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ROMAN JAKOBSON: WHAT HE TAUGHT US

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RLITZ

He does not shirk from tracing which he explains as *p'i* 'self' and fix and the alternation *r : t* is (*Writings* 2: 99).

ies are audacious and they may be one of the most daring ones are as an edifice on which it is now a method for uncovering the early prehistory of this language. They bear witness to a phenomenon to connect disparate bits of hypotheses. These gifts are also a brave work: in the space of less years bare the essentials of Aleut Nelson's inexpertly transcribed

overwhelmed by the voluminous work, in addition to his massive effort to deal with Rumanian and the "rewriters, or electric light," as I call them, elements in the domain of these which must have had the lowest possible interests are not, properly speaking, a monument to creative finesse.

Columbia University

ON THE ORIGINS OF THE DISTINCTIVE FEATURES

Morris Halle

In a television interview the physicist Richard Feynman likened the task of the physicist to that of a person attempting to discover the rules of chess solely from a study of the arrangement of pieces on boards randomly chosen from thousands of games. Feynman remarked that it would probably not be too hard to discover the fact that bishops move only on squares of a given color. He thought that it would be more difficult to discover that they move on the diagonal. Still more difficult would be the discovery of the rule of castling, since this involves the transposition of two pieces simultaneously, and to guess that such transpositions actually are allowed by the rules would no doubt require considerable imagination. This type of inspired guessing is the lifeblood of every science. Every major breakthrough in science has, therefore, had to await the appearance of a gifted individual who was able to solve the puzzle that had defeated all of his predecessors.

Since in the initial stages of even the most authentic advance the evidence and arguments that can be marshalled in its support are far from overwhelming, and since guesses are notorious for being far off the mark, the common scholarly reaction to news of a breakthrough is skepticism, if not downright hostility. While this critical attitude is clearly a necessary feature of the scientific enterprise, it does not fail to exact a toll that occasionally can be rather heavy. Gifted and productive scholars have found themselves at odds over a scientific matter with close friends, and there are well-known instances where genuine discoveries were not generally appreciated for many years. In his work on the foundations of phonetics/phonology, the science of the sounds of speech, Jakobson experienced both of these unfortunate reactions. N. S. Trubetzkoy, who was both a personal friend and scientific ally, found himself unable to accept Jakobson's suggestion of the crucial role played by binary features (oppositions) in all phonological systems. Moreover, this breakthrough as well as other proposals concerning the universal framework of features that Jakobson made in the 1920s and 1930s were almost totally disregarded until the 1950s, and to this day many students of language continue to view the sounds of speech in terms of a framework

originally proposed by Alexander Melville Bell in the 1860s, as if Jakobson had never written on this subject.

Linguistics of the nineteenth century had established sound change as one of the primary factors responsible for the evolution of languages. It had shown that there were regular correspondences between the sounds of a protolanguage and those of its different daughter languages. Nineteenth-century linguistics had accepted from a tradition that was several thousand years old the hypothesis that words and utterances are composed of discrete sounds, and that every language possesses its own repertory of sounds. But it looked upon these repertories as more or less accidental assemblies of entities, and although scholars would discuss the different sounds in an order that deviated from that in the standard alphabets, the deviation was not motivated by anything more profound than expository convenience. Jakobson's first major contribution to theory was the insight that the repertory of sounds of a given language is not just a random assembly of speech sounds, but that it is rather a highly structured collection of entities and that the structure determines to some extent what types of sounds can belong to the repertory of a given language. In a statement co-signed by N. S. Trubetzkoy and S. Karcevski and submitted in 1928 to the First International Congress of Linguists meeting in the Hague, as a response to the question: *What are the most appropriate methods for a complete and practical description of the phonology of a language?*, Jakobson wrote:

Every scientific description of the phonology of a language must above all include a characterization of its phonological system; i.e., a characterization of the repertory, pertinent to that language, of the distinctive contrasts among its acoustico-motor images (= sounds, phonemes — MH) (*Selected Writings* 1: 3).

