

Linguistics/Philosophy

Six Lectures on Sound and Meaning

by Roman Jakobson

translated by John Mepham

Preface by Claude Lévi-Strauss

"While it may be too early to totally assess Roman Jakobson's contributions, his work over the past fifty years has had a major impact on the study of linguistics. He is probably most well known for his structural approach and has made important contributions to the study of language development in children and to the study of aphasia.

"This most recent publication presents another aspect of Jakobson's scholarly activity. . . . In these six lectures, Jakobson presents the basis for a theory of language which is founded on sound and its relation to meaning. In beginning the series of lectures, Jakobson contends that linguistic research has been preoccupied with acoustic phonetics—research which is solely concerned with the mechanics of sound production. As he argues . . . a thorough study of language will inevitably lead to the necessity to consider meaning in relation to sound and its production. . . .

"Overall, these lectures by Jakobson offer communication scholars an easily accessible introduction to his theory of language."—*Journal of Communication*

"What makes this book valuable even now, despite the time separating authorship from publication, is the fact that widespread ignorance still prevails in contemporary linguistics about the semiotic structure of the sound system of language; a careful reading of Jakobson should ultimately improve matters."—*Language*

"The 15-page preface by the eminent structural anthropologist Claude Lévi-Strauss, who attended the original lectures, is a brilliant summary and projection of Jakobson's ideas."—*Choice*

As Lévi-Strauss writes: "These innovative ideas, toward which I was no doubt drawn by my own thought but as yet with neither the boldness nor the conceptual tools necessary to organize them properly, were all the more convincing in that Jakobson's exposition of them was performed with that incomparable art which made him the most dazzling teacher and lecturer that I had ever been lucky enough to hear."

This book is marked by Jakobson's elegance and demonstrative powers. Jakobson never pursues the abstract and sometimes difficult course of his argument without illuminating it by examples from a great variety of languages and from the arts.

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Foreword

L'ÉCOLE LIBRE des hautes études (the Free School of Advanced Studies) was founded in New York at the beginning of 1942 by French and Belgian scientists in exile. It immediately offered a Professorship in General Linguistics to Roman Jakobson, who inaugurated the first term with six lectures 'On Sound and Meaning', together with a course on the linguistics of Ferdinand de Saussure. There followed, during the 1942-3 academic year, two courses devoted respectively to 'Changes in Language' and to 'The Affinity and the Kinship of Languages', not to mention fifteen lectures given each semester on 'Phonology'.

These courses were followed by certain of the School's Professors – Henri Grégoire, Jacques Hadamard and Claude Lévi-Strauss – and by linguists such as J. Mattoso Camara, Paul L. Garvin, Charles F. Hockett, Henry M. Hoenigswald and Thomas A. Sebeok. Roman Jakobson gave at the same time, at the institute of Oriental and Slavic Philology and History, attached to the School, a course on 'Czech Poetry of the 9th to the 15th Centuries'.

Because he was not then used to delivering lectures in French Jakobson prepared a draft of his 'Six Lectures on Sound and Meaning' in advance, and used this draft as the basis for a more informal oral presentation. The text given here has been edited by Emmanuel Claude Jacquart and it reproduces with only slight modifications Jakobson's original draft.

Preface

A BOOK BY Roman Jakobson has no need of a preface, and I would not have presumed myself worthy of the great honour of writing one were it not for the fact that Jakobson himself wished me to contribute here my witness as a member of his audience, and also, I would like to add, as his disciple. For these lectures, now one-third of a century old, which the author has at last decided to publish, having often before formed the intention of doing so, the project having been postponed each time to make way for more urgent tasks, were the first which I heard as Professor at the New York *École libre des hautes études*, during that year of 1942-3 when we began to attend each other's lectures.

Rereading them today I rediscover that intellectual stimulation which I felt thirty-four years ago. At that time I knew almost nothing about linguistics and Jakobson's name was not familiar to me. It was Alexandre Koyré who enlightened me as to his role and who put us in touch with each other. Still keenly aware of the difficulty which, as a result of my inexperience, I had met with three or four years earlier in trying to find an adequate notation to record the languages of central Brazil, I promised myself to acquire from Jakobson the rudiments which I lacked. In fact, however, what I received from his teaching was something quite different and, I hardly need add, something far more important: the revelation of structural linguistics, as a result of which I would later

be able to crystallise into a body of coherent ideas visions inspired by the contemplation of wild flowers somewhere near the border of Luxemburg at the beginning of May 1940, and the ambiguous feelings, a mixture of enthusiasm and exasperation, which some time later at Montpellier – where, for the last time in my life I performed for a while the job of teacher of philosophy – had been aroused in me by reading Marcel Granet's *Les Catégories matrimoniales et relations de proximité dans la Chine ancienne*, as a result on the one hand of the attempt to be found there to draw together apparently arbitrary facts into a system, and on the other hand of the improbably complicated results at which this effort arrived.

What I was to learn from structural linguistics was, on the contrary, that instead of losing one's way among the multitude of different terms the important thing is to consider the simpler and more intelligible relations by which they are interconnected. Listening to Jakobson I discovered that nineteenth century, and even early twentieth century, ethnology had been content, like the linguistics of the neogrammarians, to substitute 'strictly causal questions for questions concerning means and ends' (p. 35). They were content, without having even properly described a phenomenon, to go back to its origins (p. 6). The two disciplines, therefore, found themselves confronted by 'a stunning multitude of variations', whereas explanation ought always aim at the discovery of 'the invariants behind all this variety' (p. 9). What Jakobson said about phonetics was applicable *mutatis mutandis* equally well to ethnology:

It is true that the phonic substance of language has been studied thoroughly, and that such studies, especially over the last fifty years, have produced an abundance of illuminating results. But for the most part the phenomena under consideration have been investigated in abstraction from their function. In these circumstances it has been impossible to classify, or even to understand, these phenomena.

As for kinship systems, which were the subject of my lectures from that year 1942–3, it was to the credit of those such as van Wouden (whose work I was not yet familiar with at that time) and Granet that they had gone beyond this stage, but they had still not risen above focusing their attention on the terms to look rather at the relations between them. In the absence of this approach they were unable to rationally comprehend the phenomena, and were therefore condemned to the endless task of searching for things behind things in the vain hope of reaching something more manageable than the empirical data with which their analyses had to cope. What Jakobson writes here, about the phonic individuality of phonemes, can be said about any terms whatsoever, real or imaginary: 'The important thing . . . is not at all each phoneme's individual phonic quality considered in isolation and existing in its own right. What matters is their reciprocal opposition within a . . . system' (p. 76).

These innovatory ideas, towards which I was no doubt drawn by my own thought, but as yet with neither the boldness nor the conceptual tools neces-

sary to organise them properly, were all the more convincing in that Jakobson's exposition of them was performed with that incomparable art which made him the most dazzling teacher and lecturer that I had ever been lucky enough to hear: the present text fully captures the elegance and the logical force of his exposition. It is not the least of the value of these pages that they testify, for all those who have never had the opportunity to hear Jakobson, to what his courses and his lectures were like, and what they are still like now in his eightieth year.

In these lectures the discussion, presented with an oratorical talent which was as great in whatever language Jakobson chose to express himself (even though we must assume that it is even greater when it is displayed in his native language) is developed with equal limpidity and rigour. Jakobson never develops his abstract and sometimes difficult arguments at length without illustrating them with examples drawn from a wide range of languages, and often also from poetry and the modern plastic arts. His systematic reference to the great thinkers – Stoics, Scholastics, Renaissance rhetoricians, Indian grammarians, and many others – manifests his constant concern to place these new ideas in perspective, and to impress on the mind of his audience a sense of the continuity of history and of thought.

In Jakobson the order of exposition follows, step by step, the order of discovery. His exposition thereby derives a dramatic power which holds his audience in suspense. With a wealth of theatrical effect, at one minute off on a tangent and the next sweeping rapidly through a short-cut, the exposition strides swiftly to

its conclusions, which are sometimes quite unexpected and yet which always carry conviction.

Taking their place besides those of his works which were always intended for publication, these six lectures represent a sample of his oral style which has lost none of its flavour for having been captured in print. The first lecture gives an account of the state of linguistics at the end of the nineteenth century. It argues against the opinions of the neogrammarians for whom sound and meaning belonged to completely distinct orders. It gives proper credit to the results of phonetic research but, by means of a distinction between motor phonetics and acoustic phonetics, it shows that it is impossible to divorce sound from meaning, linguistic means from their ends.

If sound and meaning are inseparable what then is the mechanism of their union? In the second lecture Jakobson shows that the idea of the phoneme enables us to resolve this apparent mystery; he defines this idea, gives an account of its origins and discusses the interpretations of it which were initially suggested. Continuing along the same track the third lecture introduces the theory of phonology, based on the primacy of relations and of the system. It refuses to get involved in a debate about the nature of the phoneme, an unnecessary and sterile problem, and via an actual analysis it demonstrates the specificity of this linguistic entity in comparison with the morpheme, the word and the sentence. The only linguistic entity without conceptual content, the phoneme, which does not itself have a meaning, is a tool which serves to discriminate between meanings.

But this immediately raises two problems, and

these form the subject-matter of the fourth lecture. In the first place, it follows from the definition of the phoneme as a discriminative value that phonemes perform their function not by virtue of their phonic individuality but by virtue of their reciprocal oppositions within a system. However, no logical relation can be discovered between phonemes standing in opposition to each other: the presence of one of them does not necessarily evoke the other. In the second place, if the relations of opposition between phonemes constitute the primary values which enable meanings to be differentiated, how can it be that these relations are much more numerous than are the phonemes which derive from them? Jakobson shows that these two paradoxes both originate in an incorrect conception according to which phonemes are indivisible elements. In fact as soon as they are analysed into differential elements we reach new kinds of relations, which on the one hand have the character of logical oppositions and which, on the other, are in all languages fewer in number than the phonemes generated by the different combinations of these oppositions.

The fifth lecture illustrates these theoretical ideas by giving a description and an analysis of the consonantal system of French. This also affords the opportunity to deepen the idea of combinatory variation, and to resolve in a positive way the problem of the phoneme's operation on the two axes, of simultaneity and succession. This demonstration results in part from an original treatment of the idea of *morae* which, I recall, was to delight Boas shortly before his death, during a dinner at his house to which both Jakobson and I had been invited.

The sixth lecture summarises and recapitulates the argument of the whole course. But Jakobson's endings are never merely repetitive. They take the listener beyond that point at which, he believes, he will be allowed to rest. In this particular case Jakobson takes him beyond the Saussurian principle of the arbitrariness of the linguistic sign. [The sign does, of course, seem arbitrary when looked at from the point of view of resemblance, i.e. when we compare the signifiers of one and the same signified in different languages; but, as Benveniste has shown, it no longer seems arbitrary for each language considered in itself, when looked at from the point of view of contiguity, taking this as a necessary relation between signifier and signified.] In the former case the relation is internal, whereas in the latter case it is external. This is the reason why the speaking subject seeks to compensate for the absence of the former by a recourse to the latter, by conferring on language a phonetic symbolism. So the union between sound and meaning is once again achieved, this time at a level which, as Jakobson shows, has an organic basis, one which was ignored by the traditional phoneticians not so much because they reduced linguistic activity to its physiological substratum – a reduction which was criticised in the first lecture – but, we can now see, because they were content with a too superficial understanding of this aspect of language.

