition with any other sound, that is, with a sound that has the same property common to both. Accordingly German *h* and *η* ("ng"), for example, are in a relationship of directly distinctive opposition with many German consonants: with *p* ("hacken"/"packen" [hack/pack], "Ringe"/"Rippe" [rings/ribs]), with *l* ("heute"/"Leute" [today/people], "fange"/"falle" [catch/fall]), and with others.

2 THE PHONOLOGICAL (DISTINCTIVE) UNIT, PHONEME, AND VARIANT

By (directly or indirectly) phonological or distinctive opposition we thus understand any phonic opposition capable of differentiating lexical meaning in a given language. Each member of such an opposition is a *phono-*

logical (or distinctive) unit.³ It follows from this definition that the scope of the distinctive units can be quite varied. A word pair such as "bahne"/"banne" (pave/expel) is differentiated only by syllable division (or by the related difference in vowel and consonant length), while the difference in sound in a word pair such as "tausend"/"Tischler" (thousand/carpenter) extends over the entire word, with the exception of the initial sound. And in a pair such as "Mann"/"Weib" (husband/wife) both words are different in sound from beginning to end. The foregoing is evidence that there are smaller and larger distinctive units, and that it is possible to group the distinctive units of a given language according to their relative size.

There are distinctive units that can be analyzed into a successive number of still smaller distinctive units. The units [mɛ] and [bɣ:] in German "Mähne"/"Bühne" (mane/stage) are of this type: from the contrasts "Mähne"/"gähne" (mane/yawn) and "Mähne"/"mahne" (mane/admonish) the analysis of [mɛ:] = [m] + [ɛ:] results, and from "Bühne"/"Sühne" (stage/expiation) and "Bühne"/"Bohne" (stage/bean) the analysis of [bɣ:] = [b] + [ɣ:] results. But the distinctive units *m*, *b*, *ɛ*:, and *ɣ*: cannot be represented as sequences of still smaller successive distinctive units. From a phonetic point of view, any *b* consists of a number of articulatory movements. First the lips are narrowed toward each other. Then they are placed together so that the oral cavity is completely closed from the front. The velum is raised simultaneously and pressed against the back wall of the velic, so that the entrance from the velic chamber to the nasal cavity is blocked. The vocal cords start vibrating immediately thereafter. The air escaping from the lungs penetrates into the oral cavity and accumulates behind the closed lips. Finally, the lip closure is ruptured by the air pressure. Each of these consecutive movements corresponds to a specific acoustic effect. However, none of these "acoustic atoms" can be considered a phonological unit since all of them always occur in unison, never in isolation. The labial implosion is always followed by an explosion, which again is always introduced by the implosion. The labial plosive between implosion and explosion cannot occur without labial implosion and explosion. Thus *b* in its entirety is a phonological unit that cannot be analyzed into successive components. The same can also be said of the other phonological units mentioned above. "Long" *y* (*ii*) cannot be interpreted as a sequence of "short" *y*'s. From a phonetic point of view, (*y*:) is, of course, a span of time filled by *y* articulation. But if one would substitute another vowel articulation for part of this span, the result would not be a new German word ("Baüne," "Büane," "Biüne," "Buüne," etc. are not possible in German). Long *ü* from the point of view of the phonological system of German is simply indivisible in time.

Phonological units that, from the standpoint of a given language, cannot be analyzed into still smaller successive distinctive units are phonemes.⁴ Accordingly the phoneme is the smallest distinctive unit of a given language. *
*
Phoneme
(def.)

The signifier aspect of every word in the system of language can be analyzed into phonemes, that is, it can be represented by a particular sequence of phonemes.

Of course, the matter should not be oversimplified. The phonemes should not be considered as building blocks out of which individual words are assembled. Rather, each word is a phonic entity, a *Gestalt*, and is also recognized as such by the hearer, just as an acquaintance is recognized on the street by his entire appearance. But the recognition of configurations presupposes that they are distinct. This is possible only if individual configurations are distinguished from each other by certain characteristics. The phonemes are then the distinctive marks of the configurations of words. *
How
so

Each word must contain as many phonemes, and in such a sequence, as to distinguish itself from any other word. The entire sequence of phonemes is characteristic of each individual word; but each single member of that sequence also occurs in other words as a distinctive mark. In every language the number of phonemes used as distinctive marks is much smaller than the number of words, so that individual words always represent only a specific combination of phonemes that also occur in other words. This is by no means in contradiction with the configurative character of the word. As a *Gestalt*, each word always contains something more than the sum of its constituents (or phonemes), namely, the principle of unity that holds the phoneme sequence together and lends individuality to a word. Yet in contrast with the individual phonemes it is not possible to localize this principle of unity within the word entity. Consequently one can say that each word can be completely analyzed into phonemes, that it consists of phonemes in the same way as a tune composed in major scale can be said to consist of the tones of that scale, although each tune will contain something that makes it a specific musical configuration.⁵ ?

The same sound (*Lautgebilde*) can at the same time be a member of a distinctive and a nondistinctive opposition. Thus, the opposition of the *ach* and *ich* sounds is nondistinctive, but the opposition of both *ch* sounds to the *k* sounds is distinctive (e.g., "stechen"/"stecken" [stab/stick], "roch"/"Rock" [smelled/skirt]). This is possible only because every sound contains several acoustic-articulatory properties and is differentiated from every other sound not by all but only by a few of these properties. The *k* sounds thus are distinguished from the *ch* sounds by forming a complete closure, while the latter only form a stricture between the dorsum and palate. But the difference between *ich* and *ach* sounds consists in the fact

that the stricture in the former takes place at the center of the palate, in the latter at the soft palate. The circumstance that the opposition *ch-k* is distinctive, while the opposition of *ich* and *ach* sounds is nondistinctive, presents evidence that for *ch* the occurrence of a stricture between dorsum and palate is *phonologically relevant*, while the position of stricture in the back or central dorsal-palatal region is *phonologically irrelevant*. Sounds participate in phonological (distinctive) oppositions only by means of their phonologically relevant properties. And since every phoneme must be a member of a distinctive opposition, it follows that the phoneme is not identical with an actual sound but only with its phonologically relevant properties. One can say that the phoneme is *the sum of the phonologically relevant properties of a sound (Lautgebilde)*.*⁶

Any sound perceived and produced in the concrete act of speech contains, in addition to the phonologically relevant properties, many others that are phonologically irrelevant. None of these sounds can therefore simply be considered a phoneme. But insofar as such a sound also contains the phonologically relevant properties of a specific phoneme, it can be considered the *realization* of this phoneme. Phonemes are realized by the sounds of language (more precisely, by speech sounds), of which every act of speech is constituted. These speech sounds are never phonemes in themselves since a phoneme cannot contain any phonologically irrelevant properties. This would be unavoidable for an actually produced speech sound. Rather, the actual sounds produced in speech are only material symbols of the phonemes.

The continuous sound flow of a speech event is realized or symbolized by a specific phoneme sequence. At specific points in the sound flow the distinctive phonic properties characteristic of the individual phonemes of the particular phoneme sequence can be recognized. Each of these points can be regarded as the realization of a specific phoneme. However, in

* *Translator's note*: The term "Lautgebilde" (also "Schallgebilde"), for want of a more appropriate term, is here rendered simply by "sound." This translation falls somewhat short of the German meaning which may be interpreted as referring to the internal structuring of the sound, possibly also to its "Gestalt."

Another term suggested by Roman Jakobson is "sound unit," which again does not exactly convey the meaning, and when translated back to German becomes "Laut-" or "Schalleinheit."

Of the above definition, which already implies the division of the phoneme into distinctive features, Vachek writes (*op. cit.*, p. 46): "This . . . definition . . . was in reality not Trubetzkoy's, but Jakobson's; he formulated it as early as 1932. [In translation] . . . by this term [the phoneme] we designate a set of those concurrent sound properties which are used in a given language to distinguish words of unlike meaning." Cf. also Trubetzkoy's own footnote 6.

addition to the distinctive phonic properties, there are still many other nondistinctive phonic properties that occur at the same point in the sound flow. We designate the sum of all distinctive as well as nondistinctive properties occurring at a specific point in the sound flow as *speech sound*. Each speech sound thus contains, on the one hand, phonologically relevant marks that make it the realization of a specific phoneme. On the other hand, it contains quite a number of phonologically irrelevant marks, the choice and occurrence of which depend on a number of things.

It follows that a phoneme can be realized by several different speech sounds. For example, for German *g* the following marks are phonologically relevant: complete closure between dorsum and palate, accompanied by raising of the velum, relaxation of the muscles of the tongue, and un-aspirated plosive release of the closure. But the place where the dorsal-palatal closure must take place and the position of lips and vocal cords during closure are phonologically irrelevant. German consequently has quite a number of speech sounds that are regarded as the realization of a single phoneme *g*. There are voiced, semivoiced, and completely voiceless *g* sounds (even in those German-speaking regions where mediae are voiced as a rule), rounded velar *g* sounds (as in "gut" [good], "Glut" [embers]), closely rounded palatals (as in "Güte" [benevolence], "Glück" [luck]), unrounded velars (as in "ganz" [whole], "Wage" [scales], "tragen" [carry]), unrounded strongly palatal sounds (as in "Gift" [poison], "Gier" [greed]), moderately palatal sounds (as in "gelb" [yellow], "liege" [lie]), etc. We designate these various speech sounds, which are realizations of the same phoneme, as *variants* (or phonetic variants) of the particular phoneme.