The statement goes on to explain that

synchronic phonology of a language has been restricted, in a majority of instances, to a characterization of the sounds from the viewpoint of their production without taking into account their role in the phonological system. Hence the distinctive contrasts themselves are not adequately defined and distinguished from extra-grammatical differences ... However, this definition is not sufficient in itself: it is necessary to specify the types of phonological distinctive contrast. There are two fundamental types of contrast among the acoustico-motor images. These are ... the contrasts among disjoint images and the differences among correlative images ... It is important above all to regard the correlations as a special type of phonological contrast for certain of these correlations stand in a regular relationship with one another, i.e., the absence of a given correlation is regularly con-

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nected either with the absence, or the presence of another correla-
tion in the same system ... This regular connection among correla-
tions, readily explained from a psychological point of view, is one of
the most important factors of phonetic change: the loss or the
appearance of a correlation frequently imposes the need to recon-
struct radically the phonological system. It is thus that we pass from
the domain of synchrony to that of diachrony ...

(*Selected Writings* 1: 5)

Comparative (= historical — MH) phonology must formulate the
general laws that govern the relations among "correlations" within
the framework of a given phonological system. The antinomy
between synchronic and diachronic phonology is removed as soon
as phonetic changes are considered as a function of the phonologi-
cal system that undergoes them ... Historical phonetics is thus trans-
formed into a history of the evolution of the phonological system ...

(*Selected Writings* 1: 3)

This statement, which represents the entry of modern phonology on
the international scene, is noteworthy for a number of reasons. First, it
focuses on the structure of the phoneme system as an independent factor
in the phonology of a language above and beyond that of the individual
speech sounds. Second, it attributes a fundamental role in that system to
distinctive phonetic contrasts among phonemes; i.e., to such contrasts as
voiced-voiceless; nasal-oral; labial-dental-palatal-velar, etc., and thereby
shifts emphasis from the phoneme to the distinctive contrasts, a move
that ultimately led to Jakobson's important insight that phonemes are
(nothing but) bundles of distinctive features. Third, it singles out for
special attention binary contrasts such as voiced-voiceless and nasal-
oral, which in turn laid the foundation for Jakobson's demonstration a
decade later that all contrasts are binary.

The radical implications of this statement were only gradually appre-
ciated. What is particularly striking is that some of the implications
turned out to be unacceptable even to one of the co-signers of the state-
ment, Jakobson's collaborator, N. S. Trubetzkoy. In his letter of October
22, 1927, Trubetzkoy wrote: "I join fully in your proposal. I note only
that in view of the novelty of the problem itself and of a certain "back-
wardness" ... of those "competent reporters" who must examine this
proposal it is desirable to put the argumentation as clearly and as "finely
chewed" as possible Remember that linguists on the average are a
dull bunch, conservative and, moreover, unused to abstractions ... But
this is a question of form. With the essence I am unreservedly in agree-
ment and ask you to add my signature" (All quotations here and below
from Jakobson 1975).

Two days later (Oct. 24, 1927) Trubetzkoy wrote again about matters raised in the statement. He was concerned about the prominence that Jakobson had assigned to the binary correlations: "You consider, in essence, only the simplest case — the contrast of two correlative differences. But matters are considerably more complicated, when there is contrast not of two, but of three or more of such differences. Thus, e.g., all Caucasian languages ... contrast not "voiced-voiceless" but "voiced-voiceless-glottalized" ... There are languages with an even more complicated system of correlative differences".

In a comment on this letter written almost a half-century later, Jakobson recalls that he responded "that such allegedly multinomial correlations prove to form scales of binary oppositions" (Jakobson 1975, 110). This response did not satisfy Trubetzkoy, as we shall see below; although no extended discussion of the issue is to be found in his letters of the late 1920s. This was the time when Trubetzkoy was making one of his major phonological discoveries, namely, that the vowel systems of all languages that he was able to examine (62 according to his count — see Jakobson 1975, 119) exhibit a simple symmetrical structure where the axis of symmetry is constituted by the binary contrasts back-front and/or rounded-unrounded (see Trubetzkoy 1929). This discovery further justified the view expressed in the 1928 statement that the phoneme repertory of a language has intrinsic structure, and to Jakobson — though not to Trubetzkoy — it seemed to provide further support for the belief that "multinomial correlations" can be shown to "form scales of binary oppositions." In fact, during the 1930s Jakobson studied the problem of how to eliminate "multinomial correlations" from the system. Trubetzkoy apparently pursued a rather different line of thought, but for some reason this disagreement did not come to a head until 1935/6.