* * *

I can now, many years later, recognise more clearly than ever those themes in these lectures which most

influenced me. However much ideas such as those of the phoneme and of the prohibition of incest might seem incongruous, the conception which I was to form of the latter was inspired by the role assigned by linguists to the former. Just like the phoneme, which though it has no meaning of its own serves as a means by which meanings can be formed, the incest prohibition seemed to me to be the link connecting two domains hitherto held to be divorced from each other. To the articulation of sound with meaning there would thus correspond, on another level, that of nature with culture. And just as the form of the phoneme is the universal means, in all languages, whereby linguistic communication is established, so the incest prohibition, which, if we limit ourselves to its negative expression, is also found universally, also constitutes an empty form which is nevertheless indispensable if the articulation of biological groups into a network of exchanges whereby they can establish communication is to be both possible and necessary. Finally, the meaning of marriage rules, which is incomprehensible when they are investigated in isolation, can only emerge by seeing them as mutual oppositions, in the same way that the true nature of the phoneme does not lie in its phonic individuality but in the opposite and negative relations in which phonemes stand to one another.

'Saussure's great merit', says Jakobson, 'was to have understood clearly that [. . .] something extrinsic is unconsciously brought into play' (p. 10). It cannot be doubted that these lectures also make an important contribution to the human sciences by emphasising the role played in the production of language (but

also that of all symbolic systems) by the unconscious activity of the mind. For it is only on condition that we recognise that language, like any other social institution, presupposes mental functions which operate at the unconscious level, that we can hope to reach, beyond the continuity of the phenomena, the discontinuity of those 'principles by which language is organised' (p. 11), and of which the subject who speaks or thinks is not normally consciously aware. With the discovery of these principles, and especially of their discontinuity, linguistics and the other human sciences should find the way open to them to make rapid progress.

This point is important because doubt has sometimes been expressed as to whether phonological theory since its inception, and in particular in Trubetzkoy, really has implied a shift to underlying unconscious structures. Yet one only has to look at the critique of Ščerba given here by Jakobson to see that it agrees on all points with that of Trubetzkoy, which is not at all surprising when one recalls just how closely related they were to each other in their thought: 'Ščerba and some other disciples of Baudouin de Courtenay', writes Jakobson, '. . . appealed to the linguistic intuition of the speaking subject' (p. 38), because they did not understand that 'the elements of language usually remain beneath the threshold of our conscious deliberation. As the philosophers say, linguistic activity takes place without self-knowledge' (p. 39). And Trubetzkoy: 'The phoneme is an idea belonging to linguistics and not to psychology. In the definition of the phoneme we must reject any reference to "linguistic intuition"' (*Principes de phono-*

logie, p. 42). The dissociation of the phoneme into distinctive features, adumbrated by Trubetzkoy but achieved for the first time by Jakobson in 1938, should make it possible once and for all, 'quite objectively and unambiguously', to reject any reliance on 'the subjective intuition of speakers' (p. 85). The discriminative value of these features constitutes the primary fact, and our more or less conscious awareness of these elements is never any more than a secondary phenomenon (p. 38).

There is only one aspect of these lectures on which Jakobson would probably no longer agree with the position which he held more than thirty years ago. In 1942-3 he believed, quite rightly at that time, that he could say that 'language is the only system which is composed of elements which are signifiers and yet at the same time signify nothing' (p. 66). Since then there has been a revolution in biology with the discovery of the genetic code, a revolution of which the theoretical consequences cannot fail to have a dramatic impact on the human sciences. Jakobson understood this immediately: he was one of the first to recognise and to elucidate 'the extraordinary degree of similarity between the genetic information system and that of verbal information' (*Essais de linguistique générale*, II, 'Rapports internes et externes du langage', Paris, Éditions de Minuit, 1973, p. 51). After having listed 'all the characteristics which are isomorphous between the genetic code . . . and the architectonic pattern which underlies the verbal codes of all human languages' (*Essais*, p. 54), he goes one step further and raises the question of whether 'the isomorphism of these two different, genetic and

verbal, codes can be explained by a simple convergence stemming from a similarity of needs, or whether the foundations of the manifest linguistic structures, intimately based on molecular communication, are not directly patterned on the structural principles of the latter' (*Essais*, p. 55).

This is a vast problem, and one which collaboration between biologists and linguists will perhaps make it possible to resolve one day. But are we not already at the present time in a position to state and to resolve a problem located at the other end of the hierarchy of linguistic operations, a problem of the same kind though of infinitely more modest significance? We have in mind the problem of the relations between linguistic analysis and the analysis of myths. This problem involves the other side of language, that which is oriented towards the world and society rather than towards the organism, and here we find the same problem of the relation between language and another system (closer to language in this case, of course, since it necessarily makes use of language), a system which, in a different way from language, is composed of elements which are combined together to form meanings without in themselves, considered in isolation, signifying anything.

In the third lecture Jakobson shows that, contrary to the view of Saussure, phonemes differ from other linguistic units – words and grammatical categories – in that they have a set of characteristics which are not found altogether in any other unit. Grammatical categories do, of course, have in common with phonemes that they are opposite and relative entities, but unlike the latter they are never negative;

in other words their value is not purely discriminative: each grammatical category taken in itself bears a semantic value which is discernible by the speaking subject (p. 64). Now, the question can be raised as to whether all the characters of the phoneme do not reappear in those entities which we have called 'mythemes': these are the elements from which mythic discourse is constructed, and they also are entities which are at one and the same time oppositive, relative and negative; they are, to use the formula applied by Jakobson to phonemes, 'purely differential and contentless signs' (p. 66). For we must always distinguish the meaning or meanings which a word has in the language from the mytheme which this word can denote in whole or in part. In everyday language the sun is a heavenly body which appears in the daytime; but the mytheme 'sun' does not, taken in and for itself, have any meaning. Depending on the particular myths under consideration it can range over a whole variety of different ideal contents. In fact nobody, coming across 'sun' in a myth, would be able to say in advance just what its specific content, nature or functions were in that myth. Its meaning could only be identified from the relations of correlation and opposition in which it stands to other mythemes within this myth. The meaning does not, properly speaking, belong to any individual mytheme: it is a consequence of their combination.

We are aware of the risks that we run in seeking to indicate the formal correspondences between linguistic entities and those which we believe to be brought to light by the analysis of myths. The latter do, of course, belong to language, but within language they

constitute a separate order because of the principles by which they are governed. In any case it would be a serious mistake to believe that we take the mytheme to be of the same order as the word or the sentence, for these latter are entities of which the meaning or meanings can be specified, albeit only ideally (for even the meaning of a word can vary with context), and these meanings can be listed in a dictionary. The elementary units of mythic discourse do, of course, consist of words and sentences, but these, in this particular usage of them, and without wishing to push the analogy too far, are rather of the order of the phoneme, in that they are units which, while they have no meanings of their own, do make it possible to generate meanings in a system in which they stand in opposition to each other, and this precisely as a result of these oppositions.

The relations between myth and language can be defined by saying that statements in the discourse of myth reproduce the structure of language but only because there is a shift of gear which disengages it from its normal operation: the basic elements of myth function like those of language, but they are from the start more complex in nature. As a result of this complexity mythic discourse becomes, in a manner of speaking, detached from the normal usage of language in such a way that there is only occasionally any precise correspondence in the results generated by the combination of these elements of different orders. In contrast to a linguistic utterance which commands, questions or informs, and which can be understood by every member of the culture or sub-culture as long as they know the utterance's context,

a myth never presents a specific meaning to those who hear it. A myth sets up a grid, solely definable in terms of the rules by which it is constructed. For the members of the culture to which the myth belongs this grid confers a meaning not on the myth itself but on everything else: i.e., on the picture they have of the world, on the society and its history about which the group members might be more or less accurately informed, and on the ways in which these things are problematic for them. Normally these diverse facts fail to hang together and more often than not they clash with one another. The matrix of intelligibility provided by the myth allows them to be connected up into a coherent whole. It is worth noting in passing that this role which we are attributing to myth leads on directly to that which a Baudelaire might have attributed to music.

Do we not also find here – albeit at the other end of the scale – a phenomenon similar to that ‘sound symbolism’ to which Jakobson devotes much of his sixth lecture? Even if it derives from ‘the neuropsychological laws of synaesthesia’ (p. 113), or even precisely because of these laws, this symbolism is itself also not necessarily the same for everyone. Poetry has at its disposal many means for overcoming the divergence, deplored by Mallarmé, between the sound and the meaning of the French words *jour* ‘day’ and *nuit* ‘night’. But if I might be allowed to contribute here my own personal testimony, I confess that I have never discerned this divergence as such: it only makes me conceive of these two periods in different ways. For me the day is something which has duration, the night something which is produced

or which comes about, as in the expression ‘the night falls’. The former denotes a state, the latter an event. Instead of perceiving a contradiction between the signifieds and the phonic particularities of their respective signifiers, I unconsciously take the signifieds to be different in nature from each other. *Jour* has a durative aspect, congruent with vocalic gravity, *nuit* a perfective aspect, congruent with vocalic acuteness: which is, in its own way, a little mythology.

We encounter at the two poles of language this emptiness of which Jakobson speaks, and which calls out for some content to fill it. However, from one pole to the other the relations which are respectively present and absent are reversed. At the lowest level of language the relation of contiguity is present, whereas that of resemblance is lacking. In contrast, at that level which could be called hyperstatic (because there are evidenced there properties of a new order) where myth bends language to its own ends, it is the relation of resemblance which is present – unlike words, the myths of different peoples resemble each other – whereas the relation of contiguity disappears because, as we have seen, there is no necessary relation between myths as signifiers and the concrete signifieds to which they can come to be applied.

Yet in the one case as in the other these relations can be complemented in a way that is neither inevitable nor determined in advance. At the lowest level, where language is under the direct sway of neuropsychological laws which represent patterns of cerebral activity between which homologies exist, sound symbolism can be expressed. At the highest level, in that region where myth, having transcended language,

latches on to external reality, we can see the appearance this time of a semantic symbolism. Yet while they are at opposite ends of the scale over which linguistic functions are ranged, these two symbolisms, the one phonetic and the other semantic, present a clear symmetry. They each reflect mental necessities of the same kind, oriented in the one case towards the body and in the other towards society and the world.

Jakobson might not find these potential extensions of his theoretical thought acceptable, but in any case they are a measure of the breadth of the domain which he has opened up for research, and of the fertility of the principles which, thanks to him, can henceforth guide this research. Although they date from many years ago these lectures are more than a mere illustration of the state of a science at some moment in its history. Today as yesterday they bring to life a great adventure of the mind, of which the products have not ceased to appear in Jakobson's own work, which is still striding ahead, and among all those, whether linguists or specialists in other disciplines, to whom he has shown the way and whom he continues to inspire.

CLAUDE LÉVI-STRAUSS

I

I AM SURE you are familiar with Edgar Allan Poe's famous poem *The Raven*, and with its melancholy refrain, 'Nevermore'. This is the only word uttered by the ominous visitor, and the poet emphasises that 'what it utters is its only stock and store'. This vocable, which amounts to no more than a few sounds, is none the less rich in semantic content. It announces negation, negation for the future, negation for ever. This prophetic refrain is made up of seven sounds – seven, because Poe insists on including the final *r* which is, he says, 'the most producible consonant'. It is able to project us into the future, or even into eternity. Yet while it is rich in what it discloses, it is even richer in what it secretes, in its wealth of virtual connotations, of those particular connotations which are indicated by the context of its utterance or by the overall narrative situation. Abstracted from its particular context it carries an indefinite range of implications. 'I betook myself to linking/ fancy unto fancy', the poet tells us, 'thinking what this ominous bird of yore –/ What this grim, ungainly, ghastly, gaunt, and ominous bird of yore/ Meant in croaking "Nevermore"'./ This I sat engaged in guessing . . . This and more I sat divining. . . .' Given the context of the dialogue the refrain conveys a series of different meanings: you will never forget her, you will never regain peace of mind, you will never again embrace her, I will never leave you! Moreover this same word

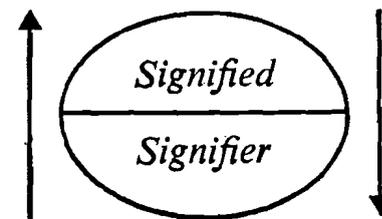
can function as a name, the symbolic name which the poet bestows upon his nocturnal visitor.