3 DEFINITION OF THE PHONEME

Not all linguists accept the present definition of the terms "phoneme," "speech sound," and "variant"; and initially the definition was not formulated in this way.

Originally the phoneme was defined in psychologicistic terms. J. Baudouin de Courtenay defined the phoneme as the "psychic equivalent of the speech sound." This definition was untenable since several speech sounds (as variants) can correspond to the same phoneme, each such sound having its own "psychic equivalent," namely, acoustic and motor images corresponding to it. Furthermore, this definition is based on the assumption that the speech sound itself is a concrete, positive given entity. But in reality this is not the case. Only the actual continuous sound flow of the

speech event is a positive entity. When we extract individual "speech sounds" from this continuum we do so because the respective section of the sound continuum "corresponds" to a word made up of specific phonemes. The speech sound can only be defined in terms of its relation to the phoneme. But if, in the definition of the phoneme, one proceeds from the speech sound, one is caught in a vicious circle.

With reference to the phoneme, the present writer sometimes used the term "Lautvorstellung" (sound image) in his early phonological writings.⁷ This expression was mistaken for the same reason as the above definition by Baudouin de Courtenay. Acoustic-motor images correspond to every phonetic variant inasmuch as the articulation is regulated and controlled by the speaker. Furthermore, there is no reason to consider some of these images "conscious" and others "subconscious." The degree of awareness of the process of articulation depends on practice. Through special training it is also possible to become conscious of nonphonological phonic properties. It is this fact that makes it possible to have what is known as auditory phonetics. The phoneme can thus be defined neither as "sound image" nor as "conscious sound image" and contrasted as such with the speech sound (phonetic variant). The expression "Lautabsicht" (sound intent), used by the present author in his paper to the Second International Congress of Linguists in Geneva,⁸ was actually only an alternative phrasing of the designation of the phoneme as "sound image." Consequently it was also wrong. Whoever intends to utter the word "gib" (give) must by the same token intend also to make all necessary movements with his speech organs. In other words, he must intend to articulate a palatal *g*. This intent is not identical with the intent involved in the desire to utter the word "gab" (gave) which has a velar *g*. All these psychological ways of expression fail to do justice to the nature of the phoneme and must therefore be rejected lest they lead to an obliteration of the boundary between sound and phoneme, as could sometimes be actually observed with Baudouin de Courtenay and some representatives of his school.

Reference to psychology must be avoided in defining the phoneme since the latter is a linguistic and not a psychological concept.⁹ Any reference to "linguistic consciousness" must be ignored in defining the phoneme, "linguistic consciousness" being either a metaphorical designation of the system of language or a rather vague concept, which itself must be defined and possibly cannot even be defined. The definition proposed by N. van Wijk (*De Nieuwe Taalgids* [1936], p. 323) can therefore also be challenged. According to Van Wijk, "the phonemes of a language form a category of linguistic elements which are present in the psyche of all members of the speech community." Phonemes "are the smallest units sensed as not

further divisible by linguistic consciousness."* The fact that the concept "phoneme" is here linked with such vague and nondescript notions as "psyche," "linguistic consciousness," or "sensory perception" cannot be of help in clarifying the phoneme concept. If this definition were to be accepted, one would never know in an actual case what to consider a phoneme. For it is impossible to penetrate the "psyche of all members of a speech community" (especially where extinct languages are involved). An inquiry into the "sensory perception" by the "linguistic consciousness" is also a ticklish and extremely difficult enterprise. The statement that "linguistic consciousness" is not capable of analyzing a phoneme into successive parts and that all members of a speech community "are in command of" the same phonemes are two quite correct claims. But they can by no means be considered a definition of the phoneme. The phoneme is, above all, a functional concept that must be defined with respect to its function. Such definition cannot be carried out with psychologistic notions.

Other equally inadequate definitions proceed from the circumstance of the existence of combinatory variants.† Daniel Jones defined the phoneme as a family or group of acoustically or articulatorily related speech sounds that never occur in the same phonic environment. This first definition by Daniel Jones proceeded from the assumption that human speech consists of phonemes and speech sounds, these not belonging to different planes but coexisting side by side on the same level. In a word such as "Wiege" (cradle) in German the *v*, *i*, and *ə* are speech sounds since they do not show combinatory variants perceptible to the naked ear. *g*, on the other hand, is a phoneme since its realization depends on its environment. It is clear that this use of the terms speech sound and phoneme only makes sense with reference to the letters of the alphabet. The term "phoneme" would then apply to those letters that are pronounced differently depending on their position within a word, while the term "speech sound" (or "phone") would apply to those always pronounced in the same way. For Jones the phoneme concept was originally also very closely related to the problem of "phonetic transcription."¹⁰ However, he very soon recognized

* *Translator's note:* The term *Sprachbewusstsein* is here translated literally by "linguistic consciousness," to distinguish it from *Sprachgefühl*, "linguistic intuition," though that appears to be what is meant. Cf. J. Vachek, *The Linguistic School of Prague*, p. 30: "There is another point [in addition to the inadmissibility of separation of levels] in which the approaches of the two groups [transformationalists and Praguists] reveal some similarity, and that is their attitude toward what the transformationalists call intuition and to which the Prague group refers by the term . . . linguistic consciousness." Cf. here pp. 64, 78, 85, 88, 301.

† *Translator's note:* The term *kombinatorische Variante* is here translated as "combinatory variant," instead of "allophone," in keeping with Prague School terminology.

that the "phoneme theory" in this form was untenable and required further refinement. The definition of the phoneme actually remained unchanged. However, it was not only applied to families or groups of such noninterchangeable sounds as could be perceived by the naked ear as different sounds, but also to those whose difference could not be perceived directly. And since experimental phonetics had supplied proof that it was impossible to produce exactly the same sound in different environments, in a word like the above "Wiege" (cradle) not only the *g* but also the *v*, *i*, and *a* became phonemes in accordance with this new interpretation. In this first developmental period of the phoneme concept Jones also assumed "diaphones" in addition to phones and phonemes. By this term were understood families of sounds which could be substituted for each other without changing the meaning of the word. Now, since the methods of instrumental phonetics show that it is impossible to repeat exactly the same sound in the same environment, Jones should actually speak only of diaphones instead of speech sounds or phones, and define the phoneme as a family of nonsubstitutable diaphones. In the final state of development of his phoneme theory Jones in fact arrives at a similar view. In so doing he bases himself on the theory of "abstract sounds," developed by the Japanese professor Jimbo and the English linguist in Tokyo, Dr. Palmer. The actual sounds that we perceive are all different, and it is impossible to produce exactly the same sound twice. Yet some sounds have so many common features and resemble each other to such a degree that their common features can be summed up in one image (*Vorstellung*) and this image can be conceived of as such. This is the way in which "abstract sounds" come into existence, for example, a velar *g*, a palatal *g*, etc. But this is only an abstraction at the first level. A second level of abstraction is reached if one sums up into one general image a whole family of such abstract sounds which, while bearing a certain resemblance to each other, never occur in the same environment in a given language. Phonemes, then, are such abstract sounds at the second level. Objections must be raised against this definition, especially for the reason that every abstraction is based on that principle according to which it is made. A number of actual dogs can correspond to the abstract concepts of "big dog," "black dog," "faithful dog," "poodle," etc., depending on what is chosen as the principle for abstraction. Every one of these "abstract dogs" will include quite different "actual dogs." Jones speaks of abstract sounds without paying attention to the principle by which such abstracting takes place. At "the first level" abstracting takes place on the basis of acoustic-articulatory similarity; at "the second level," on the basis of the relation of the sounds to their environment. These two principles of abstracting are so

different from each other that they should by no means be regarded as two levels of the same abstracting process. Further, the vagueness of the term "speech sound" ("actual sound") must again be stressed. Actual sounds exist only insofar as they are the realizations of phonemes. The first level of abstraction is, therefore, really the second. As long as Jones's phoneme concept was only coined for purposes of transcription, it had some practical value, but little relation to linguistics as such. But as soon as this concept was revamped to correspond to specific linguistic phenomena, the point of departure for the definition of the phoneme became invalid.

The phoneme can be defined satisfactorily neither on the basis of its psychological nature nor on the basis of its relation to the phonetic variants, but purely and solely on the basis of its function in the system of language. Whether it is considered as the smallest distinctive unit (L. Bloomfield) or as "Lautmal am Wortkörper" (vocal mark on the body of the word) (K. Bühler), the result is the same: every language presupposes distinctive (phonological) oppositions. The phoneme is a member of such an opposition that cannot be analyzed into still smaller distinctive (phonological) units. There is nothing to be changed in this quite clear and unequivocal definition. Any change can only lead to unnecessary complications.