On November 26, 1935 Trubetzkoy sent Jakobson a long letter in which, among other things, he outlined a paper on phonological oppositions he was preparing for the French *Journal de Psychologie* (see Trubetzkoy 1936). In developing here a theory of oppositions Trubetzkoy proposed to carry out the demand of the joint declaration of 1928 (quoted above) "to specify the types of phonological distinctive contrasts" that are encountered in the languages of the world. Though he never made this explicit, Trubetzkoy's picture of these contrasts was basically that of the alphabet of the International Phonetic Association (IPA), which, then as now, was the most widely used tool for recording phonetic data.

Trubetzkoy wrote again about matters concerned about the prominence that he placed on the correlations: "You consider, in contrast of two correlative differences more complicated, when there is a difference of such differences. Thus, e.g., "voiced-voiceless" but "voiced-voiceless" with an even more compli-

This alphabet is in its essentials the work of Alexander Melville Bell, who devised it primarily as a practical tool for teaching speech to the deaf and for correcting speech impediments. Since a practical tool for teaching speech need not meet the same requirements as a scientific account of the speaking process, the IPA alphabet includes many traits for which no justification other than pedagogic effectiveness and convenience is offered. Thus, for example, in addition to many binary attributes such as voiced-voiceless; nasal-nonnasal; pharyngealized-nonpharyngealized; labialized-nonlabialized, the IPA alphabet includes a number of multi-valued phonetic properties of which the most important are, no doubt, the points of articulation of the consonants and the distinction in the height of the tongue body found in the vowels. Moreover, in the IPA alphabet, vowels are characterized in terms of the location of the tongue body (or, according to some phoneticians, the highest point of the tongue arch (Wood 1982)), whereas the consonants are described in terms of where, along the stationary portion of the vocal tract, the tract is maximally constricted (point of articulation). The difference is significant: for vowels the instructions focus on where a given articulator (i.e., the tongue body) is placed, whereas for consonants the instructions focus exclusively on where the cavity is maximally narrowed without regard to the articulator that effects the narrowing.

In a practical teaching device such asymmetries are readily justified on grounds of pedagogic expediency. In a scientific account, by contrast, they require serious discussion since it is surely not self-evident that the phonetic contrasts in the vowels are of a fundamentally different kind than those in the consonants. (Are not both types of sounds produced by the same anatomical structures?) Curiously these issues have attracted little attention among linguists and phoneticians, and Trubetzkoy, like most linguists, accepted the adequacy of the IPA treatment of vowels and consonants (see his letter of August 17, 1930 in Jakobson 1975, 167). The paper that he was preparing for the *Journal de Psychologie* was thus an attempt at a formal characterization of the different types of phonetic contrasts specifically recognized in the IPA alphabet. Trubetzkoy proposed to distinguish *bilateral* oppositions, which have only two members, from *multilateral* oppositions, which have more than two members. A typical example of a bilateral opposition is the opposition voiced-voiceless whereas that of a multilateral opposition is the point of articulation of consonants. He further drew a distinction between *isolated* and *proportional* oppositions, basing it on the fact that some oppositions are represented within a phonological system by a single pair of phonemes; e.g., that of [r] : [l],

most a half-century later, Jakobson allegedly multinomial correlations" (Jakobson 1975, 110). as we shall see below; although he found in his letters of the late 1920s that he was making one of his major contributions to the vowel systems of all languages according to his count — see Jakobson 1975, 110. The structure where the axis of binary contrasts back-front and/or high-low (Jakobson 1929). This discovery further justified the phoneme repertory proposed to Jakobson — though not to the support for the belief that he had found to "form scales of binary oppositions" from the system. Trubetzkoy followed a different line of thought, but for some time he was a head until 1935/6.