Yet this expression's value is not entirely accounted for in terms of its purely semantic value, narrowly defined, i.e., its general meaning plus its contingent contextual meanings. Poe himself tells us that it was the potential onomatopoeic quality of the sounds of the word *nevermore* which suggested to him its association with the croaking of a raven, and which was even the inspiration for the whole poem. Also although the poet has no wish to weaken the sameness, the monotony, of the refrain, and while he repeatedly introduces it in the same way ("Quoth the raven, "Nevermore"") it is nevertheless certain that the variation of its phonic qualities, such as modulation of tone, stress and cadence, the detailed articulation of the sounds and of the groups of sounds, that such variations allow the emotive value of the word to be quantitatively and qualitatively varied in all kinds of ways.

The utterance of Poe's refrain involves only a very small number of articulatory motions – or, to look at this from the point of view of the acoustic rather than the motor aspect of speech, only a small number of vibratory motions are necessary for the word to be heard. In short, only minimal phonic means are required in order to express and communicate a wealth of conceptual, emotive and aesthetic content. Here we are directly confronted with the mystery of the idea embodied in phonic matter, the mystery of the word, of the linguistic symbol, of the Logos, a mystery which requires elucidation.

Of course, we have known for a long time that a

word, like any verbal sign, is a unity of two components. The sign has two sides: the sound, or the material side on the one hand, and meaning, or the intelligible side on the other. Every word, and more generally every verbal sign, is a combination of sound and meaning, or to put it another way, a combination of signifier and signified, a combination which has been represented diagrammatically as follows:



But while the fact that there is such a combination is perfectly clear, its structure has remained very little understood. A sequence of sounds can function as the vehicle for the meaning, but how exactly do the sounds perform this function? What exactly is the relation between sound and meaning within a word, or within language generally? In the end this comes down to the problem of identifying the ultimate phonic elements, or the smallest units bearing signifying value, or to put this metaphorically, it is a matter of identifying the quanta of language. In spite of its fundamental importance for the science of language it is only recently that this set of problems has at last been submitted to thorough and systematic investigation.

It would certainly be wrong to ignore the brilliant insights concerning the role of sounds in language which can be found scattered through the work of the thinkers of Antiquity and of the Middle Ages, for example those of Thomas Aquinas, who was among the most profound of philosophers of language: and it would equally be wrong to ignore the subtle observations of the ancient oriental, and above all Hindu, grammarians. But it is only in the last two centuries that our science has devoted itself really energetically to the detailed study of linguistic sounds.

This interest in linguistic sounds derived at first from essentially practical objectives, such as singing technique or teaching the deaf and dumb to speak: or else phonation was studied by physicians as a complex problem in human physiology. But during the nineteenth century, as linguistics gained ground, it was this science which gradually took over research into the sounds of language, research which came to be called *phonetics*. In the second half of the nineteenth century linguistics became dominated by the most naive form of sensualist empiricism, focusing directly and exclusively on *sensations*. As one would expect the intelligible aspect of language, its signifying aspect, the world of meanings, was lost sight of, was obscured by its sensuous, perceptible aspect, by the substantial, material aspect of sound. Semantics, or the study of meaning, remained undeveloped, while phonetics made rapid progress and even came to occupy the central place in the scientific study of language. The neogrammarian school of thought, which was the most orthodox and characteristic current of thought in linguistics at the time, and which

was dominant in the last quarter of the nineteenth century and up to the First World War, rigorously excluded from linguistics all problems of teleology. They searched for the origin of linguistic phenomena but obstinately refused to recognise that they are goal-directed. They studied language but never stopped to ask how it functions to satisfy cultural needs. One of the most distinguished of the neogrammarians, when asked about the content of the Lithuanian manuscript which he had been assiduously studying, could only reply with embarrassment, 'As for the content, I didn't notice it'. At this time they investigated *forms* in isolation from their *functions*. And most important, and most typical of the school in question, was the way in which they regarded linguistic sounds; in conformity with the spirit of the time their view was a strictly empiricist and naturalistic one. The fact that linguistic sounds are signifiers was deliberately put aside, for these linguists were not at all concerned with the linguistic function of sounds, but only with sounds as such, with their 'flesh and blood' aspect, without regard for the role they play in language.

Linguistic sounds, considered as external, physical phenomena have two aspects, the motor and the acoustic. What is the immediate goal of the phonatory act? Is it the acoustic phenomenon or is it the motor phenomenon itself? Obviously it is the acoustic phenomenon which the speaker aims at producing, and it is only the acoustic phenomenon which is directly accessible to the listener. When I speak it is in order to be heard. Of the two aspects of sound it is, therefore, the acoustic aspect which has intersubjec-

tive, social significance, whereas the motor phenomenon, in other words the workings of the vocal apparatus, is merely a physiological prerequisite of the acoustic phenomenon. Yet phonetics in the neogrammarian period concerned itself in the first place with the *articulation* of sound and not with its acoustic aspect. In other words it was not strictly speaking the sound itself but its production which was the focus of attention, and it was this which formed the basis for the description and classification of sounds. This perspective may seem odd or even perverse to us, but it is not surprising in the context of neogrammarian doctrine. According to this doctrine, and to all other theories which were influential in that period, the genetic perspective was the only one considered acceptable. They chose to investigate not the object itself but the conditions of its coming into being. Instead of describing the phenomenon one was to go back to its origins. Thus the study of linguistic sounds was replaced by historical phonetics, i.e., by a search for their prototypes in earlier forms of each given language, while so-called static phonetics was more or less entirely given over to the observation of the vocal apparatus and its functioning. This discipline was incorporated into linguistics in spite of the obviously heterogeneous character of the two domains. Linguists tried to pick up a bit of physiology with results that are well illustrated by the following typical example: Edward W. Scripture, a famous phonetician who also had training as a physician, ironically quotes the current description of a particular laryngeal articulation which would, had this description been accurate, have inevitably resulted in the fatal strangulation of the speaker! But

even disregarding mistakes like this we can ask what results would the study of linguistic sounds in their motor aspect arrive at.

At first, even though linguists attempted to discuss sounds in a strictly naturalistic manner and to scrupulously leave aside the problem of the functions they perform in language, they did in fact unconsciously employ properly linguistic criteria in their classifications of sounds, and especially in their demarcation of sounds in the speech chain. This illicit importation was facilitated by the fact that linguists, and psychologists too, were as yet quite unfamiliar with the role of the unconscious, and in particular with its great importance in all linguistic operations. But as the observation of phonatory acts was improved and as the employment of special instruments came to replace reliance on purely subjective experience, the linguistic correlate of the physiological phenomena was increasingly lost sight of.

It was towards the end of the century that instrumental phonetics (or as it was usually but less accurately called 'experimental phonetics') began to make rapid progress. With the help of increasingly numerous and improved instruments a remarkable precision was achieved in the study of all the factors involved in buccal articulation and in the measurement of expiration. A new era in the physiological investigation of linguistic sounds was opened up by X-ray photography. X-rays, used in conjunction with sound film, revealed the functioning of the vocal apparatus in all its details; the whole of *sound* production, the entire phonatory act, was uncovered and could be actually seen as it happened. When this method became practically and

technically available to phoneticians a large number of the previous phonetic instruments became redundant.

It was radiography above all which brought to light the crucial role of the posterior parts of the vocal apparatus, parts which are most hidden and which were until then most inaccessible to the available methods of experimental phonetics. Before the arrival of radiography there was, for example, very little accurate knowledge of the functioning in the process of the phonatory act of the hyoid bone, of the epiglottis, of the pharynx, or even of the soft palate. The importance of these parts, and especially of the pharynx, was suspected, but nothing about them was known in detail. Remember that the pharynx is at a crossroads from which leads off, at the top, the passage to the mouth cavity and the passage to the nasal cavity, and below, the passage to the larynx. Each of these upper two passages is opened or closed by the velum whereas the lower passage, to the larynx, is opened or closed by the epiglottis. It was only a few dozen years ago that one could read on the subject of the pharynx, in the text-book of Ludwig Sütterlin, a well-known linguist and phonetician: 'The pharynx seems to be very important in sound production, in that it can be narrowed and widened, but at the present time nothing more definite is known with certainty on the subject' (*Die Lehre von der Lautbildung*, Leipzig, 1908).

As a result especially of recent work by Czech and Finnish phoneticians using radiography we do now have a more adequate understanding of the functioning of the pharynx in phonation, and we can now

affirm that the phonetic role of this organ is no less important than, for example, that of the lips, which are in some ways analogous to it. It can be seen from these more recent observations that so long as the physiological investigation of sounds had no grasp of the functioning of the pharynx and of contiguous parts, it was only possible to arrive at a fragmentary and unsatisfactory description. A physiological classification of sounds which scrupulously takes into account the varying degrees of opening of the mouth but which fails to consider the varying degrees of opening of the pharynx can lead us into error. If phoneticians concentrated on the functioning of the lips and not on that of the pharynx this was not because the former had been shown to be the more important. If the physiology of sound production were to refuse to draw on other disciplines it would have no way of establishing the relative importance of the various organs involved. If phoneticians, in classifying linguistic sounds, took the labial factor but not the pharyngeal factor into account, this was solely because the former was more accessible to observation than the latter. As it broadened the field of inquiry and as it became an increasingly precise discipline, the autonomous investigation of phonation decomposed the sounds which it analysed into a disconcerting multitude of detail without, however, being able to answer the fundamental question, namely that of the value which is assigned by language to each of these innumerable details. In its analysis of the various sounds of a language, or of several languages, motor phonetics uncovers for us a stunning multitude of variations, but it has no criterion for distinguishing the functions and

the degrees of relative significance of all these observed variations, and thus has no way of discovering the invariants among all this variety.

Now the identification of individual sounds by phonetic observation is an artificial way of proceeding. To the extent that phonetics is concerned exclusively with the act of phonation, that is with the production of sounds by the various organs, it is not in a position to accomplish this, as Ferdinand de Saussure had already made clear. In his *Cours de linguistique générale*, given between 1906 and 1911 and edited after his death (1913) by his pupils Charles Bally and Albert Sechehaye, and published in 1916,* the great linguist said with foresight: 'Even if we could record on film all the movements of the mouth and larynx in producing a chain of sounds it would still be impossible to discover the subdivisions in this sequence of articulatory movements; we would not know where one sound began and where another ended. Without acoustic perception how could we assert, for example, that in *fal* there are three units and not two or four?' Saussure imagined that *hearing* the speech chain would enable us to directly perceive whether a sound had changed or had remained the same. But subsequent investigations have shown that it is not the acoustic phenomenon in itself which enables us to subdivide the speech chain into distinct elements; only the linguistic value of the phenomenon can do this. Saussure's great merit was to have understood clearly that in the study of the phonatory act, when we raise the question of phonetic *units* and that of demar-

* Published in English as *Course in General Linguistics*, trans. Wade Baskin, London, 1960.

cating the sounds in the speech chain, something extrinsic is unconsciously brought into play. Twenty years after his death the film that Saussure would have liked to have seen was in fact made. The German phonetician Paul Menzerath made an X-ray sound film of the workings of the vocal apparatus, and this film completely confirmed Saussure's predictions. Drawing on this film and on the latest results of experimental phonetics Menzerath and his Portuguese associate Armando Lacerda demonstrated that the act of speech is a continuous, uninterrupted movement (*Koartikulation, Steuerung und Lautabgrenzung*, 1933). Whereas traditional doctrine had distinguished between *positional* sounds, which are held steady, and *transitional* sounds which lack this stability and which occur in the transition from one position to another, these two phoneticians showed that all sounds are in fact transitional. As for the speech chain, they arrived at an even more paradoxical conclusion. From a strictly articulatory point of view there is no *succession* of sounds. Instead of following one another the sounds overlap; a sound which is acoustically perceived as coming after another one can be articulated simultaneously with the latter or even in part before it. However interesting and important the study of linguistic sounds in their purely motor aspect may be everything indicates to us that such a study is no more than an auxiliary tool for linguistics, and that we must look elsewhere for the principles by which the phonic matter of language is organised.