Incidentally, the reasons for such complications are sometimes not only psychologically understandable but are also quite legitimate. For example, the extremely complicated definition of the phoneme advocated by the American phonologist W. Freeman Twaddell in his interesting monograph *On Defining the Phoneme* (Language Monographs, published by the Linguistic Society of America, XVI [1935]) seems to have arisen from the fear of a hypostasis of the phoneme, that is, from the fear of the conception of phonemes as objects that the speaker possesses and uses like building blocks to assemble words and sentences (see especially, p. 53). To guard against this danger, Twaddell wants to give special emphasis to the relational character of the phoneme (i.e., to its nature as an opposition member). With this end in mind he develops his phoneme theory which may be summed up as follows: An "utterance" (i.e., a concrete speech event) is a physical phenomenon (a sound) coupled with a specific meaning. An articulatory complex that recurs in various utterances and has the same meaning everywhere is called a "form." Two forms with different meaning are in principle also different in sound—apart from homonyms which are relatively rare in all languages.¹¹ The degree of difference in sound between two different forms may vary. The minimal difference in sound between two dissimilar forms corresponds to the fractions of the respective articulatory complexes. A group of forms that are minimally

different form a "class." Such a class is characterized by the articulatory complex common to all its members. If the minimal difference constitutes the same fraction in all these members, for example, the initial or final fraction, the class is "ordered." Thus, for example, the words "nahm"/"lahm"/"kam"/"Rahm"/"Scham"/"zahm" (took/lame/came/cream/shame/tame) form an ordered class in German. The relations between the members of such a class are minimal phonological oppositions. Twaddell calls the members of such oppositions "micro-phonemes." Thus in our case *n-l-k-r-sch-ts* are "micro-phonemes" of the form class characterized by the following *am*. The phonetic equivalent of a micro-phoneme contains several articulatory properties. Two form classes are called "similarly ordered" if the relationship between their micro-phonemes is identical. For example, the classes *pill-till-kill-bill* and *nap-gnat-knack-nab* in English are similarly ordered. Although the phonetic makeup of the micro-phonemes in both cases is not quite the same—*p, t, k* are aspirated initially, unaspirated finally—the relation between these micro-phonemes is nevertheless identical. All micro-phonemes found in the same position in various similarly ordered form classes form a "macro-phoneme" which corresponds to our concept "phoneme." J. Vachek remarked quite correctly (*Proceedings of the Second International Congress of Phonetic Sciences*, pp. 33 ff.) that this definition of the phoneme fundamentally agrees with ours. W. Freeman Twaddell's micro-phonemes and macro-phonemes are opposition members that cannot be analyzed into smaller fractions. With regard to the macro-phoneme, it is expressly stated that it is the sum of the phonologically relevant phonic properties. By a complicated roundabout way Twaddell thus arrives at the same result as we had reached in a more direct way.* Yet this complicated detour offers no advantage. There is nothing in our definition that would presuppose or require a hypostasis of the phoneme. Karl Bühler's conception of the phoneme as a "vocal mark on the face of the word," which does justice to the conception of the word as a configuration, is wholly in accord with our definition. So is the "abstract

* *Translator's note:* With respect to his own phoneme definition and theory, Twaddell says of the Prague School: "It should be clear for what kinds of procedure in linguistic study a unit like the (macro-) phoneme is adopted. It is a procedure very much like the 'phonology' of the Cercle linguistique de Prague. That such a procedure is in order can scarcely be questioned. . . . The only limitation which the definition proposed above would impose upon such a procedure is the necessity for antecedent and concurrent phonetic (and articulatory) analysis. If the valuable and suggestive work of many members of the Cercle linguistique de Prague has not been wholly convincing to many students of language, it is (aside from its newness) because of the subjective mentalistic definition of units and a somewhat truculent denial of the relevance of phonetic analysis" (*On Defining the Phoneme* [1935], reprinted in M. Joos, ed., *Readings in Linguistics*, p. 77).

relevancy" which Bühler rightly considers the basis and logical prerequisite for our phoneme concept (see *TCLP*, IV, 22–53). The advantages that a distinction between micro-phonemes and macro-phonemes has to offer can just as easily be attained through our theory of neutralization of phonological oppositions, and of archiphonemes (see end Chap. III). In addition, our solution of the problem avoids the danger connected with the micro-phoneme theory, that of atomizing phonology. We therefore believe that Twaddell's complicated theory cannot replace our definition of the phoneme. Twaddell's great merit consists in putting an end to psychological and naturalistic prejudices that had arisen around the phoneme concept on the part of some proponents as well as opponents of phonology. It is true, of course, that his abstract way of expression and his philosophically trained thinking make rather high demands on the reader which some obstinate opponents of phonology are not able to meet. This can lead, and has already led, to misunderstandings. Thus, for example, B. Collinder and P. Meriggi eagerly took Twaddell's claim that the phoneme is no physical and mental reality but an "abstractional fictitious unit" as a flat rejection of the phoneme concept.¹² In reality, of course, Twaddell only meant the same as what Ferdinand de Saussure considered the essence of every linguistic value ("entités oppositives, relatives et négatives," *Cours de linguistique générale*, p. 164), which actually can be said of every value concept. Since the phoneme belongs to *langue*, and *langue* is a social institution, the phoneme also is a *value* and has the same kind of existence as all values. The value of a currency unit, for example, the dollar, is also neither a physical nor a psychic reality, but an abstract and "fictitious" value. But without this "fiction" a government cannot exist.

A. W. de Groot defined the phoneme as follows (*TCLP*, IV, 125): "The phoneme is thus a phonological symbolic sign which has a self-evident function. The essential function of the phoneme is the following: to make possible or facilitate, if need be, the recognition and identification of words or parts of words that have symbolic value by means of the fact that the phoneme itself is recognizable and identifiable. Phonemes may be defined as *the shortest fractions of sound sequences that have this function.*" Arvo Sotavalta (*Die Phonetik und ihre Beziehungen zu den Grenzwissenschaften*, p. 10) agrees with this definition, but formulates it more clearly. However, he does not speak of phonemes but of "speech sounds." By speech sound he understands "*the smallest fraction of a sequence of sounds occurring in the speech flow which requires a more or less specific time for its production and which can be recognized and identified; it is further capable of forming recognizable, identifiable linguistic forms by combining with sounds of like nature.*" The question may be raised:

word
recognition

Why are "speech sounds" or "words" and "parts of words" recognized? What is meant by "recognition" and "identification"? Of course, only that which is distinguished from other things of like nature can be recognized at all. Recognizable, identifiable words are those that distinguish themselves from all other words by specific phonic discriminative marks. The word "Leber" (liver) is identified because it is differentiated by an *l* from the words "Weber" (weaver) and "Geber" (giver), by an *e* from the word "Lieber" (dear), by a *b* from the word "Leder" (leather), and by an *r* from the word "Leben" (life). A phonic element that is not capable of differentiating one sound sequence from another cannot be recognized either. Recognition is thus not the primary import but the logical consequence of differentiation. Further, "recognition" is a psychological process and it is not advisable to draw on psychological concepts in the definition of linguistic notions. Our definition of the phoneme must therefore be given preference.

¹ In "Projet de terminologie phonologique standardisée," in *TCLP*, IV, the term "phonologischer Gegensatz," "opposition phonologique," is proposed. This term may be retained for all those languages in which the word "phonological" cannot cause misunderstandings. For English, however, we would recommend the term "distinctive opposition" since both "phonological opposition" and "phonemic opposition" might give rise to misunderstandings.

² It is true, however, that the tone is sometimes shifted when individual words form compounds: "ása" (morning): "asá-meshí" (breakfast): "samúrai" (knight): "ináka-zámurai" (country squire), etc.

³ Cf. "Projet de terminologie phonologique standardisée," in *TCLP*, IV, 311. For English the term "distinctive unit" is probably to be recommended.

⁴ In 1912, L. V. Ščerba in *Russkije glasnyje* (St. Petersburg, 1912), p. 14, gave the following definition of the phoneme: "The shortest general sound image of a given language which is capable of associating with images of meaning and of differentiating words . . . is called phoneme." In this definition, which is still under the spell of association psychology, as in Ščerba's *Court exposé de la prononciation russe* (1911, p. 2), the differential function of the phoneme seems to have been clearly stressed for the first time. In 1928 N. F. Jakovlev, in an article titled "Matematičeskaja formula postrojenija alfavita" (in *Kul'tura i pis'mennost' Vostoka*, I, 46), gave a definition that had already been cleansed of psychologistic elements: "By Phonemes we understand those phonic properties that can be analyzed from the speech flow as the shortest elements serving to differentiate units of meaning." The definition of the phoneme which we quoted above was formulated for the first time in 1929 by R. Jakobson in his "Remarques sur l'évolution phonologique russe" (*TCLP*, II, 5): "Tous termes d'opposition phonologique non susceptibles d'être dissociés en sous-oppositions phonologiques plus menues sont appelés phonème." This is the definition that was incorporated

in somewhat altered form into the "Projet de terminologie phonologique standardisée" (*TCLP*, IV, 311): "... non susceptible d'être dissociée en unités phonologiques plus petites et plus simples."

⁵ Cf. Karl Bühler, "Psychologie der Phoneme," in *Proceedings of the Second International Congress of Phonetic Sciences*, pp. 162 ff., and N. S. Trubetzkoy, "Über eine neue Kritik des Phonembegriffes," in *Archiv für vergleichende Phonetik*, I, 129 ff., in particular pp. 147 ff.

⁶ For a similar definition, cf. R. Jakobsen in the Czech encyclopedia *Ottův slovník naučný*, Dodatky II, I, 608 (see "fonéma").

⁷ N. S. Trubetzkoy, "Polabische Studien," in *Sitzb. Wien. Akad., Phil.-hist. Kl.*, CCXI, no. 4, p. 111, and "Versuch einer allgemeinen Theorie der phonologischen Vokalsysteme," in *TCLP*, I, 39. Incidentally, this term was never intended as an exact scientific definition. This writer was at that time not at all interested in the formulation of definitions, but only in the correct application of the phoneme concept. The phoneme concept was used in exactly the same way in the first-mentioned phonological articles by the present writer as it is used by him today (cf. e.g., "Polabische Studien," pp. 115-120).