Trubetzkoy sent Jakobson a long letter in 1935 in a paper on phonological oppositions in the *Journal de Psychologie* (see Trubetzkoy 1935, 110). The theory of oppositions Trubetzkoy proposed in the joint declaration of 1928 was based on the phonological distinctive contrasts of the world. Though he was not the discoverer of these contrasts was based on the International Phonetic Association's widely used tool for recording

while others have many representatives in the system; e.g., that of voiced:voiceless. Orthogonal to this fourfold classification of oppositions is the ternary categorization of oppositions into: *privative-gradual-equipollent*. Privative oppositions are characterized by the presence of a distinctive mark in one set of sounds and by the absence of that mark in their unmarked cognate; exemplified once again by the opposition voiced:voiceless. Gradual oppositions are actualized so that a given property appears to a greater vs. lesser extent in contrasting phonemes: an example of a gradual opposition is tongue height in vowels which is greatest in [i], less in [e] and least in [æ]. Equipollent oppositions are implemented not by degrees or presence of a given phonetic property such as tongue height or voicing, but by two distinct phonetic properties, such as we find in the case labial vs. dental point of articulation. These three classificatory parameters define twelve different types of opposition, of which the binary correlations are one, i.e., they constitute the class of bilateral, proportional and privative oppositions.

Jakobson, who had understood the inadequacy of the IPA alphabet since the early 1920s, when he attended lectures of the phonetician J. Chlumský (personal communication), was apparently upset by this blithe acceptance of the IPA alphabet on the part of his friend and reacted to it by lapsing into silence. It was only five months later, in April 1936 that Jakobson got in touch with Trubetzkoy, who responded with great warmth: "You have greatly cheered me with your letter. I had already imagined that you were planning to move to Russia and in view of this have cut off relations with me as these might have compromised you" (p. 356). On June 1, 1936, Trubetzkoy returns to the issue again, responding to a letter from Jakobson the text of which has not survived: "Your objections to my article I do not fully understand. Inasmuch as the article is printed in a psychology journal, it was necessary to indicate to psychologists what might be of interest to them in all this — except for this there is no psychologism (in the article — MH). As regards violations of the terminology, if any have taken place, these are the minimum necessary. Part of it was discussed with you. Moreover, either in October or November (see above — MH) I wrote you a long letter with a detailed exposition of the article and with references to the new terminology. If you had replied to that letter I would have taken your indications into account. But 'silence is a sign of agreement'" (p. 359). In a footnote Jakobson comments: "Actually, NT's new attempt toward a classification of phonological oppositions produced a serious disagreement between him and R. J., which the two animatedly discussed during their Brno weekend (June 20–21, 1936 — MH)."

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Though the personal relations between Trubetzkoy and Jakobson were little affected by it, the theoretical disagreement remained unresolved at the time of Trubetzkoy's death in June 1938. In fact, Jakobson's last meeting with Trubetzkoy, which took place in Vienna on the weekend of February 12, 1938, and thus coincided with Austrian chancellor Schuschnigg's fateful meeting with Hitler at Berchtesgaden, was devoted to a discussion of Jakobson's (1938) important paper on the phonological classification of consonants, where Jakobson demonstrated that the multivalued point of articulation feature was actually a conglomerate of a number of binary features, showing thereby that all phonologic oppositions are binary. In view of the political situation as well as Trubetzkoy's poor health it is hardly surprising that no account of these discussions was given in Trubetzkoy's last book, *Grundzüge der Phonologie*, where the elaborate classification of Trubetzkoy (1936) is reproduced almost verbatim. (Jakobson comments on these events in Jakobson and Pomorska (1983), pp. 28-34.)

Jakobson's radical alternative was published after Trubetzkoy's death, in a communication to the Third International Congress of Phonetic Sciences, (Jakobson 1938) where a systematic attempt is made to show that all phonetic contrasts are binary and that the same contrasts underlie both vowels and consonants, and, moreover, that the phonetic framework incorporating these modifications accounts for all facts at least as well as the framework it has come to replace.