Even though they focused on the motor aspect of language, phoneticians were nevertheless unable to ignore the quite obvious, indeed tautological, fact

that sound as such is an acoustic phenomenon. But they believed that the investigation of the *production* of sound, rather than of the sound itself, gave one the motor equivalent of the acoustic phenomenon, an equivalent which is more accessible, more instructive and open to more profitable methods of analysis. This view was put forward, for example, by Pierre Rousselot. They assumed that there is a one-to-one correspondence between the two aspects and that the classification of motor phenomena has an exact equivalent in the classification of acoustic phenomena. Thus one need only construct the former, since the latter follows automatically from it. Now this argument, which has been put forward time and again right up to the present day, and which has many implications for the science of linguistics, is utterly refuted, contradicted by the facts. Arguments against this position were put forward long ago, even before the very first hand-book on phonetics.

We can mention, in the first place, a French book dating from 1630, which was called *Aglossostomographie ou description d'une bouche sans langue qu'elle parle et fait naturellement toutes ses autres fonctions* [Aglossostomography, or the description of a tongueless mouth which speaks and naturally performs all its other functions]. In 1718 Jussieu published in the *Mémoires de l'Académie royale des sciences* a treatise called 'Sur la fille sans langue' [On the girl with no tongue]. Each of these works contained a detailed description of people who, though they had only rudimentary tongues, were capable of an impeccable pronunciation of all the sounds which in phonetics nowadays are called the 'linguals', and

which are defined as sounds the emission of which necessarily involves the tongue. These interesting facts have since then been confirmed many times. For example, at the beginning of this century the physician Hermann Gutzmann, who was one of the best known of researchers in the field of errors of pronunciation, was forced to admit that while in French the very same word (*langue*) is used to designate a part of the mouth (the tongue) and language itself, in fact as far as the latter is concerned the former is dispensable, for almost all the sounds which we emit can be produced if necessary in quite a different way without the acoustic phenomena being altered at all (*Des Kindes Sprache und Sprachfehler*, Leipzig, 1894). If one of the phonatory organs is missing then another one can function in its place, without the hearer being aware of this. Gutzmann, however, stated that there are exceptions to this. Thus the sibilants – the fricatives *z*, *s*, and the corresponding affricates – require the involvement of the teeth. Subsequent research, however, has shown conclusively that these apparent exceptions are not in fact so at all. Godfrey E. Arnold, director of the Vienna clinic for language disorders, has shown (*Archiv für gesamte Phonetik*, III, 1939) that even with the loss of the incisors the ability to pronounce the sibilants correctly remains intact as long as the subject's hearing is normal. In cases where dental abnormality gives rise to errors of pronunciation one always finds that the subject's hearing is impaired, and it is this that prevents the functional compensation for the anatomical abnormality.

Christoph Hellwag, who was one of the famous pioneers of motor phonetics and the discoverer of the

vocalic triangle, reported and discussed this important discovery in his treatise *De formatione loquelae* (Tübingen, 1781). At the beginning of his book he suddenly poses the following problem: if we owe our faculty of speech to our articulatory organs, how was it possible for the serpent, which lacks these organs, to talk with Eve? Hellwag's strange question can be replaced by another, which though basically equivalent to it is more empirical. Phonetics seeks to deduce the sounds of our language from the various kinds of contact between the tongue and the palate, the teeth, the lips, etc. But if these various points of articulation were in themselves so essential and crucial then how would it be possible for a parrot to faithfully reproduce so many of the sounds of our language in spite of the fact that its vocal apparatus is so dissimilar to ours? All these considerations lead us to a conclusion which is both simple and yet ignored in the vast majority of works on phonetics. We cannot classify, nor even give a precise description, of the various articulations, unless we constantly hold in mind the question: what is the acoustic function of such and such a motor performance?

Thus, in investigating the consonants phoneticians have carefully noted the points where they are articulated, and in classifying the consonants they have ranged them all on a line according to the position of these points in the mouth: first the labials, then the dentals, next the palatals and finally the velar consonants of which the point of articulation is behind the hard palate. For a long time the fact that velar consonants change into labial consonants and vice versa remained incomprehensible, or was explained by a

mystical formula – extreme opposites come together. But if we give up treating the points of articulation as if they were independent variables and ask instead what their purpose is, then we realise immediately that they function mainly by forming two different types of resonator. Both the labial consonants, articulated at the lips, and the velar consonants, articulated at the soft palate, involve the formation of a long, continuous resonator; on the other hand, in articulating the dental and the palatal consonants the tongue divides the resonator, the mouth cavity, into two short compartments. Now, as we know from general acoustics, the pitch of the resonance increases as the resonating cavity decreases. Thus, what the velar and the labial consonants have in common is the length of the resonator and the consequent gravity of the resonance. Facts such as the change from *lact-* to *lapt-* and from *direct* to *drept* in Roumanian, which were for a long time considered mysterious, are thereby explained. Moreover, the possibility of achieving the same acoustic effect by different articulatory means (and, in particular, functional compensations for anatomical abnormalities in the phonatory organs) permits us and encourages us to look for the common characteristics of these dissimilar articulations which determine the identity of their acoustical effects and which disclose to us the essence of the articulations, their pertinent aspects.

Now, acoustic phonetics is not a recent invention. Since the middle of the nineteenth century physicists have been interested in language sounds, and especially in the acoustics of the vowels. But in contrast to the study of articulation, acoustic phonetics had no in-

fluence at all on traditional linguistics, and in particular it made no mark on the work of the neogrammarians. This is explained in part, as we have already indicated, by the genetic orientation of linguistics, and in part by the uncertain and over-speculative character of the first attempts at linguistic acoustics. But during the last twenty or thirty years the acoustic investigation of linguistic sounds has made rapid, or one might even say miraculous, progress. Many things have permitted this development, in particular the perfecting of methods of empirical description in modern psychology and phenomenology, illustrated notably in the fundamental works of Wolfgang Köhler ('Akustische Untersuchungen', *Zeitschrift für Psychologie*, 1910-15) and Carl Stumpf (*Die Sprachlaute*, Berlin, 1926). We can now draw upon research in acoustics which was performed in connection with developments in telephonic communication, radio and sound film in Europe and, above all, in America; and we can use the new precision instruments which this research gave rise to, in particular sound spectrographs, oscillographs, etc. Thanks to the telephone, the gramophone and above all radio, we have become accustomed to hearing speech in the absence of a speaker. The phonatory act is overshadowed by its phonic products, and it is increasingly toward the latter that people turn their attention.

Whereas the study of articulation, even though it was called 'experimental phonetics', remained at least for the most part merely observational, modern acoustics by contrast employs a wide range of experimental methods. Sound is filtered, some of its elements can be deliberately removed, it can be decomposed

and recomposed. In the eighteenth century attempts were made by the forerunners of modern phonetics to build a speaking machine by copying our vocal apparatus; but nowadays linguistic sounds can be imitated by producing their various acoustic components using special instruments. We have now succeeded in artificially reproducing if not a homunculus then at least the phonic substance of his speech. For the first time we can hear human sounds not produced by human beings. And this is not the furthest that experimentation in acoustics can go in this direction. Sound film promises to take us much further still. The physical aspect of sounds, i.e., the complex vibratory motions produced in the air by the organs of speech, are now reproduced in an optical form on the reel of sound film. As anyone who has had the opportunity to examine closely a reel of sound film knows, each linguistic sound imprinted there has its own specific optical character. These are so distinctive that film workers can learn to read the dialogue of a film simply from the reel of film itself. When the film is projected these visual images of the sounds once more turn into acoustic phenomena. This process opens up many possibilities for phonetic experimentation. A knowledge of the visual representation of each sound makes it possible to directly draw the speech and then to transform it, via film, into an audible phenomenon. It is thereby made possible to hear speech which has never been uttered by anyone. And there is no need to be limited to slavishly imitating sounds we already know. In drawing the sounds one can progressively alter and distort their visual equivalents so as to achieve previously unfamiliar acoustic effects.

Acoustic phonetics, which is developing and increasing in richness very rapidly, already enables us to solve many of the mysteries of *sound*, mysteries which motor phonetics could not even begin to solve. However, even though it has infinitely greater organising power, acoustic phonetics, no more than motor phonetics, cannot provide an autonomous basis for the systematisation and the classification of the phonic phenomena of language. Basically it is faced with just the same obstacles as is motor phonetics. At first acoustics attributed to the different sounds only a limited number of characteristic features. This did not mean that these particular features were the most essential ones. The limits were due above all to the fact that the analytical capacities of the new discipline were as yet rather restricted. But if we consult a thoroughly modern work in the field of acoustic phonetics, such as for example the fine monograph by Antti Sovijärvi on the Finnish vowels and nasals, *Die gehaltenen, geflüsterten und gesungenen Vokale und Nasale der finnischen Sprache* (Helsinki, 1938), we find ourselves once again confronted with a stunning multitude of details concerning the features of each sound, the sound being decomposed into an innumerable variety of fractions. Motor and acoustic phonetics have proved equally incapable of offering any guidance in this chaos, of identifying the pertinent characteristics, the constitutive and inalienable features of each sound. Acoustics can provide us, in impressive detail, with the micrographic image of each sound, but it cannot interpret this image; it is not in a position to make use of its own results. It is as if they were the

hieroglyphics of an unknown language. When, as is always the case, two sounds show both similarities and dissimilarities, acoustics, having no intrinsic criteria for distinguishing what is significant from what is not, has no way of knowing whether it is the similarity or the dissimilarity which is crucial in any given case. It cannot tell whether it is a case of two variants of one sound or of two different sounds.

This crucial difficulty is faced not only by experimental acoustics but by any method of phonetic transcription of auditory phenomena, to the extent that the transcription is based solely on purely auditory perception. Such transcriptions, being obliged to note all nuances of pronunciation, even the most subtle, scarcely perceptible and fortuitous among them, are as Antoine Meillet pointed out, difficult to read and difficult to print. This is not a purely technical difficulty. It is once again the vexing problem of identity within variety; without a solution to this disturbing problem there can be no system, no classification. The phonic substance of language becomes as dust. When faced with a similar problem in relation to motor phonetics we had to make reference to an extrinsic criterion and to ask about the immediate aim of articulations, or more precisely about their acoustic aim. Now we must ask what is the immediate aim of sounds, considered as acoustic phenomena? In raising this question we straight away go beyond the level of the signifier, beyond the domain of sound as such, and we enter the domain of the signified, the domain of meaning. We have said that we speak in order to be heard; we must add that we seek to be *heard* in order to be understood.

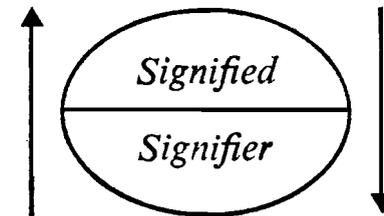
The road goes from the phonatory act to *sound*, in a narrow sense, and from sound to meaning! At this point we leave the territory of phonetics, the discipline which studies sounds solely in their motor and acoustic aspects, and we enter a new territory, that of phonology, which studies the sounds of language in their linguistic aspect.