⁸ Cf. *Actes du II^e Congrès International de Linguistes*, pp. 120 ff.

⁹ Cf. *TCLP*, II, 103.

¹⁰ Also cf. J. Vachek in *Charisteria Gugelmo Mathesio*, pp. 25 ff., and the writings by D. Jones, cited there.

¹¹ Cf. B. Trnka, "Bemerkungen zur Homonymie," in *TCLP*, IV, 152 ff.

¹² Cf. P. Meriggi in *Indogerm. Forsch.*, I IV, 76, and B. Collinder in *Actes du IV^e Congrès International de Linguistes* (Copenhagen, 1938).

II RULES FOR THE DETERMINATION OF PHONEMES

I DISTINCTION BETWEEN PHONEMES AND VARIANTS

After ascertaining the definition of the phoneme in the preceding chapter, we now must give the practical rules by which a phoneme can be distinguished from phonetic variants on the one hand, and from combinations of phonemes on the other.¹

What are the conditions under which two speech sounds can be considered realizations of two different phonemes, and under what conditions can they be considered phonetic variants of a single phoneme? Four rules can be formulated.

RULE I.—Two sounds of a given language are merely optional phonetic variants of a single phoneme if they occur in exactly the same environment and are interchangeable without a change in the lexical meaning of the word.

Several subtypes can be distinguished. According to their relation to the speech norm, optional variants are divided into *general* and *individual* variants. The former are variants that are not regarded as speech defects or deviations from the norm and can therefore be used by the same speaker. For example, the lengthening of consonants before a stressed vowel in German is not considered a speech defect, and the same speaker may pronounce the same word sometimes with a short and sometimes with a long initial *s* and *sch* (phonem. |z, š|). The difference in pronunciation is here used for emotional coloration of speech ("ssoo?" "schschöön!")

North German "jja!"). Individual variants, on the other hand, are distributed among the various members of the speech community. Only a specific variant is considered "normal," "good," or "model" pronunciation, while the rest are regarded as regional, social, or pathological deviations from the norm. An example would be the uvular and alveolar *r* in various European languages. But the value of these two sounds differs depending on the language. In the Slavic languages, as well as in Italian, Spanish, Hungarian, and Modern Greek, alveolar *r* is regarded as the norm. The uvular *r* is treated as a pathological deviation or a sign of snobbish affectation. More rarely it is considered a regional peculiarity, as, for example, in Slovenian, where it occurs especially in certain dialects of Carinthia. Conversely, in German and French the uvular *r* (or, more precisely, different types of uvular *r*) are considered the norm, and the alveolar *r* is considered a regional deviation or an archaizing affectation, such as the *r* used by French actors. In all these cases, which certainly are not rare, the distribution of the variants is a "norm" in itself. It frequently also happens that two variants of a phoneme are general but that the frequency of their use is subject to individual fluctuations: a phoneme *A* is sometimes realized by all speakers as *α'* and sometimes as *α''*; but one speaker prefers its realization as *α'*, another as *α''*, etc. Consequently there is a gradual transition between "general" and "individual" variants.

With respect to the function of the optional variants, they can be divided from this point of view into *stylistically relevant* and *stylistically irrelevant* variants. Stylistically relevant variants express differences between various styles of speech, as, for example, between an excited emotional and a careless familiar style. In German, for instance, lengthening of pretonic

consonants as well as the overlengthening of long vowels and spirantization of intervocalic *b*, in a word such as "aber" (but) in careless, familiar, or tired speech, are used for this function. Not only emotional but also social styles of speech can be characterized by stylistic variants: it is possible to have an uneducated, a cultured, and a stylistically neutral variant of the same phoneme coexist in one language. These variants reveal the degree of education or the social class of the speaker. Stylistic variants on their part can consequently be divided into emotional or pathognomic and physiognomic variants. However, none of these aspects is important with respect to stylistically irrelevant optional variants. The stylistically irrelevant optional variants have no function whatever. They replace one another quite arbitrarily, without any change in the expressive or the conative function of speech. In Kabardian, for example, the palatal occlusives are sometimes pronounced as *k* sounds and sometimes as *tʃ* sounds: one and the same Kabardian pronounces the word "gane" (shirt) sometimes as *ḡane* and sometimes as *ʒane*, without noticing any difference and without thereby producing any stylistic or emotional coloration.²

As already stated above (Introduction, sec. 2), one of the tasks of phonostylistics is to differentiate and systematize the stylistic variants. From the point of view of phonology in the narrower sense, that is, from the point of view of the phonology of representation, both the stylistically relevant and the stylistically irrelevant optional variants can be grouped under the general concept of optional variants. It should be kept in mind that from the point of view of representational phonology the "variant" is a purely negative concept: a relation of variance exists between two sounds if they cannot be used to differentiate lexical meaning. The question of whether or not the difference between these two sounds has any other function, such as an expressive function or an appeal function, is not part of phonology in the narrower sense but belongs to phonostylistics. All optional phonetic variants owe their existence to the fact that only part of the articulatory properties of each speech sound is phonologically relevant. The remaining articulatory properties of a speech sound are "free" with regard to distinctiveness, that is, they can vary from case to case. The question of whether or not this variation is used for purposes of expression and response is of no importance from the point of view of representational phonology, especially from the standpoint of word phonology.

RULE II.—*If two sounds occur in exactly the same position and cannot be interchanged without a change in the meaning of the words or without rendering the word unrecognizable, the two sounds are phonetic realizations of two different phonemes.*

Such a relationship exists, for example between the German *i* and *a* sounds: in a word such as "Lippe" (lip) the substitution of *a* for *i* would result in a change in meaning: "Lappe" (Lapp). A word like "Fisch" (fish) would be rendered unrecognizable by such a substitution ("Fasch"). In Russian the sounds *ä* and *ö* occur exclusively between two palatalized consonants. Since their interchange would either change the lexical meaning ("t'ät'ä" [daddy]: "t'öt'ö" [aunt]) or render the words unrecognizable ("id'öt'i [you go]: "id'ät'i??"; "p'ät'" [five]: "p'öt'??"), they are interpreted as realizations of different phonemes.

The degree to which words are "made unrecognizable" may vary considerably. By substituting *f* for *pf* initially in German, words usually do not become unrecognizable to the degree they would by a substitution of *a* and *i*. In a large part of Germany speakers of literary German systematically replace any initial *pf* by *f*. Nevertheless, they are understood without any difficulty by all other Germans. However, the occurrence of such pairs as "Pfeil"/"feil" (arrow/for sale), "Pfand"/"fand" (pawn/found), "Pfad"/"fad" (path/stale), "hüpfte"/"Hüte" (jumped/hip), "Hopfen"/"hoffen" (hop/hope) provides proof that in literary German *pf* and *f* must be regarded as different phonemes even in initial position; further, that those educated German speakers who replace initial *pf* by *f* actually do not speak correct literary German but a mixture of literary German and their native dialect.

RULE III.—*If two sounds of a given language, related acoustically or articulatorily, never occur in the same environment, they are to be considered combinatory variants of the same phoneme.*

Three typical cases can be distinguished

a. A given language has, on the one hand, a whole class of sounds (α' , α'' , α''' , . . .) which occur only in a specific position, and on the other, only one sound (α) which never occurs in just this position. In this case the sound α can only be in a relation of variance with that sound of class α' , α'' , and α''' to which it is most closely related acoustically or articulatorily. Example: In Korean *s* and *r* do not occur in final position, while *l* is found only in that position. Since *l* as a liquid is obviously more closely related to *r* than to *s*, *l* and *r* can here be regarded as combinatory variants of a single phoneme.

b. A given language has one series of sounds that occurs only in a specific position and another series that cannot occur in just that position. In this case a relation of combinatory variance exists between every sound of the first series and that sound of the second series which is most closely related

to the former acoustically or articulatorily. Examples: In Russian the sounds *ö* and *ä* occur only between two palatalized consonants, while the sounds *o* and *a* are not found in this position. Since *ö* as a half-open, rounded vowel is more closely related to *o* than to *a*, and since, on the other hand, *ä* as a very open unrounded vowel is closer to *a* than to *o*, *o* and *ö* are regarded as combinatory variants of one phoneme ("O"), and *a* and *ä* as combinatory variants of another phoneme ("A"). In Japanese the sounds *c* (*ts*) and *f* occur only before *u*, while *t* and *h* are not permitted before *u*. Of these sounds *t* and *c* (*ts*) are the only voiceless dental occlusives, *h* and *f* the only voiceless spirants. *t* and *c* must therefore be regarded as combinatory variants of one phoneme, *h* and *f* as combinatory variants of another phoneme.

c. A given language has only *one* sound that occurs exclusively in a specific position, and *one* other sound that does not occur in that position. In this case the two sounds can only be considered combinatory variants of a single phoneme provided they do not form an indirect phonological opposition. Thus, for example, the German sounds *h* and *ŋ* ("ng") are not combinatory variants of a single phoneme but representatives of two different phonemes, although they never occur in the same position (see p. 33 above). In Japanese, on the other hand, *g* which is only found word-initially and *ŋ* which can never occur in that position are considered combinatory variants of a single phoneme: they are the only voiced gutturals of Japanese, that is, they have certain common properties that distinguish them from all other sounds in Japanese.³

RULE IV.—*Two sounds that otherwise meet the conditions of Rule III can still not be regarded as variants of the same phoneme if, in a given language, they can occur next to each other, that is, if they are part of a sound sequence in those positions where one of the sounds also occurs in isolation.*

For example, in English *r* can occur before vowels only, *ə*, on the other hand, does not occur before vowels. Since *r* is produced without any noise of friction or explosion, and *ə* is produced with a rather indeterminate degree of opening and timbre, one might be tempted to consider English *r* and *ə* as combinatory variants of the same phoneme. However, this becomes impossible due to the fact that in such words as "profession" (pron. "prəfeʃn") the *r* and *ə* sounds occur in succession and that there are other words in which *ə* occurs in isolation in the same environment; for example: "perfection" (pron. "pəfekʃn").