Jakobson begins his demonstration with an analysis of the Turkish vowel system which he characterizes in terms of the three binary oppositions: open-close; palatal-velar (= front-back); rounded-unrounded. He next describes the acoustic correlates of the three oppositions, arguing that the open-close contrast corresponds to greater vs. lesser acoustic perceptibility (loudness), while velar-palatal and rounded-unrounded correspond to distinct differences in the acoustic spectrum, which he characterizes as *grave* vs. *acute*. Jakobson then remarks that almost all phonetic oppositions are known to be binary. The major exception to this is the point of articulation which, as Jakobson then proceeds to show, can readily be analyzed as being composed of a number of binary oppositions. Noting that most languages distinguish four points of articulation, Jakobson writes: "Ordinarily one attempts ... to order these consonants in accordance with the location of their point of articulation, so that the series is terminated by the velars at one end and by the labials at the other. But how is one then to explain a phenomenon, so frequent and wide-spread among the languages of the world, as the

change of velars into labials or vice versa ...? The principle of the extremes that touch has been invoked (here), but unless this be mysticism or pure arbitrariness, one must ask whether these two extremes are united by means of a *genus proximum*, opposed to all other consonants. It turns out that the velars and labials obtain their distinctive quality from their long and undivided oral resonator, whereas in the case of the palatals and dentals, the tongue divides the oral cavity into two short resonators Similarly, there is a specific difference which contrasts the velars and palatals including here all hushing sounds, to the labials and dentals. By classing the former under the heading of posterior, and the latter under that of anterior, one is in a position to state the following formula: the point of articulation of posterior (consonants) is located behind, whereas that of the anterior (consonants) is in front of their only or dominant resonator.¹ Thus, the differences among the four types of consonants (velars, palatals, dentals and labials) are in fact reduced to two oppositions of phonological qualities which we have just defined from the viewpoint of their articulation ...” Jakobson remarks that in many languages each of the four points of articulation exhibits subsidiary distinctions. Thus, many languages distinguish bilabials from labio-dentals, linguo-dentals [θ, v] from apicals [s, z], palatal [c, j] from palato-alveolar [ʃ, ʒ], velars from uvulars. It is significant that all of these splits are binary in character, and that they involve a single phonetic distinction, that between a “strident” rather noisy sound [f, s, ʃ, χ] vs. a “dull” (Fr. *mar*) much less noisy sound [ϕ, θ, ç, x]. Jakobson therefore proposes that the phonetic framework be extended by the addition of a new opposition “strident-dull”.

In this way Jakobson completes the first of the two tasks he has set himself; namely to demonstrate that all phonetic oppositions encountered in the different languages of the world are binary. His second task is to establish that a single set of oppositions underlies both consonants and vowels. Jakobson points out that velars are more perceptible (louder) than either labials or dentals and that, on the other hand, the “characteristic pitch” of velars and labials is “grave” (lower) and that of palatals and dentals “acute” (higher). He then observes that a parallel relationship is found in the vowels: open vowels are more perceptible than close vowels, and back vowels are “grave” whereas front vowels are

¹ Although Jakobson is mistaken in locating the major resonator of palatal sounds in back, rather than in front of the main constriction, he is correct in distinguishing sounds with an anterior point of articulation from sounds with a posterior point of articulation (see Chomsky and Halle 1968, 304).

versa ...? The principle of the (here), but unless this be mysterious whether these two extremes are opposed to all other consonants. obtain their distinctive quality rator, whereas in the case of the the oral cavity into two short ic difference which contrasts the shing sounds, to the labials and e heading of posterior, and the position to state the following posterior (consonants) is located sonants) is in front of their only nences among the four types of l labials) are in fact reduced to ies which we have just defined ...” Jakobson remarks that in of articulation exhibits subside-distinguish bilabials from labio-cals [s, z], palatal [c, j] from ars. It is significant that all of that they involve a single pho-t” rather noisy sound [f, s, ʃ, χ] and [ϕ, θ, ç, x]. Jakobson there-ork be extended by the addition

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“acute”. These parallels reflect the fact that a single set of oppositions underlies both vowels and consonants as shown in Table 1:

Table 1

	grave	acute
greater perceptibility	velar consonants back open vowels	palatal consonants front open vowels
less perceptibility	labial consonants back close vowels	dental consonants front close vowels

To support this analysis Jakobson cites a number of phonological rules as well as other facts all of which can readily be formulated in terms of the above framework. For example, he observes that just as languages may differ in having a “triangular” rather than a “quadrilateral” vowel system; i.e.

u i vs. u i
a a æ

they may differ in having a “triangular” rather than a “quadrilateral” consonant system, i.e.,

p t vs. p t
k k c

and he concludes that “the abyss which the manuals of the past created between the structure of consonants and that of vowels ... seems to be overcome in a phonological approach.” (p. 276).