One hundred years ago the Romantic Russian writer Vladimir Odoevskij told the story of a man who received from a malevolent magician the gift of being able to see everything and to hear everything: 'Everything in nature became fragmented before him, and nothing formed into a whole in his mind', and for the unfortunate man the sounds of speech became transformed into a torrent of innumerable articulatory motions and of mechanical vibrations, aimless and without meaning. The victory of naive empiricism could not have been foretold and represented in a more forceful way. In the laboratories of the scientists of this tendency the phonic resources of language were split up into a multitude of microscopic facts which they proceeded to measure with great care while deliberately neglecting their goal and *raison d'être*. It was in conformity with this approach that metrists of that time taught that one can only study verse if one forgets both the language it is written in and the meaning which it conveys. The study of the sounds of language completely lost touch with the truly linguistic problem, that of their value as verbal signs. The disheartening picture of the chaotic multitude of facts inevitably suggested the antithetical principle, that of unity and organisation. 'Phonology', said the master

of French linguistics, Antoine Meillet, 'frees us from a kind of nightmare which had weighed upon us.' In the next lecture we shall try to state more exactly what phonology is and how it succeeds in reconnecting the problem of sound with that of meaning.

II

IT IS SAID that every word, and more generally every linguistic sign, is an entity with two sides. Every linguistic sign is a unity of sound and meaning, or in other words, of signifier [*signifiant*, Latin *signans*], and signified [*signifié*, Latin *signatum*]. Remember the diagram that is used to represent this:



It is rightly said that the two components are intimately related, that they call for each other, as is indicated by the arrows in the diagram. Take, for example, the French word which is written *pain* 'bread'. This graphic form, which is the way in which this word is reproduced in writing, is a form stemming from tradition or history, and it no longer corresponds to the way in which the word is actually pronounced; in some dictionaries it is complemented by a more or less detailed phonetic transcription. What is the present day phonic form of the word? It is $p\tilde{e}$ (the consonant p plus the *nasal* vowel), and this is the signifier of the word. The dictionary goes on to tell us what the word means: 'Food made of dough, with added yeast, and baked in an oven'. This is the signified of the word *pain* 'bread'.

If someone says *pē*, this signifier evokes in us the corresponding signified, i.e., the idea of food made of dough, with added yeast, and baked in an oven. On the other hand, if we think of this kind of food, and if our thought happens to be captured in the French language, then the motor and acoustic representation which springs to mind is the phonic representation *pē*.

This intimate relation between sounds and meaning is perfectly manifest and clear but, as we have already pointed out, it is only recently that the structure of this relation has been studied systematically, and this study is as yet far from being complete. We know that the chain of sounds acts as the support of the meaning but we need to know how the sounds perform this function. We made use above of a metaphor: we said that this comes down to the problem of discovering the quanta of language, i.e., of identifying the smallest phonic elements bearing signifying value.

It is true that the phonic substance of language has been studied thoroughly, and that such studies, especially over the last fifty years, have produced an abundance of illuminating results. But for the most part the phenomena under consideration have been investigated in abstraction from their function. In these circumstances it has been impossible to classify, or even to understand, these phenomena. In the same way, it would be impossible to understand and classify machines or other instruments so long as attention was focused exclusively on the materials with which they are made, or on their external form, with no consideration of what they are used for. In order to be able to interpret and classify the diverse actions of our phonatory organs it is essential that we take into

account the acoustic phenomena that these actions aim at producing, *for we speak in order to be heard*; and in order to be able to interpret, classify and define the diverse sounds of our language we must take into account the meaning which they carry, *for it is in order to be understood that we seek to be heard*.

If we look at some phonic phenomenon – for example, stress – from a purely phonetic, i.e., purely sensualist, point of view, the direct observation of the motor and acoustic facts and the instrumental analysis of them would show us that the observable characteristics of this phenomenon are essentially the same in various different languages. Auditory intensity and its physiological determinants have been studied and this has thrown light on the role played by the length of the vocal cords. To make a sound louder we put more force into the flow of air; this mechanical force increases the length of the vocal cords, their vibrations increase in amplitude, and as a result the sound becomes louder. In comparing stress in different languages it has been noted that it can differ in degree and that it can be related in different ways to pitch and duration, but basically the operation of stress is in itself identical in the different languages. In contrast to this, the use which language makes of it, the linguistic functions of stress, vary from one language to another.

To illustrate this we can compare a simple sentence in two Slavic languages, precisely because although they have an extensive common heritage and although they are very similar in very many respects, the Slavic languages differ from one another completely in their use of stress.

- Russian: *baba kosit pole*, 'the old woman is mowing the field';
- Czech: *baba kosi pole*.

In each of the three words of this sentence the stress in both Russian and Czech, falls on the first syllable and it seems that the role of stress is exactly the same in the two languages. Yet nothing could be further from the truth! Although stress has an external resemblance in the two cases it actually performs a completely different function in each of the two sentences. In Russian the location of stress is variable i.e., there are words with a stress on the first syllable others with stress on the second, and so on. As a result stress can act as a way of distinguishing words with different meanings. The same group of sounds *muka* has the meaning 'torture' when the accent falls on the first syllable (*múka*), and 'flour' when it falls on the second syllable (*muká*). And if, in the sentence we are using as an example, instead of *bába kósit* we were to say *bába kosít*, it would no longer mean 'The old woman is mowing' but 'The old woman is squinting'. On the other hand, in Czech the stress always falls on the first syllable, and it is therefore not capable of distinguishing the meanings of words. Its function is not to differentiate but, by contrast, to delimit; i.e., stress indicates the beginning of a word: *bAba kOsī pOle*; the stress tells us the boundaries of the words within the sentence. This delimiting function of stress does not exist in Russian. In both languages stress performs a disjunctive function; the number of stresses indicates for the hearer the number of words in the sentence, the number of elements constituting the sentence. *bAba kOsī pOle*: three stresses, three words, i.e., three basic

syntactic elements. This function can be complemented by the subordinative function. In stressing one term more than the others it is given prominence, it is indicated that it is the point of departure of the sentence. In giving greater stress to the subject of the sentence *bÁba kOsit pOle*, we signify: 'It is the old woman who is mowing the field'. If the stress fell on the object, *bAba kOsit pÓle*, this could be translated: 'It is the field that the old woman is mowing'. Or again it could be the predicate *kÓsit* that is given prominence over the other words by means of stress.

Of all of these functions which have been mentioned it is basically only the disjunctive function which is performed by stress in French. But over and above these functions, which serve in the communication of ideas or intellectual content, there is another, the emotive, expressive or emphatic function. It is in playing this role that in French the stress can be moved from the end of a word to its beginning. Here are some examples taken from the phonetician Léonce Roudet, who was the first to point out this fact: 'Vous êtes un *misérable*'; 'C'est *barbare*!'

We have enumerated several functions performed in language by the phonic elements. Which, among all these functions, plays the most essential role from the linguistic point of view? Which is indispensable? It is not difficult to answer this question. If someone addresses us in a language with which we are unfamiliar, the very first question we must ask is: What is the meaning of this utterance? What do these words mean? It is the differentiating function, the capacity of sounds to differentiate words according to their meanings, which is of the greatest importance. While

keeping in mind the multiplicity of the linguistic functions of sounds, it is their differentiating function which we must consider first of all.

If we look at French words such as *dé* (*de*) 'dice' and *dais* (*dɛ*) 'canopy', we can see that the difference between two sounds – closed *e* and open *ɛ* – functions here to distinguish the two words. And if we look at the phonic repertory of Russian we can find the same among the stressed vowels, two analogous sounds: a more closed *e* and a more open *ɛ*: *mel'* (= *m'el'*) 'ground' and *mel* (= *m'ɛl*) 'chalk'. In Russian the closed *e* only ever appears before the palatalised consonants; *ɛ* (open) appears in all other positions. Remember that the palatalised consonants are pronounced by pressing the top of the tongue against the hard palate, i.e., with a flattened buccal resonator, and that they are therefore acute (high-pitch). Therefore in Russian *e* (closed) and *ɛ* (open) cannot appear in the same position and so they are not able to differentiate between words. You can see then that there is a fundamental difference between the pair *e*–*ɛ* in French and the analogous pair in Russian. This pair possesses in French, a differentiating value which it lacks in Russian.

Sounds which have differentiating value, those sounds which are able to distinguish words, have been given a specific name in linguistics. They are called *phonemes*. Thus in Russian closed *e* and open *ɛ* are only two variants of one and the same phoneme; they are called *combinatory variants*, because they depend solely on the combination of sounds: before palatalised consonants the vowel *e* is closed and in other combinations it is open.

In Czech also closed *e* and open *ɛ* are unable to differentiate between the meanings of words. Here again they are but two variants of one and the same phoneme, but the distribution of the two variants is quite different from in Russian. In a style that we might call neutral, Czech uses an open *ɛ*, whereas in an affected style – but more particularly in vulgar style, in gutter language – a closed *e* can be heard. Whereas in Russian the two vowels are combinatory variants, which vary with the phonic context of the phoneme in question, in Czech they function as stylistic variants: the vocative *ɛpiku!* ('Joe!' and simply 'fellow!') becomes *pepiku!* in speech which is more free and easy. While open *ɛ* and closed *e* are both pronounced in Russian and in Czech – in the former varying with the neighbouring sounds, in the latter varying with the style of speech – it is nevertheless difficult for both Russians and Czechs to use the open *ɛ* and the closed *e* of French correctly as different phonemes – or even to notice this difference without effort in pairs of words like *le dais* and *le dé*, or *le lait* (*lɛ*) 'milk' and *le lé* (*le*) 'width'. This is explained by the fact that in these two Slavic languages the difference between these two vowels cannot mark the distinction between the meanings of words.

On the other hand Czech, and also Hungarian, contain, besides the dental consonants, a neighbouring series of prepalatal consonants, which are articulated further back than the dentals, i.e., a series articulated at the front part of the *hard palate*. For example, using conventional Czech orthography, *sít* 'to sow', and *sít* 'the net'. These are, therefore, two different phonemes, the one dental, the other prepalatal. There is an

analogous pair among the voiced phonemes: in conventional orthography *dej!* 'give!' (imperative) *děj* 'the action'. Now the same prepalatal consonants are found in popular French pronunciation, for example before the semi-vowel of the French word 'pity', as spoken by a working-class Parisian. By contrast to the Czech and Hungarian languages, the prepalatal occlusives of this French parlance do not oppose the prepalatal phoneme to a dental phoneme. Here the dental and prepalatal occlusives are only combinatory variants of a single phoneme. The prepalatal variant occurs before the prepalatal semi-vowel, and the dental variant occurs in all other positions. While the prepalatal consonant has a place in the phonetic repertory of popular French it does not perform a differentiating function. Similarly, the two variants *k* – one a velar (back) consonant, articulated at the soft palate (the velum), and the other palatal, articulated in a more forward position, on the hard palate – both occur in the pronunciation of French. The former variant of this consonant is used in various French parlances before front vowels, especially before *i*. There is often a very clear difference between the initial sounds of the words *cas* 'case' and *qui* 'who' but they are only two combinatory variants, and the difference has no independent value in French. By contrast in Polish, and also in Roumanian, these are two quite distinct phonemes. For example, in Roumanian the palatal variant of the occlusive in *chi* 'cries' or *chiar* 'same' (given here in conventional orthography) are opposed to the velar occlusive of *cu* 'with' or *car* 'cart'.

Irish uses the presence or absence of the voice not

only to distinguish *d* from *t*, *g* from *k*, etc., but also two different lateral phonemes, a voiced *l* and an unvoiced *l̥*: *la* and *la*. Now these two sounds are also used in the pronunciation of French, but a French speaker who has no knowledge of phonetics would not notice this since this pair, which in Irish is used to distinguish between words with different meanings, cannot perform this function in French. In this language they are combinatory variants: the unvoiced *l̥*, which is pronounced without vibrating the vocal cords, occurs at the end of words after an unvoiced consonant, as for example in *peuple* 'the people'; in all other positions *l* is voiced, as for example in *peupler* 'to people'.