The phonetic variants are therefore either optional or constant. In the latter case they can, of course, only be combinatory. But in addition there are also optional combinatory variants. For example, in Russian the

phoneme "j" is realized as a nonsyllabic *j* after vowels, but after consonants sometimes as *j* and sometimes as a spirantal *j*. In this case the two variants are optional. In certain Central German dialects *t* and *d* coalesce phonologically, that is, only one phoneme is found in these dialects, which in most positions is optionally realized sometimes as a *t* and sometimes as a *d*. After nasals, however, only *d* occurs. For example: "tinde"/"dinde" = standard German "Tinte" (ink).

We have seen above that some of the optional variants, namely, the so-called "stylistic variants," fulfill specific functions on the plane of appeal or the plane of expression (see pp. 43 f.). The function of the combinatory variants lies entirely on the plane of representation. They are, so to speak, phonological auxiliary devices either signaling a word or morpheme boundary or the neighboring phoneme. We will discuss their function as boundary signals (*Grenzsignale*) in its appropriate place, when we examine the delimitative function of sound (see pp. 273 ff.). As regards the signaling of neighboring phonemes by combinatory variants, this is by no means a superfluous, though not necessarily an indispensable, function. In fast and unclear speech the realization of a phoneme can lose its identity completely. It is therefore always good if this identity finds additional expression through a special marking in the realization of the neighboring phoneme. But this can only be the case if the particular realization of the adjacent phoneme occurs not only in fast speech but whenever the two phonemes in question occur next to each other. Only then does such special realization leave an imprint on the consciousness and become an actual signal for the immediate proximity of the particular phoneme. For example, the articulation of Japanese *u* is not very distinctive in itself: the lips participate only slightly, and its duration is so short that in fast speech the vowel is not pronounced at all. Under these circumstances it is very welcome for communication that certain Japanese phonemes have special combinatory variants before *u*, namely, the variant *c* in the case of *t*, and the variant *φ* in the case of *h*. If the *u* should not be perceived, one would still be able to surmise from the realization of the preceding phoneme that a *u* was intended to follow.⁴

2 FALSE EVALUATION OF THE PHONEMES OF A FOREIGN LANGUAGE

The phonological system of a language is like a sieve through which everything that is said passes. Only those phonic marks that are relevant for the identity of the phoneme remain in it. The rest falls down into

another sieve in which the phonic marks, relevant for the function of appeal, are retained. Still further down is yet another sieve in which those features are retained which are characteristic for the expression of the speaker, etc. Starting from childhood, each person becomes accustomed to analyzing what is said in this fashion. This analysis is carried out quite automatically and unconsciously. The system of "sieves," however, which makes such analysis possible, is structured differently in each language. Each person acquires the system of his mother tongue. But when he hears another language spoken he intuitively uses the familiar "phonological sieve" of his mother tongue to analyze what has been said. However, since this sieve is not suited for the foreign language, numerous mistakes and misinterpretations are the result. The sounds of the foreign language receive an incorrect phonological interpretation since they are strained through the "phonological sieve" of one's own mother tongue.

Here are some examples. In Russian all consonants are divided into two classes. They are either palatalized or nonpalatalized, the latter being velarized. For most consonants, membership in one or other of these classes is phonologically relevant. A Russian speaker immediately perceives which consonant in a Russian word is palatalized and which is not. The contrast between palatalized and nonpalatalized consonants is emphasized additionally by the fact that all vowels have specific combinatory variants depending on the class membership of the preceding or following consonants. The phoneme "i," for example, is realized as a pure *i*, that is, as a "high, tense front vowel" only when it occurs initially or after a palatalized consonant. Speakers of Russian also transfer this peculiarity to foreign languages. If a Russian hears a German word containing a long *i*, he assumes that he has "misheard" the palatalization of the preceding consonant: *i* for him is a signal of palatalization of the preceding consonant. Such palatalization must take place. If a Russian speaker does not hear it, he assumes this can only have been due to an acoustic delusion. When a Russian has to pronounce a German word that he has heard, he palatalizes the consonant before the *i*: "l'ige," "d'ip," "b'ibel," "z'iben," (lie down, thief, Bible, seven). He does this not only because he is convinced that it must be so, but also because he cannot pronounce a close, tense *i* after a nonpalatalized consonant. German short *i* is lax. There is no exact equivalent for this lax *i* among the Russian stressed vowels. Consequently a Russian speaker cannot associate this sound with the palatalization of the preceding consonant. A Russian hears that the initial consonants in German words, such as "Tisch," "Fisch" (table, fish) are not palatalized. But a nonpalatalized consonant is velarized for a Russian, and after a velarized consonant the Russian phoneme *i* is realized as *ui*, an unrounded

why not?

tense high central or back vowel. These words are consequently pronounced as *tuiš* and *fuš* by a Russian speaker. What has been said is, of course, true only of Russian speakers who have just started to learn German. These difficulties are overcome in time, and the correct German pronunciation is acquired. Something of a "Russian accent" nevertheless remains, and even after long years of practice a Russian who otherwise speaks correct German will palatalize his consonants somewhat before a long *i* and will slightly back his articulation of short *i*.

Another example: standard Russian has a vowel *ə* that can be described as an unrounded mid back (or back-central) vowel. This vowel occurs only after consonants, that is, on the one hand in posttonic syllables, on the other in pretonic syllables, with the exception of directly pretonic syllables. For example: "də:mə" (at home), "pətəmu:" (therefore). Since the vowel *ə* in unstressed syllables occurs only in initial position (e.g., "əd'ino:kəj" [lonely]), after vowels (e.g., "vəšrūžat" [to offend]), or after consonants in directly pretonic syllables (e.g., "dāməj" [home]), a relation of combinatory variance exists between *ə* and unstressed *ä*. Bulgarian also has a vowel *ə* with acoustic-articulatory properties approximately identical to those of Russian *ə*. However, this vowel in Bulgarian not only occurs in unstressed but also in stressed syllables: "pət" (way), "kəštə" (house), etc. Russians who learn Bulgarian find it extremely difficult to pronounce the Bulgarian stressed *ə*. They substitute *a*, *u*, and a mid *e*. Only with great effort and after long practice are they able to pronounce it halfway correctly. The fact that *ə* occurs in their own mother tongue does not facilitate the correct pronunciation of the Bulgarian *ə*. On the contrary, it impedes it. For although the Russian *ə* sounds almost like the Bulgarian *ə*, it has a completely different function: the former calls attention to the relative position of the stressed syllable. The fact that it is not stressed is therefore not accidental but has a reason for existence, while the *ə* in Bulgarian may be stressed. For this reason a Russian speaker is able to identify the stressed Bulgarian *ə* with any vowel of his mother tongue except with *ə*.

The Russian stressed vowels are not only more forceful but also longer than the unstressed vowels. One can say that in Russian all stressed syllables are long, all unstressed syllables are short. Quantity and stress parallel each other and form an indivisible unity for speakers of Russian. The stressed syllable can occur word-finally, initially, or medially. Its position is frequently important for the meaning of the word "päl'it'i" (you ignite, pres. indic.), "pal'it'i" (ignite, imper.), "pal'it'ì" (fly). In Czech quantity and stress are distributed quite differently. Stress always occurs on the first syllable of a word and is hence nonsignificant for the differentiation of lexical meaning: it merely signals the beginning of a word.

Quantity, on the other hand, is not bound to a particular syllable. It is free, and often serves to differentiate the meaning of words ("piti" [drink]: "piti" [the drinking]). This presents a source of great difficulty for Russians learning Czech and for Czech speakers studying Russian. A Russian will either stress every initial syllable of Czech words but then also lengthen it or he will shift the accent to the first long syllable. Thus he will pronounce instead of "kùkàtko" (opera glasses) and "kàbàt" (skirt) either "kùkatko" and "kàbàt" or "kukàtko" and "kabàt." He has difficulty separating quantity from accent because for him both are the same. Czech speakers who speak Russian usually interpret the Russian accent as a long quantity. They stress the first syllable of every word in Russian sentences and they pronounce etymologically stressed syllables with lengthening. A Russian sentence such as "pr'in'isit'ì mn'è stàkàn vòdù" (bring me a glass of water) in the mouth of a Czech becomes "priñesiti mnë stàkàn vòdì." All this is, of course, only true as long as the student has not yet had sufficient practice. Gradually these rather gross mistakes disappear. But some characteristic features of a foreign accent remain: a Russian, even when he speaks Czech well, will always stress the first syllable somewhat, especially when the words are long and have the accent on one of the final syllables, such as "gosudàrstvo" (the state) or "konnozavòdstvo" (studs), and place the accent incorrectly. Czech and Russian speakers retain their differences of interpretation of quantity and stress even when they have a good command of both languages. This is demonstrated particularly clearly in the interpretation of foreign poetry.⁵ Russian metrics are based on the regular alternation of stressed and unstressed syllables, stressed syllables, as already mentioned, being long, unstressed syllables short. Word boundaries can occur anywhere in the verse and the continuous irregular rearrangement of word boundaries serves to animate and vary the verse structure. Czech verse is based on a regular distribution of word boundaries. As was already mentioned, the beginning of each word is emphasized by an increased loudness of voice. Long and short syllables, on the other hand, are irregularly distributed in the verse and their free rearrangement serves to animate the verse. A Czech who hears a Russian poem will regard its meter as quantitative and the entire poem as rather monotonous. A Russian, on the other hand, who hears a Czech poem for the first time will be completely disoriented and will not be able at all to indicate in which meter it was composed. The rhythm of the stressed initial syllables intermingles with the irregular alternation of long and short syllables. Both sets of rhythm become confused and disturb and paralyze each other, so that the Russian does not gain any rhythmic impression at all. Upon better acquaintance with the language, these first

impressions will be weakened. A Czech will nevertheless often remain incapable of really appreciating the aesthetic value of Russian verse; and the same can also be said of a Russian with respect to Czech poetry.