While some of these ideas have been shown to be in need of revision,² his

² In the light of the research carried out during the forty-five years that have elapsed since Jakobson presented his paper just reviewed, a number of improvements can readily be suggested. Thus, it is curious that Jakobson overlooked the obvious articulatory parallels between high vowels and palatal and velar consonants, and between (nonhigh) back vowels and uvular and pharyngeal consonants. The parallelism between vowels and consonants then turns out to be not that given in Table 1 but rather that represented in Table 2:

Table 2

front	back	
front close vowels palatal consonants	back close vowels velar consonants	close
front half close vowels	back half close vowels uvular consonants	half close
front open vowels	back open vowels pharyngeal consonants	open

major insights, i.e., that speech sounds are complexes of binary oppositions (features) and that the same oppositions underlie both vowels and consonants — have been strongly supported by subsequent research. It is, therefore, somewhat sad to observe that these ideas were not generally discussed in the professional literature until the 1950s in spite of the fact that Jakobson continued to write about them all through the intervening period. Among these writings was what many regard as Jakobson's best work, the monograph "Kindersprache, Aphasie und allgemeine Lautgesetze," published by Uppsala University in 1941. The war and Jakobson's move to the United States in 1941 are, no doubt, part of the explanation for this long delay. Of equal importance is the conservatism of a well-established discipline like linguistics. It was only when those of us who had been Jakobson's students began to publish and teach that his ideas on the phonetic framework of language received the wide, general discussion among linguists that they deserved. Since that time the influence of these ideas on linguistic thought has steadily increased so that at present these ideas are accepted by a substantial fraction — though probably not a majority — of students of language. Thanks to the extraordinary length of his career as an active contributor to linguistics Jakobson had the satisfaction of witnessing this constant growth in approval and acceptance of his ideas, and thus could truly say that his work in his chosen discipline had not been in vain.³

Massachusetts Institute of Technology

The two gaps in the distribution in the consonants in Table 2 which at first sight might appear to represent a weakness are, on more mature reflection, a sign of the essential correctness of the proposed modification in the framework. The gaps are consequences of the fact that unlike vowels, consonants require a complete or virtual closure in the vocal tract. Since such a closure can be implemented only by moving an active articulator into contact with either the roof of the mouth or the back wall of the pharynx, it follows that movements of the articulator away from both the roof of the mouth and the back wall of the pharynx will not produce contact and hence will not result in articulatory configurations for consonants. Consonants that are front and half-close or open can, therefore, not exist. (For additional discussion see Chomsky and Halle 1968, Ch. 7).

³ All non-English texts quoted above have been translated by me.

complexes of binary oppositions derive both vowels and consonants from subsequent research. It is, therefore, surprising that these complexes were not generally discussed in spite of the fact that Jakobson had already mentioned them throughout the intervening period. Indeed, as Jakobson's best work, the "allgemeine Lautgesetze," published in 1929, and his move to the University of Cambridge in 1951, the explanation for this long delay in the explanation of this long history of a well-established discipline of us who had been Jakobson's disciples is that his ideas on the phonetic general discussion among linguists, the influence of these ideas on the general theory of language, and that at present these ideas are probably not a majority — of the binary length of his career as an academic and the satisfaction of witnessing the acceptance of his ideas, and thus the discipline had not been in vain.³

Massachusetts Institute of Technology

Table 2 which at first sight might appear to be a sign of the essential correctness of the analysis, are consequences of the fact that the closure in the vocal tract. Since such a closure of the articulator into contact with either the alveolar or the velar follows that movements of the articulator against the wall of the pharynx will not produce the same configurations for consonants. Consonants which do not exist. (For additional discussion see

related by me.

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NOTE: The abbreviation *SW* refers to the five volumes of Jakobson's *Selected Writings* (The Hague: Mouton (1962, 1971) (1966a) (1971a) (1979a) (1981a)).

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