The English language distinguishes between two different phonemes: a labiodental, written *v*, and a bilabial, written *w*. In Slovak, the labiodental *v* and the bilabial *w* are two combinatory variants of a single phoneme which occurs as the labiodental *v* before vowels and as the bilabial *w* in all other positions.

The two liquids *r* and *l* have such clearly distinct functions in our languages (cf. *ray-lay*, *fur-full*) that it seems strange to us that in some other languages they are simply two combinatory variants of a single phoneme. Thus in Korean this phoneme is represented by *l* at the beginning and by *r* at the end of a syllable (the Indo-European language was probably similar in this respect originally). It is natural that a Korean who is trying to learn English will at first pronounce *round* with an initial *l*, *sell* with an *r* at the end, and will reverse the order of the two liquids in *rule* which will then be confused with *lure*. Again, in French there is a distinction between three vocalic phonemes in words

such as *si*, *su*, and *sou*, whereas in Cherkess these are merely three combinatory variants of a single phoneme (narrow vowel) and the choice of variant depends on the nature of the preceding consonant.

These few examples, although elementary, should be enough to make clear the fundamental difference between the strictly *phonetic* point of view, which aims only at drawing up an inventory of the sounds of a language considered simply as motor and acoustic phenomena, and the *phonological* point of view which requires that we examine the linguistic value of the sounds and that we list the phonemes, i.e., the system of sounds considered as elements which serve to distinguish the meanings of words. If we compare these two inventories it will be seen that they are quite different and that of the two the collection of phonemes is at once very much more restricted, more clear-cut and more discrete in the mathematical sense of the term. It reveals to us a coherent and coordinated system. If we compare any two particular languages we will see that from an acoustic and motor point of view their sounds could be identical while the way in which they are grouped into phonemes is different. For example, in the Far East there are found several neighbouring languages which all use the dental sound *r*; yet in some of these languages, for example in Tungusic, *r* and *l* are separate phonemes; in others, for example in Korean, *r* and *l* are the two combinatory variants of a single liquid phoneme; a third possibility is represented by old Gilyak in which *r* and *t* were two combinatory variants representing a single dental phoneme. In an intervocalic position the occlusion – the closure of the breath passage which is necessary for

the articulation of a *t* – was not complete and in these conditions the dental phoneme was pronounced in the form of an *r*. On the other hand an essentially identical phoneme can be represented in different languages by sounds among which there is a significant variation from an acoustic and motor point of view. For example, in the majority of Far Eastern languages there is but a single liquid phoneme, but whereas in Chinese this phoneme takes the form of an *l*, in Japanese it takes the form of an *r*, and in Korean, as we have already said, it is represented by two combinatory variants: these purely external differences in no way alter the fact that in all of these languages there is only one liquid phoneme.

In linguistics the idea of the phoneme, of the distinctive sound, or rather the idea of that in the sound which is distinctive, is not a recent one. In the history of linguistics the credit for having initiated a discussion of this problem goes primarily to Baudouin de Courtenay. This great Polish linguist introduced the idea of the phoneme in 1870, when he was twenty-five years old, in his inaugural lecture at the University of St. Petersburg. From the very beginning he had considered, besides the purely phonatory and auditory study of linguistic sounds, 'their role in the mechanism of language, and the significance attributed to them by the linguistic intuition of speakers'. The young Baudouin had understood that this latter aspect does not always coincide with the classification of the phonic data on the basis of their physical and physiological properties: in short, on his view of the matter, what is important in linguistic sounds, for both the linguist and the speaker of the language, is primarily

their role in the ordering of words. Baudouin Courtenay proposed the creation of a new linguistic discipline, to be called 'etymological phonetics'. This new discipline would have as its task, according to its founder, the analysis of the relations between the motor-acoustic properties of sounds and their lexical and grammatical values.

Baudouin's creativity enabled him with astonishing foresight to raise and to undertake a preliminary discussion of the central problems of linguistics as we know it today, but the ideological weakness, or uncertainty, of his time prevented this scientist of genius from fully exploiting his own discoveries, and from having any direct successors. We have quoted from Baudouin's inaugural lecture which was given in 1870. We can see from this date the uncommon independence of thought at work in Baudouin's *juvenilia*. This was, for international linguistics, a period of debate and fermentation, a period which was favourable for the instigation of bold, individual ideas and initiatives. It was only at the end of the 1870s that the neogrammarian school, centred on Leipzig, stabilised and became an identifiable and lasting force. This current of thought soon came to exercise a dominant influence over linguistic thought on an international scale, and it succeeded in maintaining this position up to the time of the First World War. While Baudouin never strictly speaking fully identified himself with the neogrammarian school, it must be admitted none the less that, like almost all linguists in that period, he was influenced by this school, and clear indications of this influence can be found in his work.

Perhaps the most characteristic feature of neo-

grammarian thought is the continual substitution of strictly causal questions for questions concerning means and ends. Any attempt to define a linguistic phenomenon in terms of its function would have been condemned in this period as an unacceptable heresy. The etymological phonetics, or in other words the functional phonetics, contemplated by the young Baudouin, was replaced in this scientist's own later works, in conformity with the spirit of the times, by what he called 'psychophonetics'. The new discipline in the process of formation was no longer centred on the function of sounds, on the ends which they serve; in short it was no longer conceived in terms of the problem of the relation between sound and meaning. And whereas etymological phonetics had been conceived by Baudouin as a bridge between phonetics and grammar, psychophonetics on his own account would attempt to build a bridge between phonetics and psychology. Phonetics would study the production and the audition of language sounds, and psychophonetics would have the task of throwing light on the psychological determinants of phonation and audition.

Yet if we ignore the phraseology and the terminology of Baudouin's programme, and if we look instead at the essence, at the actual content, of his works in this field, we can observe that he did in fact treat language sounds not as a psychologist but as a linguist. Right from the start he had grasped the importance of differentiation, he had brought to light the distinctive kernel of sounds – in other words, the phoneme itself. His investigation of the phonic aspect of language was based precisely on the concept of the phoneme. Yet

while he was an original and subtle thinker in linguistics, Baudouin de Courtenay's philosophical and psychological views remained within the framework of ideas current in his time. And since it was required at that time that any phenomenon be defined not in terms of its function but solely in terms of its origin, Baudouin attempted to formulate a genetic concept of the phoneme, in conformity with the dominant ideology. To legitimate the idea of the phoneme, he felt himself obliged to answer certain troublesome questions: where is the phoneme located? in what domain of reality does it have its roots? He thought he could deal with these problems by projecting the phoneme, in fact a purely functional, purely linguistic idea, into the realm of mental images. He thought he had succeeded in providing proper foundations for the phoneme in defining it as 'the psychic equivalent of the sound'. Baudouin's 'psychologism' was only a camouflage which served to legitimate his innovative studies in the eyes of his contemporaries, and in his own eyes too. But this camouflage prevented him from finding his way among his own great discoveries and from drawing out their implications.

What people learned from Baudouin's work unfortunately shared this ambiguous character. For example, the distinguished Russian linguist Lev Ščerba, one of Baudouin de Courtenay's best pupils, in his book on the Russian vowels (published in 1912) which represented an important point in the development of the Baudouin School and of linguistics in general, paid careful and detailed attention to the concept of the phoneme, and identified the phoneme as the 'fundamental element' in linguistics. In defining

it in this way Ščerba placed greater emphasis than had Baudouin on the functional aspect of the phoneme, but at the same time he tied this concept, even more firmly than had his master, to the genetic and mechanistic dogmas of traditional psychology. It is true that for Ščerba the essential characteristic of the phoneme is its capacity to distinguish between words, but at the same time this scientist insisted on psychological criteria for identifying phonemes. For him the phoneme and the sound are not two aspects of one and the same phenomenon, but two contiguous phenomena. Instead of taking the phoneme to be the functional aspect of the sound and the sound to be the substratum of the phoneme, he distinguished between the sound and the phoneme as being an external, objective phenomenon on the one hand, and a subjective, psychic phenomenon on the other. This conception is mistaken. To be convinced of this it is enough to refer to our interior, non-externalised speech.

We speak to ourselves without emitting and without hearing any sounds. Instead of pronouncing or hearing we imagine ourselves to be pronouncing or hearing. The words of our interior speech are not composed of emitted sounds but of their acoustic and motor images. And if a Russian, in his interior speech, pronounces in imagination the words *mel* and *mel'*, which we have already discussed above, the former word will include the acoustic and motor image of an open *ε*, and the latter word will include the image of a closed *e*. Therefore, the identity of the phoneme in contrast to the variety of the sounds – for example, in Russian the identity of the phoneme /e/ in relation to its two variants, the sounds open *ε* and closed *e* – cannot be

interpreted as the identity of the psychic image in contrast to the variety of actually emitted sounds. What is the meaning of the identity of a phoneme, for example the identity of the phoneme /e/ in Russian? It is that the difference between a closed *e* and an open *ɛ* is not put to work in the semantic system of this language; that this difference does not serve to distinguish between words. What does serve to distinguish between words is the intermediate character of an /e/ (whether open or closed) in contrast to the high vowel /i/ (*m'ial* 'dear') and the low vowel /a/ (*m'al* 'crumpled').

It is only by an analysis of the functioning of sound in a given language that the system of phonemes of that language can be established. Ščerba and some other disciples of Baudouin de Courtenay chose to rely on a different method, that of psychological introspection. They appealed to the linguistic intuition of the speaking subject. On their view the phoneme is an acoustic motor image which the speaker is himself in a position to identify. It is true that we are much more consciously aware of those elements of a language which have an independent differentiating role than of those which lack this function. But the primary fact is precisely this differentiating value of any particular element; conscious awareness of it is a consequence of this value. It is therefore logical to take as the analytical criterion this primary fact, i.e., the differentiating value of the elements to be analysed, rather than the secondary fact, i.e., our more or less conscious awareness of these elements. This latter criterion would take us out of the territory of linguistics and into that of psychology. But the greatest disadvantage of this criterion is that the borderline between what we are

and what we are not conscious of is very shifting and indefinite as regards everything concerned with language and its elements. As a rule language is not for us an end in itself but only a means, and the elements of language usually remain beneath the threshold of our conscious deliberation. As the philosophers say, linguistic activity takes place without self-knowledge. And even if a speaker with no special training were to succeed in isolating some of the functional elements of language, in particular some of the phonemes or the grammatical categories, he would still not be in a position to discover the laws which relate them one to another, i.e., the system of grammatical categories or the system of phonemes. As we would expect, Ščerba, having based his investigation of phonemes on what speakers were conscious of, found himself compelled to give up any attempt at classifying these entities.

In spite of all these ambiguities the solid core of Baudouin's doctrine, the idea of the differentiating value of phonemes, did in the end gain admittance into linguistics. Moreover, some other nineteenth-century linguists introduced similar ideas, independently of the school we have been discussing. We should mention in particular the Swiss dialectologist Winteler who, in a brilliant monograph on a Swiss-German dialect of the canton of Glarus (published in 1876) not only blazed a trail for scientific dialectology but also clearly indicated the necessity of not confusing two distinct kinds of phonic differences: those which in a given language are used to mark lexical or grammatical differences, and others which lack this function. But Winteler's book came out at the same time as did the first important works which were to spread the doc-

trines of the neogrammarian school, and since his basic idea went so much against the stream it went almost entirely unnoticed. Two famous phoneticians, the Englishman Henry Sweet and his Danish disciple Otto Jespersen, distinguished in principle among phonic phenomena between those which are endowed with signifying value and those which lack this, but they failed to draw any methodological conclusions for the theory of language from this. At the beginning of the present century the idea of the phoneme which had been launched by the two Polish scientists – Baudouin de Courtenay and Nicolas Kruszewski – and by their Russian pupils began to infiltrate into linguistics internationally. This idea answered to both theoretical and practical needs. Attempts were being made to analyse and describe in a scientific manner a rapidly increasing number of languages. Observation of the data continually raised the following question: what aspects of the phonic substance are the most worthy of being recorded? It goes without saying that it was impossible to record the innumerable multitude of subtle phonic details which could be observed. It was necessary to choose, but on what criteria? The idea of the phoneme was welcomed by Africanists as well as by the specialists in the numerous Caucasian languages, by Americanists as well as by Orientalists.