The number of such examples could easily be multiplied. They prove that the so-called foreign accent does not at all depend on the inability of a particular foreigner to pronounce some sound, but rather on his incorrect evaluation of this sound. And such incorrect evaluation of sounds in a foreign language is conditioned by the differences between the phonological structure of the foreign language and the mother tongue of the speaker. Mistakes in pronunciation are mostly not different from other typical mistakes in the speech of a foreigner. Any Hungarian is familiar with the opposition between male and female. But for him this difference belongs to the sphere of the lexicon, not to the sphere of grammar. When he speaks German, therefore, he confuses "der" (masc. def. art.) and "die" (fem. def. art.), "er" (he) and "sie" (she), etc. Likewise a Russian speaker is familiar with long, tense *i*, but for him it is a combinatory variant of the phoneme *i* which signals palatalization of the preceding consonant. Consequently, when he speaks German he palatalizes all consonants before the *i*.

3 INDIVIDUAL PHONEMES AND PHONEME COMBINATIONS

A Monophonemic Evaluation

It is not always easy to distinguish between a single phoneme and a combination of phonemes. The sound flow of the concrete speech event is an uninterrupted movement. From a purely phonetic point of view, that is, ignoring the linguistic function of sound, it is not possible to say whether a particular segment of this sound continuum is to be considered "monophonemic," that is, a single phoneme, or "polyphonemic," that is, a combination of phonemes. Here, too, there are definite phonological rules that one must follow.⁶

In general one can say that in a given language only those combinations of sound *can* be interpreted as monophonemic whose constituent parts are not distributed over two syllables, and which are, further, produced by a homogeneous articulatory movement. Their duration must not exceed the normal duration of single sounds. A combination of sounds that fulfills these purely phonetic prerequisites is only "potentially monophonemic." However, it will also be interpreted as being *actually* monophonemic, that is, as the realization of a single phoneme, if in accordance with the rules of the particular language it is treated as a single phoneme, or if the

general structure of the phonemic system of that language calls for such an evaluation. A monophonematic evaluation of a combination of sounds is particularly *favoured* when its constituent parts cannot be taken as the realization of any other phonemes of the same language. Accordingly the phonetic prerequisites and the phonological conditions governing the monophonematic evaluation of a combination of sounds can be summarized by the following six rules.

RULE I.—*Only those combinations of sound whose constituent parts in a given language are not distributed over two syllables are to be regarded as the realization of single phonemes.*

In Russian, Polish, Czech, etc., where both constituents of the sound combination *ts* always belong to the same syllable, this combination of sounds is interpreted as a single phoneme (*c*). Examples: Russian “*ce-laj*” (entire), Polish and Czech “*co*” (what); Russian “*l’i-co*” (face), Polish “*pla-ce*” (I pay), Czech “*vi-ce*” (more); Russian “*ka-n’ec*,” Polish “*ko-n’ec*,” Czech “*ko-nec*” (end). In Finnish, however, where this sound combination occurs only medially, with *t* closing the preceding syllable, *s* beginning the following syllable (“*it-se*” [self], “*seit-se-man*” [seven], etc.), it is regarded as the realization of the phoneme sequence *t + s*. In Russian, Polish, and Czech, in cases where the combination “vowel + nonsyllabic *i*” occurs before a vowel, the *i* attaches to the following vowel and forms the onset of the following syllable (Russian “*zbru-jä*” [harness of horses], Czech “*ku-pu-je*” [he buys], etc.). In these languages such combinations are consequently considered the realizations of the phoneme sequence “vowel + *j*,” even in cases where the entire sequence is monosyllabic (e.g., Russian “*daj*” [give] = phonol. “*daj*”). In German, on the other hand, where the *i* and *u* diphthongs are not distributed over two syllables before vowels, for example, “*Ei-er*,” “*blau-e*,” “*mistrauisch*” (eggs, blue, distrustful), these diphthongs appear to be monophonematic.⁷

RULE II.—*A combination of sounds can be interpreted as the realization of a single phoneme only if it is produced by a homogeneous articulatory movement or by the progressive dissolution of an articulatory complex.*

Diphthongs are very often regarded as unitary phonemes. This is most clearly illustrated in English, where, for example, *ei* and *ou* are regarded as uniform phonemes: as is known, English speakers also pronounce the long *e* and *o* of German as *ei* and *ou* because they confuse the German monophthongs with their own diphthongal phonemes.⁸ J. Vachek noted

(in “Über das phonologische Problem der Diphthonge,” *Práce z vědeckých ústavů filosof. fakulty Karlovy university*, XXXIII [Prague, 1933]) that in English as well as in other languages only the so-called diphthongs of movement (*Bewegungsdiphthonge*) are regarded as monophonematic, that is, only those diphthongs that are produced during the change in position of the vocal organs. Neither the point of departure nor the end-point of this change is important, only the general direction of movement. ^{basis for perception of diph.?} This proposition must not be inverted (as is done by Vachek, incorrectly in my opinion): not every diphthong of movement has to be evaluated as monophonematic. ^{??} But if a diphthong is regarded as monophonematic, it must be a diphthong of movement. ^{??} In other words, it must involve a homogeneous articulatory movement. ^{cf. acoustic studies} A combination, such as *aia* or *aiu*, cannot be considered monophonematic in any language because it involves two differently oriented articulatory movements. The so-called transitional sounds between two consonants are “counted” as belonging to either the preceding or the following consonant, so that a “nuclear sound” together with its adjacent transitional sound is considered a unit. Yet in a combination such as “*s + transitional sound from s to k + s*” the transitional sound would be considered the realization of a specific phoneme, namely, “*k*” (even if a genuine *k* articulation would not be effected) because the articulatory movement in this case would not be homogeneous. ^{what's homogeneous movement}

Looking at the typical cases of monophonematic interpretation of groups of consonants, one can easily see that this always involves the gradual dissolution of an articulatory complex. In the case of “affricates” an “occlusion” is first relaxed to form a stricture, and finally released completely. In the case of aspirates the oral closure is released with a plosive effect, but the larynx still remains for some time in the position it had during oral closure. The aspiration following the stop is the acoustic result. In the case of the “glottal occlusives” the glottal closure is formed simultaneously with the oral closure. After dissolution (plosive release) of the oral closure, the closure of the glottis at first still continues and is then also released with a plosive effect. The acoustic result is the sudden occurrence of a glottal stop, and so on. Those palatalized and labialized consonants that leave the acoustic impression of being combinations of consonants with a very short, incompletely formed *i* (*j*) or *u* (*w*) show the same kind of a not quite simultaneous dissolution of an articulatory complex. All these cases involve a homogeneous articulatory movement in the same direction, that is, in the direction of “dissolution,” or of return to a neutral position. A sequence of sounds such as *st*, on the other hand, could never be considered monophonematic because it involves the progressive “movement” toward an occlusion that is subsequently “dissolved” ^{*}

(released with a plosive effect). Nor can a sequence such as *ks* be regarded as monophonematic because it requires two different articulatory movements.⁹

RULE III.—*A combination of sounds can be considered the realization of a single phoneme only if its duration does not exceed the duration of realization of the other phonemes that occur in a given language.*

From a practical point of view, this rule is less important than the two preceding rules. Nevertheless, it should be emphasized that the duration of the Russian affricates *c* and *č*, for example, normally does not exceed that of the other "short" consonants. In any case, it never reaches the normal duration of sequences such as *ks* and *kš*.¹⁰ Further, the duration of Czech *ou* exceeds the duration of the normal long vowels of the Czech language. This seems to be important for the polyphonematic interpretation of this diphthong.

The following rules state when articulatory complexes that are potentially monophonematic *must* actually be evaluated as monophonematic.

