ROMAN JAKOBSON:
WHAT HE TAUGHT US

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CONTENTS

MORRIS HALLE
Foreword .................................................. 5

HUGH MCLEAN
A Linguist Among the Poets ............................ 7

PAUL KIPARSKY
The Grammar of Poetry .................................. 20

OMELJAN PRITSAK
The Igor Tale ............................................. 30

CALVERT WATKINS
Slavic Mythology and Folklore ....................... 38

LADISLAV MATEJKA
Church Slavonic as a Tool of Poetry and Spiritual
Unification .............................................. 46

HORACE G. LUNT
Slavic Historical Linguistics ......................... 52

IGOR A. MELČUK
Studies of the Russian Language .................... 57

ROBERT AUSTERLITZ
Studies of Paleosiberian Languages ................ 72

MORRIS HALLE
On the Origins of the Distinctive Features .......... 77

References .............................................. 87
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*Writings* 2: 99).
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Columbia University

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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 ran-
domly 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 casting, since this involves the
transposition of two pieces simultaneously, and to guess that such trans-
positions actually are allowed by the rules would no doubt require con-
siderable 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 evi-
dence 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 skep-
ticism, 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
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 fea-
tures (oppositions) in all phonological systems. Moreover, this break-
through 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 repertoires as more or less accidental assemblages 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-

ions, 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 appreci-

ated. 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 had, 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.
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correlations: “You consider, in
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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
def 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 conven-
ience is offered. Thus, for example, in addition to many binary attributes
such as voiced-voiceless; nasal-nasal; 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 signifi-
cant: 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 anat-
omical structures?) Curiously these issues have attracted little attention
among linguists and phoneticians, and Trubetzkoj, like most linguists, ac-
cepted 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. Trubetzkoj 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 oppo-
sitions, 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].
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 [ɛ] 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 psychology (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).”
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 phonological 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. 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 labiodentals, 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, ʒ] vs. a “dull” (Fr. mat) 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) then 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

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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).
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whether these two extremes are opposed to all other consonants.
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ator, whereas in the case of the
the oral cavity into two short
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heading of posterior, and the
position to state the following
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..."Jakobson remarks that in
of articulation exhibits subsidi-
distinguish bilabials from labio-
cals [s, z], palatal [c, j] from
rs. It is significant that all of
that they involve a single pho-
t' rather noisy sound [f, s, ʃ, θ] and
[ç, Ʒ, ç, x]. Jakobson there-
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id that, on the other hand, the
is "grave" (lower) and that of
en observes that a parallel
vowels are more perceptible
grave" whereas front vowels are

major resonator of palatal sounds in
, he is correct in distinguishing sounds
with a posterior point of articulation

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

<table>
<thead>
<tr>
<th></th>
<th>grave</th>
<th>acute</th>
</tr>
</thead>
<tbody>
<tr>
<td>greater perceptrility</td>
<td>velar consonants</td>
<td>palatal consonants</td>
</tr>
<tr>
<td></td>
<td>back open vowels</td>
<td>front open vowels</td>
</tr>
<tr>
<td>less perceptrility</td>
<td>labial consonants</td>
<td>dental consonants</td>
</tr>
<tr>
<td></td>
<td>back close vowels</td>
<td>front close vowels</td>
</tr>
</tbody>
</table>

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.,

\[ u_i \ vs. \ u_e \]
\[ a \ vs. \ a_e \]

they may differ in having a "triangular" rather than a "quadrilateral" con-
sonant system, i.e.,

\[ p \ vs. \ p \]
\[ t \ vs. \ t \]
\[ k \ vs. \ k \]

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 pharyngal 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>
<thead>
<tr>
<th></th>
<th>front close vowels</th>
<th>back close vowels</th>
</tr>
</thead>
<tbody>
<tr>
<td>palatal consonants</td>
<td></td>
<td>velar consonants</td>
</tr>
<tr>
<td>front half close vowels</td>
<td>...</td>
<td>back half close vowels</td>
</tr>
<tr>
<td>front open vowels</td>
<td>...</td>
<td>back open vowels</td>
</tr>
<tr>
<td></td>
<td>pharyngal consonants</td>
<td></td>
</tr>
</tbody>
</table>
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.  

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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).

All non-English texts quoted above have been translated by me.
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derlie both vowels and conson-
ent-sequent research. It is, there-
as were not generally discussed
in spite of the fact that Jakob-
rough the intervening period.
As Jakobson's best work, the
allgemeine Lautgesetze," pub-
lar and Jakobson's move to the
of the explanation for this long-
ism of a well-established disci-
se of us who had been Jakob-
that his ideas on the phonetic
general discussion among lin-
the influence of these ideas on
that at present these ideas are
1 probably not a majority — of
inary length of his career as an
1d the satisfaction of witnessing
ptance of his ideas, and thus
iscipline had not been in vain.3

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NOTE: The abbreviation SW refers to the five volumes of Jakob-
son's Selected Writings (The Hague: Mouton (1962, 1971) (1966a)
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