It was at the beginning of the present century that French linguistics grasped the importance of the concept of the phoneme. Before the First World War Antoine Meillet had already noted that phonemic value was destined to become the central problem of all linguistic study of sounds. In the *Course in General Linguistics* which Ferdinand de Saussure gave during

his last years as a university teacher, and which his pupils edited and published some years later, we find a curious conglomeration drawn from different stages in the investigation of sounds, from the neogrammarian to the modern period. Saussure taught that the important thing about a word is not the sound in itself, but those phonic differences which allow this word to be distinguished from all other words, for it is these which are the bearers of meaning. The *Course* put forward the formula, which has subsequently become famous: 'Phonemes are above all else opposite, relative and negative entities'. Saussure went so far as to assert that the system of these clearly differentiated phonemes, the *phonological system* as he called it, is the only reality of interest to the linguist in the phonic domain. Yet on the other hand there can also be found in this very same *Course* of Saussure the imprint of a naive psychologism precisely similar to that of Baudouin. When he goes beyond his preliminary statements and arrives at the principles on which the linguistic study of sounds must be based, he takes as the 'natural basis' of these principles not the functional value of sounds, nor even the linguistic intuition invoked by Baudouin, but 'the impression produced by the sound on the ear'. And when he arrives at the concrete study of the 'phonological system' he even abandons this auditory criterion and postulates simply that this analysis 'can only be conducted on the basis of the articulatory act'. In other words, he retreats to a way of proceeding which is typical of the primitive stage of motor phonetics.

However, in spite of the contradictions, however numerous, to be found in the teachings of Baudouin de

Courtenay, it is to him and his school that we owe one idea which is crucial for the functional study of sounds, i.e., the idea of the *phoneme*. And in spite of the numerous contradictions in the teachings of Saussure, it is to him and his school that we owe the second idea crucial for the functional study of sounds, the idea of the relations between the phonemes, i.e., the idea of the *phonological system*. Once the point of departure for the study of the relation between sounds and meaning had been indicated by these two linguists, it was a matter of drawing out all the implications of this and of actually developing the new discipline, the systematic study of the sounds of a language from the point of view of their linguistic functions. This discipline, which is now usually called 'phonology' (or sometimes 'phonemics') was founded on the one hand by Edward Sapir and Leonard Bloomfield in America, and on the other hand by a Prague circle of Russian and Czech linguists known in the linguistics literature as the Prague School. It was this group which proposed to the 1st International Congress of Linguistics, held at The Hague in 1928, several methodological rules or theses, which were adopted by the Congress. According to these *Theses* 'all scientific description of the phonology of a language must above all else include the salient features of its phonological system, i.e., the salient features of that language's own repertory, the differences between the acoustic-motor images which are pertinent to signification'. (Notice here the vestiges of the quasi-psychological terminology of Saussure and Baudouin.) The *Theses* go on to demand a very detailed specification of these significative differences, the investigation

of the general laws which govern the relations between them, and the study of the functional changes in the phonological system which underlie them. During the 1930s phonological research developed in both breadth and depth in all countries where linguistics was to be found. This research was conducted in a large variety of fields, in synchronic, historical and geographical linguistics, in the prehistory of languages, in language pathology, in child language, poetic language, language of written texts, etc.

Drawing on this wealth of research we will go on to ask: what do we now know about the relation between sound and meaning? And we will try to analyse this relation.

III

IT IS TRUE that some scientists during the 1870s did raise in a preliminary way the problem of the relation between sound and meaning, the problem of sounds at work in the service of language. But it was only after the First World War that linguistics really began the systematic and thorough study of sounds from the point of view of their functions in language. This study has become a specific discipline within linguistics, and in fact it was only with the foundation of this new discipline that the study of sounds was brought within the science of language, within linguistics in the strict sense of the term, because the study of the phonic material in itself, the study of sounds from a motor and acoustic point of view with no regard to the functions they perform in communication, falls outside the field of linguistics. Such phonetic research can provide us with valuable data on phonic matter but it is not able to tell us how this is put to use by language, how language adapts these raw materials to its own ends. Phonetics falls outside linguistics just as the chemistry of colours strictly speaking falls outside the theory of painting. On the other hand, the study of the use of sounds in language (in other words, of sounds considered as verbal signs) is an integral part of linguistics just as the study of the use of colours considered as pictorial signs is part of the theory of figurative art and in particular of the theory of painting.

This linguistic study of sounds, the study of sounds

in the light of the work they perform in language, has come to be called *phonology*. In the nineteenth century the term 'phonology' was often used simply as a synonym of 'phonetics', but it was the latter term which really caught on in most countries. For example, Michel Bréal, the predecessor of Meillet at the Collège de France, condemned the term 'phonology' because it seemed to him to be too closely associated with the Greek *phonos*, 'murder', and thus conjured up the idea of a science of homicide! Ferdinand de Saussure used these two terms, 'phonology' and 'phonetics', to designate on the one hand the description of the phonic resources either of a given language or of language in general, and on the other hand purely genetic research, the study of changes in language sounds.

As we have already mentioned earlier the *Course in General Linguistics* contains serious contradictions in its manner of understanding and describing the phonic resources of language. These contradictions are indicative of the intermediate position of Saussure's teaching between two successive currents of thought in linguistics, those of naive empiricism on the one hand and of the structuralist tendency of the modern science on the other. In the section of the *Course* on phonology these contradictions were magnified by the editors, who themselves later expressed their regret at having mechanically collected together Saussure's notes on phonology, since they did in fact derive from quite different stages of his scientific work. For example, in chapter VII of the Introduction we find an unqualified identification of phonology with the physiology of sounds, and yet a few lines later Saussure

asserts that 'what is important in analysis' is not 'the movements of the vocal apparatus which are necessary for the production of each acoustic image', but solely the operation of the oppositions which are put to work by the language. 'What is important in a word', we read later, 'is not the sound in itself, but the phonic differences which allow this word to be distinguished from all other words, for it is these which are the bearers of meaning' (Part Two, chapter II). It was the significative aspect of phonology – sounds conceived as signifiers – that Saussure's disciples rightly emphasised.

One of the first and most distinctive products of Saussure's teaching, Albert Sechehaye's book *Programme et méthodes de la linguistique théorique* (1908) [Programme and methods of theoretical linguistics], unambiguously asserts: 'The mistaken view that we are fighting against rests on the confusion between two very different things: the science of the voice as a physical and physiological phenomenon, and phonology, or the study of sounds in the organisation of language' (p. 132). The proper starting point is the symbol, and the important thing is less its intrinsic quality but its relations with all the other symbols, those features which at one and the same time allow it to be distinguished from everything with which it differs, and to be equated with everything with which it is grammatically identical. Its material features must be such as to make this double operation possible. It must be analysable into phonological elements with well-defined characteristics; and for these characteristics to be well-defined they must exist not in transitory, concrete acts, but as ideas, as are the sym-

bols themselves. It would not be feasible for these ideas of sounds to be too great in number, varying from one word to another. Each language presupposes a *phonological system*, i.e., a set of sound ideas ('ideas, or if one prefers, representations of sounds', Sechehaye adds, to make his terminology if not his conception less unusual). The existence of this system is a grammatical operation of a particular order, but similar in many respects to all the other operations. In the last analysis this system is the bearer of all thought in the language, because it is only with its aid that symbols exist and have the particular features that they have. It also constitutes a *form*, because 'the phonological system can be represented in an algebraic manner, replacing the thirty, fifty or one hundred elements which make it up in any given language by as many general symbols which specify their individual identity but not their material properties' (pp. 150 f). Though he admits that 'we are far from having as yet covered much ground in the knowledge of phonological phenomena', Sechehaye's theses do already clearly represent the birth and define the essence of the new discipline, and baptise it 'phonology', a name which was taken up and was soon to be in widespread use.

Up to a certain point our own use of the term 'phonetics' also corresponds to that of the Saussurian tradition. We conceive phonetics properly speaking to be an investigation of the sounds of language in abstraction from their linguistic roles. Now what characterises the phonetic point of view according to Saussure? It is the principle that everything 'which is phonetic is non-significative'. But we do not share

Saussure's preconceived idea that phonic evolution has nothing to do with the linguistic values of sounds. For Saussure, changes in sounds are blind and fortuitous, and 'alien to the system of the language'. But observation has shown on the contrary that changes cannot be understood except in relation to the phonological system which undergoes them. Consequently the system of sounds considered as linguistic values can be studied in its evolution just as well as in its given state, and phonology includes the historical study of phonemes. Therefore the distinction between phonology and phonetics is not at all the same as the distinction between description and history.

The reason I have tried to elucidate the affinities between modern phonology and the views and terminology of the Saussurian school is that it is often incorrectly asserted that our use of the term 'phonology' has nothing in common with that of the Genevan tradition.

Phonological research – descriptive as well as historical, theoretical as well as concrete – has made rapid progress over the last fifteen or twenty years. It is not easy to find one's way among all this research. We do not even have a bibliography which is anything like complete. Phonological studies are very scattered. It is enough to list the languages in which they are written to give an impression of their great diversity: they are written in French, Italian, Spanish and Roumanian; English, the Scandinavian languages, German and Dutch; Russian, Ukrainian, Czech, Slovak, Polish, Serbo-Croat and Bulgarian; Lithuanian and Latvian; Hungarian, Finnish and Estonian; and dozens of phonological studies have also been

published in Japanese. Towards the end of the 1930s phonology reached the stage of producing hand-books, but world events have interrupted this development. The great modern linguist Nicolas Trubetzkoy (1890–1938) devoted the last ten years of his life almost solely to phonological research. Among a series of brilliant discoveries we owe to him especially the first attempt at a phonological classification of the vowels and consequently a typology of the vocalic systems of the whole world. These are extremely far-reaching discoveries, and it is quite appropriate that they have been compared with the famous periodic table of chemical elements established by Mendeléeff. Trubetzkoy, who taught at the University of Vienna, was working on a wide ranging treatise of general phonology, but the occupation of Austria by the Nazis hastened this scientist's premature death, and his posthumous work *Grundzüge der Phonologie* [Fundamental Concepts of Phonology], which was published in 1939 as the seventh volume of the *Travaux du Cercle linguistique de Prague* [Works of the Prague Linguistic Circle], contains only the first of the two projected parts: even this first volume was not completed by the author. It was also in 1939 that Nicolas van Wijk, a linguist of Leyden University, published the only comprehensive hand-book of phonology, but this book, written in Dutch and called *Phonology*, was accessible only to a limited number of readers; a new edition of this work, which the author had hoped to publish in a more widely spoken language, could not be brought to completion, the author dying in 1941 in the occupied Netherlands. Numerous contributions to phonology by linguists from a

variety of countries can be found particularly in the *Travaux du Cercle linguistique de Prague*, from the first to the eighth volumes (1929–39). Phonological research in America has a fine beginning in the works of Edward Sapir, whose premature death in 1939 was a grievous loss to international science, and in those of Leonard Bloomfield, the distinguished master of contemporary American linguistics. I would like to draw your attention in particular to the phonological chapters of Bloomfield's major work, *Language*, published in New York in 1933, and to Sapir's brilliant study, 'Sound Patterns in Language', which appeared in 1925 in the first volume of the excellent review *Language*, the journal of the Linguistic Society of America. This periodical continues to publish important contributions to phonological research.