RULE IV.—*A potentially monophonematic combination of sounds, that is, a combination of sounds corresponding to the conditions of Rules I to III, must be evaluated as the realization of a single phoneme, if it is treated as a single phoneme; that is, if it occurs in those positions in which phoneme clusters are not permitted in the corresponding language.*

For example, many languages do not permit initial consonant clusters. If, in such languages, combinations of sound such as *ph*, *th*, *kh*, or *pf*, *kx*, *ts*, or *tw*, *kw*, etc., can occur initially, it is clear that they must be regarded as the realization of single phonemes (aspirates, affricates, labialized consonants, etc.). This is true, for example, of the combinations *ts*, *dz*, *tš*, *dž* in Tlingit,¹¹ Japanese, the Mongolian, Turko-Tatar languages; of *ph*, *th*, *kh*, *tsh*, *tšh* in Chinese; of *ph*, *th*, *kh*, *kx*, *ts*, *tš*, *tʰ*, *kʰ* in Avar,¹² and of many similar cases. German combines consonant plus *l* initially, as in "klar" (clear), "glatt" (smooth), "plump" (plump), "Blei" (lead), "fliegen" (fly), "schlau" (shrewd), or with *w*, as in "Qual" (torture), "schwimmen" (swim). But as regards combinations of "two consonants + *l* or *w*," only *špl* as in "Splitter" (splinter), *pfl* as in "Pflaume" (plum), "Pflicht" (duty), "Pflug" (plough), "Pflanze" (plant), and *tsiw* as in "zwei" (two), "zwar" (although), "Zwerg" (dwarf), "Zwinger" (arena), are permitted in initial position. Since, apart from *štr*, *špl*, and *špr*, groups of three consonants are not permitted in initial position in German words, it becomes necessary to regard German *pf* and *ts* as single phonemes.¹³

phonemically,
not phonetically

RULE V.—*A combination of sounds fulfilling the conditions of Rules I to III must be considered the realization of a single phoneme, if this produces symmetry in the phonemic inventory.* ??

In languages such as Chechen,¹⁴ Georgian, and Tsimshian,¹⁵ which permit consonant sequences in all positions, the sequences *ts* and *tš* must nevertheless be considered unitary phonemes (affricates), and not realizations of phoneme clusters. This is required by the entire context of the phonemic system: in these languages all occlusives occur in two forms, either with or without a glottal catch, whereas this opposition is not found with respect to the fricatives in these same languages. Since, in addition to *ts* and *tš* without a glottal catch, there also occur *tsʰ* and *tšʰ* (or in American transcription *tsʰ* and *tšʰ*) with a glottal catch, the latter are grouped with the stops (*p-pʰ t-tʰ, k-kʰ*), and the relation between *ts-s* or *tš-š* is completely parallel to that of *k-x*.

RULE VI.—*If a constituent part of a potentially monophonematic sound combination cannot be interpreted as a combinatory variant of any other phoneme of the same language, the entire sound combination must be considered the realization of a single phoneme.*

In Serbo-Croatian, and also in Bulgarian, the *r* is often found with a syllabic function. Usually this involves the combination of *r* plus a vocalic glide of indeterminate quality which sometimes occurs before and sometimes after the *r*, depending on the environment. In Serbo-Croatian such "indeterminate vowel" does not occur in any other position. The indeterminate vocalic glide that occurs before or after the *r* cannot be identified with any phoneme of the phonemic system, and the entire sequence of *r* plus (preceding or following) vocalic glide must be considered a single phoneme. Bulgarian, on the other hand, has an "indeterminate vowel" (usually transcribed by *ǎ*) which occurs also in other positions. For example: "kǎštǎ" (house) = "kǎštǎ"; "pǎt" (way) = "pǎt," etc. The transitional vowel to syllabic *r* in this case is considered a combinatory variant of the indeterminate vowel, and the entire sequence is regarded as polyphonematic (as *ǎr* or *rǎ*).

As a consequence of Rule VI, a potentially monophonematic sound combination must be considered a single phoneme if the only phoneme sequence for which it could be considered is realized by another combination of sounds which does not follow Rules I to III. Polish *č* (written *cz*), for example, which does not exceed a normal consonant in duration, and which in intervocalic position belongs entirely to the next syllable, must be considered the realization of a single phoneme because the phoneme cluster

$t + \text{ʃ}$ (written *dsz*, *tsz*, or *trz*) in Polish is realized by another sound combination. The duration of the latter exceeds that of a normal consonant, and in intervocalic position this sound sequence is occasionally distributed over two syllables. For example: "podszywać," pronounced *pot-ʃywać*." In Russian, too, the phoneme clusters $t + s$ and $t + \text{ʃ}$ are realized by sound combinations which in duration and relation to the syllable boundary are quite different from "c" and "č," which are interpreted as monophonemic. The glottalized palatal sibilant fricative of Western Adyghe ("Adyghe" or "Circassian"), for example, in such words as "ʃesʹaʃʹe" (peculiar), is realized quite differently from the combination "palatal sibilant constrictive + glottal stop" in such words as "ʃesʹaʃʹ(e)" (gave to recognize). The former can therefore only be considered monophonemic. Examples of this type can easily be multiplied.

B Polyphonemic Evaluation

The polyphonemic evaluation of a single sound is exactly the opposite of a monophonemic evaluation of a sound combination. In almost all such cases a phoneme sequence consisting of a vowel plus a preceding or following consonant is realized either as the consonant alone or as the vowel alone. The former case can occur only when the "suppressed," that is, the unrealized vowel has a particularly slight degree of sonority in other positions and accordingly approximates a consonant from an acoustic and articulatory point of view. The second case, on the other hand, is possible only if the suppressed consonant in other positions is realized as particularly "open," that is, with as much sonority and as little friction as possible, and consequently approximates a vowel. The first case actually involves short or unstressed high or indeterminate vowels, the second sonorants (liquids, nasals, and w and j). These are the *phonetic prerequisites* for the polyphonemic evaluation of single sounds. The *phonological conditions* governing this phenomenon can all be summarized under the following rule.

RULE VII.—*If a single sound and a combination of sounds corresponding to the above phonetic prerequisites stand in a relation of optional or combinatory variance, in which the sound combination must be considered the realization of a phoneme sequence, the single sound must also be considered the realization of the same phoneme sequence.*

Three typical cases can be distinguished:

a. The particular single sound occurs only in those positions where the respective combination of sounds is not permitted. Examples: In

German syllabic l , m , and n occur only in unstressed syllables before consonants or in final position, while the sound sequences *el*, *em*, and *en* occur only in unstressed syllables before vowels. These sound sequences cannot be considered monophonemic since the syllable boundary lies between the ∂ and the following sonorant (see Rule Ia, above). Syllabic l , m , and n are therefore considered realizations of the phoneme sequences "*əl*, *əm*, and *en*." (This is, incidentally, often revealed in slow and clear speech.) In many Polish dialects, namely, those in which the "q" of literary Polish initially corresponds to ∂ and u or *om* and *um*, nasalized vowels occur only before constrictives. The combination "vowel + nasal," on the other hand, occurs before stops and vowels, and in final position. Since the sequence "vowel + nasal" does not fulfill any of the three requirements for monophonemic evaluation, and since its constituent segments represent independent phonemes in other positions, they are considered the realization of the phoneme sequence "vowel + nasal." Nasalized vowels in the respective dialects must therefore be considered realizations of the same phoneme sequence "vowel + nasal."

b. A particular single phone α only occurs in a specific sound combination ($\alpha\beta$ or $\beta\alpha$) in which it is considered a combinatory variant of a particular phoneme. It also occurs in another position in which the sound sequence $\alpha\beta$ or $\beta\alpha$ is not allowed: in this position the single phone α must then be regarded as replacing the entire sound sequence $\alpha\beta$ or $\beta\alpha$ and must consequently be regarded as the realization of the corresponding phoneme sequence. Examples: In the Russian sound sequence ∂l the tense ∂ is considered a combinatory variant of the phoneme "o." In addition to its occurrence in this sound sequence (and in the position before unstressed u , as in "pò-ùxù" [over the ear]), the only other occurrence of tense ∂ is in the word "sòncə" (sun). But since the sequence ∂l , as well as any sequence of "vowel + l ," never occurs before " n + consonant," the ∂ in "sòncə" is interpreted as substitution for the sequence ∂l . Phonologically the entire word is then regarded as *solncə*. The unstressed "ü" in Russian is realized as an \ddot{u} after palatalized consonants and after j , in all other positions as a u . For example, "jül'it'" (to turn and twist) is phonemically *jül'it'*; "t'ül'en'" (soul) is phonemically *t'ül'en'*. In cases where \ddot{u} in unstressed syllables occurs after a vowel it is regarded as a substitution for the phoneme combination "*jü*," which in that position cannot be realized in any other way. For example, "znäüt" (they know) is phonemically *znajüt*. In Czech the "i" after j and after the palatals t' , d' , and n' is realized as a tense vowel, after gutturals, dentals, and sibilants, on the other hand, as a lax vowel. In connected discourse the initial j of the sequence *ji* is suppressed, that is, it is not realized after a final consonant

of the preceding word. In this way tense *i* comes to occur directly after gutturals, dentals, and sibilants and is then regarded in that position as the realization of the phoneme sequence "ji." For example: Czech spelled "něco k jídlu" (something to eat), pronounced approximately as *ňecokǐdľu*; spelled "vytah ji ven" (he pulled her out), pronounced approximately as *vitaxiven*; spelled "už ji mám" (I already have her), pronounced approximately as *ušimām*, which is different from *ušimām*, spelled "uši mám" (I have ears), having a lax *i*.

c. In many languages where sequences of consonants are not permitted at all, or are only permitted in a certain position, for example, initially or finally, the high vowels may optionally be suppressed. The consonant preceding another consonant then is considered the realization of the sequence of "consonant + high vowel." In Uzbek, which does not permit consonant sequences in initial position, the *i* in unstressed initial syllable is usually suppressed. For example, the word "to cook" is pronounced *pširmoq*, but is evaluated as *pširmoq*.¹⁶ Japanese does not have any consonant sequences, with the exception of "nasal + consonant." Nor are consonants permitted in final position. However, in fast speech, especially after voiceless consonants, the vowel *u* is often suppressed. The preceding consonant then represents the combination "consonant + *u*." For example, "desu" (is) is pronounced *des*.

4 ERRORS IN MONOPHONEMATIC AND POLYPHONEMATIC EVALUATION OF THE SOUNDS OF A FOREIGN LANGUAGE

The rules governing monophonematic and polyphonematic evaluation refer to the structure of a given system and to the special role of the particular sound in this system. Sounds or combinations of sounds that are evaluated as monophonematic or polyphonematic in one language need not be considered such in other languages. But in the perception of a foreign language the "naive" observer transfers to the foreign language the phonic values that are the result of the relations existing in his own mother tongue. This, of course, leaves him with a quite incorrect impression of that language.

Evgenij L. Polivanov, in his article "La perception des sons d'une langue étrangère" (*TCLP*, IV, 79 ff.), gives a number of instructive examples. Japanese does not have any consonant sequences at all. Its high vowels are very short and can optionally be suppressed. Japanese speakers think that they also hear short high vowels between consonants and in final position in foreign languages. Polivanov illustrates this by the Japanese pronunciation of the Russian words "tak" (so), "put'" (way), "dar"

(gift), "kor'" (measles), as *taku*, *puč'i*, *daru*, *kor'i*. The point may be illustrated further by the Japanese pronunciation of such English words as club *kurabu*, film *hurumu*, cream *kurimu*, ski *suki*, spoon *supun*, etc. The Japanese *Kirisuto* for "Christ" and many other cases may be cited. (Also compare Henri Frei, "Monosyllabisme et polysyllabisme dans les emprunts linguistiques," in *Bulletin de la Maison franco-japonaise*, VIII [1936].) As a consequence of this interpolation between consonants and after final consonants of *u* and *i* (and of *o* after *t* and *d*), as well as of the confusion of *r* and *l*, it is very difficult to understand a Japanese trying to speak a European language. Only after long practice is a Japanese able to break away from such pronunciation. But he then often goes to the opposite extreme and suppresses the foreign *u*'s and *i*'s that are etymological: consonants followed by a *u* or *i* and consonants without following vowels are for a Japanese simply optional variants of a phoneme sequence. He finds it extremely difficult to get accustomed not only to relating a distinctive function to these supposed optional variants, but also to regarding them as single phonemes and not as realizations of a phoneme sequence. Another example given by Polivanov is the Korean treatment of the sequence "*s* + consonant." Contrary to Japanese, Korean permits certain consonant combinations, though only medially. The combination "*s* + consonant," however, is foreign to Korean as it is spoken today. When a Korean hears such a sequence in a foreign language, he interprets the *s* as a special kind of pronunciation of the following consonant which he is not able to imitate; and when he wants to pronounce the respective word, he omits the *s*: Russian "starik skazal" (the old man said) becomes *tarik kazal*. Edward Sapir (*Journal de psychologie*, XXX, 262) tells us that American students, who in phonetic studies became acquainted with the existence of glottal plosives, tend to hear this sound after every short, stressed final vowel of the foreign language. The reason for this "acoustic" delusion lies in the fact that in English all final stressed vowels are long and that persons whose mother tongue is English can conceive of a short vowel only before a consonant.

Whenever we hear a sound in a foreign language which does not occur in our mother tongue, we tend to interpret it as a sound sequence and to regard it as the realization of a combination of phonemes of our mother tongue. Very often the sound perceived gives reason for doing this since every sound is a sequence of "sound atoms." The aspirates actually consist of occlusion, plosion, and aspiration; the affricates, of occlusion and friction. It is therefore not surprising if a foreigner in whose mother tongue these sounds are not present, or where they are not considered monophonematic, regards them as realizations of phoneme sequences. Likewise,

it is quite natural that speakers of Russian and Czech consider the English long vowels, regarded as clearly monophonematic by English speakers, as diphthongs, that is, as combinations of two vowel phonemes. For these vowels are actually "diphthongs of movement." But the polyphonematic interpretation of foreign sounds is very often based on a delusion: different articulatory properties, which in reality occur simultaneously, are perceived as occurring in succession. Speakers of Bulgarian interpret German *ü* as *ju* ("juber" = "über" [over]), etc. They perceive the frontal position of the tongue and the protraction of the lips, which in German occur simultaneously, as separate stages. Ukrainians, to whom the *f* sound is unfamiliar, reproduce the unfamiliar *f* by *xv* (*Xvylp* = *Philip*). They interpret the simultaneous properties of *f*, that is, voiceless friction and labiodental position of articulation, as two successive stages. Many foreigners perceive Czech ř, an absolutely homogeneous sound, as the sound sequence rž. (This interpretation even found its way into the Czech grammar by the Parisian Slavist A. Mazon!)¹⁷ In reality ř is only an *r* with less amplitude in vibration of the tip of the tongue, so that a frictionlike noise resembling a *ž* is audible between the trills of the *r*.¹⁸ In some North Caucasian languages, such as Circassian, Kabardian, Artshi, and Avar, and in all languages of Western Daghestan, as well as in some American Indian languages and in some African languages such as Zulu, Suto, and Pedi, so-called voiced as well as voiceless "lateral spirants" occur. Foreign observers perceive the voiceless variety as *tl, kl, θl, xl, sl*, that is, voicelessness and lateral articulation are perceived as two successive phonemes.¹⁹ Examples of this kind can easily be multiplied. From a psychological point of view, these examples can be explained by the fact that the phonemes are not symbolized by sounds but by specific distinctive *sound properties*, and that a combination of such sound properties is interpreted as a combination of phonemes. However, since two phonemes cannot occur simultaneously, they must be interpreted as occurring in succession.

When learning a foreign language, one must fend against all these difficulties. It is not enough to get one's vocal organs accustomed to a new articulation. One must also get one's phonological consciousness accustomed to interpreting such new articulations correctly as either monophonematic or polyphonematic.

¹ Cf. N. S. Trubetzkoy, *Anleitung zu phonologischen Beschreibungen* (Brno, 1935).

² Cf. N. F. Jakovlev, "Tablicy fonetiki kabardinskogo jazyka," in *Trudy podrazrjada issledovanija severnokavkazskich jazykov pri Institute vostokovedenija v Moskve*, I (Moscow, 1923).

³ A fourth case can be mentioned. Sometimes a sound (α) occurs only in those positions in which two other sounds (α' and α'') are never found, α being closely related to α' as well as to α'' , so that α must be considered a combinatory variant of both α' and α'' . This is a case of neutralization of a phonological opposition. We will discuss this in detail later in its appropriate place (cf. pp. 77 ff.).

⁴ This special function of signaling the neighboring phoneme can be termed *associative* or *ancillary-associative*.

⁵ Cf. R. Jakobson, *O češskom stiche*.

⁶ In this connection, cf. N. S. Trubetzkoy's *Anleitung zu phonologischen Beschreibungen*, pars. 7-16, mentioned above.

⁷ It is, of course, true that in such German words as "Eier" (eggs), "blaue" (blue) transitional sounds may develop between the diphthong and the following vowel, which belong to the following syllables (so, for example, "æ̯-jər," etc.). However, what is important is that the diphthong still belongs entirely to the first syllable.

⁸ Cf. A. C. Lawrenson in *Proceedings of the Second International Congress of Phonetic Sciences*, p. 132.

⁹ What has here been said must not be misunderstood. Each phenomenon pertaining to speech sounds has two aspects, an articulatory and an acoustic one. The fact that "Rule II" is only expressed in articulatory terms is due only to the circumstance that there are not enough means in present-day scientific terminology to describe acoustic impressions with precision. However, there is no doubt that there is a precise acoustic equivalent for the distinction between homogeneous articulatory movements, just as these exist for the movements for the dissolution of a sound and the movements for the formation of a sound; so that it is possible to determine, without knowing the requirements of articulation simply on the basis of the acoustic impression, whether a combination of sounds is "potentially monophonematic" or not.

¹⁰ Cf. L. Ščerba, "Quelques mots sur les phonèmes consonnes composés," in *Mémoires de la Soc. de Ling. de Paris*, XV, 237 ff.

¹¹ Cf. John R. Swanton in *Bulletin of the Smithsonian Institution, Bureau of Ethnology*, XL.

¹² Cf. P. K. Uslar, *Etnografija Kavkaza*, I, "Jazykoznanije," III (*Avarskij jazyk*) (Tiflis, 1889).

¹³ Furthermore, in native German words combinations of the type "occlusive + constrictive" are not permitted initially. (Words such as "Psalm" (psalm), "Xanthippe" (proper name) clearly bear the mark of foreign origin.) This also influences the monophonematic interpretation of *pf* and *ts* (z).

¹⁴ Cf. P. K. Uslar, *Etnografija Kavkaza*, I, "Jazykoznanije," II (*Čečenskij jazyk*) (Tiflis, 1888).

¹⁵ Cf. Franz Boas in *Bulletin of the Smithsonian Institution, Bureau of Ethnology*, XL.

¹⁶ Cf. E. L. Polivanov in *TCLP*, IV, 83.

¹⁷ *Grammaire de la langue tchèque* (Paris, 1931), p. 14.

¹⁸ Cf. J. Chlumský, "Une variété peu connue de l'r lingual," in *Revue de phonétique* (1911).

¹⁹ N. S. Trubetzkoy, "Les consonnes latérales des langues caucasiennes septentrionales," in *BSL*, XXIII, 3, 184 ff.