How then, in the light of all these numerous and multiform studies, is the principal problem of phonology, that of the phoneme, to be posed: i.e., the problem of sounds considered as signifiers? Certainly it is linguistic value which has rightly come to occupy the central place in the modern definition of the phoneme. It is not its 'psychophonetic' bases which define the phoneme, but the tasks which it performs in the language. Following directly from this strictly linguistic definition one would naturally expect to find above all else an analysis of the internal structure of the phoneme in these recent works. But this expectation is disappointed. A structural analysis of the phoneme is still waiting to be done, and instead of this what we find above all in the majority of these studies is a heated debate concerning its mode of existence. One of these works, by the Polish linguist Witold Doros-

zewski, has an eloquent title: *Autour du phonème* [Around the Phoneme]; for generally the reader is in fact always being led around among surrounding discussion rather than being introduced straight away to the phoneme's internal structure itself. The heritage of 'psychophonetics', although covered over, is in fact still alive, and though it is accepted that the phoneme is a linguistic phenomenon defined in terms of its function, it is still naively and obstinately asked: but where then is this linguistic phenomenon located? People carry on trying to find what it is that corresponds to the phoneme in speakers' minds. Very strange though this is, those linguists who study the phoneme are especially inclined to debate its mode of existence. They thereby concern themselves with a problem of which the solution must obviously be found elsewhere than in linguistics.

The ontological problem of what form of reality is concealed behind the idea of the phoneme is in fact not at all specific to the idea of the phoneme. It is actually one particular example of a much more general question: what kind of reality is to be attributed to linguistic values, or even to semiotic values in general? Consider, for example, the smallest grammatical elements (either roots or simple suffixes or prefixes), which are known in modern linguistics as 'morphemes' after the term invented by Baudouin de Courtenay. Now, if we are determined to find in psychological reality the being of a morpheme, and of morphemes in general, the being of a word and of words in general, of a segment of discourse and of discursive segments in general, the being of a syntactical rule and of syntactical rules in general, and

ultimately the being of a given language and of language in general, in short if we are determined to find in psychology the being of linguistic values and their systems, then *eo ipso* we are equally compelled to accept the purely psychological basis of the phoneme and of all phonological value. But if we consider all these linguistic values to be social, as being the products of culture, then the phoneme is automatically subjected to this same kind of interpretation. Finally, a scientist who takes the idea of value to be a methodological convention, a sort of fiction, simply a kind of heuristic device (i.e., to be a presupposition which is a necessary condition for scientific analysis), and who attributes no objective reality to this ideal of value, such a scientist would have also to treat the idea of the phoneme in the same manner.

With very few exceptions, the linguists' discussion about the essence of the phoneme has merely repeated the famous philosophical debates between the nominalists and the realists, between the adepts of psychologism and those of antipsychologism, etc.; moreover it has been conducted with inadequate means. For example, it is unnecessary to discuss over again the legitimacy of the psychological conception of the phoneme after the famous campaign of the phenomenologist Husserl and his disciples against the application of an out-moded psychologism to the theory of meaning. The efforts by some linguists to refute the objective reality of phonemes reflects basically, though in an unconscious and distorted way, the paradoxical ideas of the philosopher Bentham and his successors on the necessity of 'fictitious entities'. These incursions by linguists into fields foreign to

them seem to me to be either superfluous or dangerous. They are dangerous in those unfortunately all too frequent cases in which a specialist who is perfectly competent in his own field takes his chances in a different discipline without being sufficiently familiar with its methods and principles. This is the case, for example, with the linguist Alfred Schmitt, who attempted to do away with the idea of the phoneme by means of quasi-psychological arguments without having familiarised himself with psychological questions (*Wörter und Sachen*, XII/1936). Schmitt believed that he could deny the existence of the phoneme on the grounds that in the majority of cases, the attention of speakers is not at all focused on phonemes, and that in the majority of cases phonemes do not function in isolation. The author invokes psychology not realising that this science shows us precisely the existence of numerous elements which function without their necessarily being the objects of conscious reflection, and even without it being actually possible to isolate them from the contexts within which they exist.

Schmitt believes that the word is the smallest linguistic element as far as speakers are concerned. But in fact in cases where this is so it is a symptom of a clearly pathological state. The word is the smallest linguistic phenomenon for a subject suffering from a kind of aphasia that is called atactic aphasia. A person with this illness retains his normal lexicon and he still has the capacity to utter it impeccably, but apart from these words with which he is familiar he is no longer able to use the very phonemes and syllables of which these words consist. He can say *kafe* (café), but if he is asked to pronounce *feka* or *fake* he is not able to do

so. In contrast to a person with this illness, and in contrast to Schmitt's idea of the normal speaking subject, the real normal subject does not take the word to be a solidified and completely indivisible whole, lacking inner autonomy. Consequently, the normal subject can—if, for example, he is contributing to the creation of a secret slang – change the word *cabaret* to *baréca*, a *prince* to *inspra*, etc., and for the same reason he would be able to understand, or even invent, 'Spoonerisms', i.e., word play produced by the transposition of phonemes. Here are some examples of such word play which I owe to M. Lévi-Strauss and which are simultaneously play with phonemes and play which demonstrates for us the autonomy of the phoneme: *un sot pâle – un pot sale: tendez votre verre – vendez votre terre; mort de faim – fort de main* (a pale fool – a dirty pot; hold out your glass – sell your land; died of hunger – strong of hand). As we said in an earlier lecture, *r* and *l* are two phonemes for a French speaker, whereas for a Korean they are only two variants of a single phoneme. This phoneme appears in the form of an *r* at the beginning and in the form of an *l* at the end of a syllable. *Louez les rois – rouez les lois* (praise the kings – smash the laws); by transposing the two liquid phonemes we obtain a Spoonerism based on the *r* and *l*; but given the phonic conventions of a Korean what we would obtain in transposing the two liquids in a similar Korean example would not be a Spoonerism, and it would not be a change of meaning; it would simply be a mispronunciation of Korean.

Here is another argument for the relative autonomy of the phoneme and against the view that the word is

the smallest linguistic element. Imagine that a French speaker who is not familiar with slang suddenly hears for the first time the word *mek* (*mec* 'bloke'). He might wonder what this word means, but he would be ready to accept that it is a French word, because all of its phonemes and the rules governing their combination are familiar in French. The monosyllable *mec* contains three phonemes and there are in French a number of words which only differ from this word in respect of their initial phonemes (*bec, sec, chèque*), or of their second phonemes (*moque, macque, manque*), or finally of their third phonemes (*mer, messe, mèche*). The French speaker in question does not know what the word *mec* means, but he knows that this word is different from these other words we have mentioned, and that consequently it can in all probability be presumed to have a different meaning from these words. But imagine that this French speaker suddenly hears among words with which he is familiar a monosyllable which differs from *mec, mer, etc.*, in having as its final phoneme a voiceless prepalatal occlusive, or else a velar constrictive as in the Czech vocable *mech* 'moss'. How would he interpret these forms? Either he would recognise the foreign character of the final consonant and would take these words for foreign words, or he would pay no attention to the specific quality of the final sound and would erroneously assimilate it to one of the French phonemes – for example, he would assimilate the velar constrictive (in *mech*) to the velar occlusive or to the fricative constrictive and interpret the word as *mec* or as *mèche* respectively. So we see that even when a word is unfamiliar its phonemes enable us to assign it a virtual place in our language

and to recognise different words, i.e., to recognise that they differ in meaning.

Let us now raise a question which is too often forgotten, that of the specificity of the phoneme. In what way is the phoneme distinct from other linguistic values? We can state straight away that the phoneme occupies a place quite different from all other linguistic values, and from all other values in the world of signs in general. Each sentence, each clause, each phrase, each word, and each morpheme is endowed with its own meaning. This meaning can, of course, be very general, very fragmentary and implicit, i.e., it can stand in need of its context or situation in order for it to be made specific and complete. A Berliner might say in a curt manner *mit* ('with') or *ohne* ('without'), and in a café these laconic utterances would mean: 'Bring me coffee with cream' or 'without cream'; but if said in a bar they would mean: 'Bring me a glass of beer with raspberry juice' or 'without raspberry juice'. The general meaning of the two utterances – presence or absence of some particular supplement – remains in force in both cases. In his book *The Logical Syntax of Language* (1937) Rudolph Carnap uses a sentence made up of invented words: '*Pirots karulize elatically*'. We do not know what these mysterious *pirots* are, but we know that there are more than one of them, that this plurality is indeterminate, that they are active, and that some description or other of their obscure activity is given in this sentence from which we can derive some other sentences, such as: '*A pirot karulizes or karulized before*'. We know the grammatical value and thereby the syntactical function of these nonsense words because we are familiar with their inflexions.

Let us try to analyse a contrary example, in which we are familiar with the roots of the words but are unable to interpret the suffixes. Let us take, for example, pairs of Russian words of which the roots are borrowed from western vocabulary; *interes-y student-a*, 'the interests of a student'; *interes-naja student-ka*, 'an interesting woman student'; *interest-ujtes' student-ami*, 'take an interest in students' (imperative). Those who do not understand Russian will recognise the identity of lexical value of the three pairs of words and will recognise two spheres of meaning – that of interest and that of students – whereas the different grammatical values of these three groups of words will escape them. But even when we hear, in a discourse composed of words which we know, one word with which we are completely unfamiliar, we do not *a priori* consider this word to be lacking in meaning. A word is always for us a particular semantic element and, in the present case, the signified of this particular semantic element is zero. In the novel *Hunger* by Knut Hamsun the hero invents the word '*Kuboa*'. 'I have the right', he says, 'to endow it with whatever meaning I judge appropriate: I do not know yet myself what this word means.' To put it another way, as soon as a certain group of phonemes is conceived to be a word, it looks for a meaning for itself. In other words it is a potential semantic element. Signifier: *kuboa*; signified: semantic element of unknown content. Similarly, signifier: *pirots*; signified: plural noun of unknown semantic content.

Given that the word introduces a semantic element each phonic device which serves to indicate the boundaries of words or the number of words in some

grammatical unit *eo ipso* indicates the boundaries or the number of the semantic elements. Therefore a delimiting phonic device in itself implies a semantic value. For example, in German the initial vowel of a word is preceded by a glottal catch – *Achtung* – and the glottal catch does not occur except at the beginning of words. So the presence of the glottal catch functions in German as an indicator of the beginning of a word. We have mentioned above that in Czech the stress always falls on the first syllable of a word; thus it indicates the beginning of the word, i.e., the beginning of a semantic element. Therefore it possesses in itself a positive and fixed meaning. Signifier: stress; signified: the beginning of a semantic element. The sentence is a unit of meaning of higher order than the word. Any phonic device which serves to delimit the sentence, or to subdivide it, or to indicate the hierarchy of its components, is equally an independent sign. Thus cadence, falling intonation at the end of a sentence, indicates the end of the unit of meaning introduced by the sentence. In its subordinative function stress directly indicates the importance of the stressed word in the utterance. We can be unable to understand the words in a sentence and yet know that the cadence is announcing its end, know that the number of stresses is equal to the number of terms in the sentence, and know that the strongest stress indicates the most important term, that of which the signified serves as point of departure for the sentence.

Phonic elements which serve to characterise the sentence do so by marking its boundaries, by subdividing it and by indicating emphasis within it, whereas phonic elements which serve to characterise

words in themselves function solely by distinguishing the words' meanings. Assertions by some linguists to the effect that there are in language, over and above those elements which serve to distinguish the meanings of words, some phonic elements which serve directly to distinguish the meanings of sentences, these assertions are inaccurate and they can lead, in fact have led, to misunderstanding. Such phonic devices give us no information concerning the cognitive content of sentences; they signal only their emotive or conative functions – emotion or appeal. An interrogative sentence cannot be construed as a form of information. A question is not a piece of information but only an appeal for information. The intonation of interrogative sentences symbolises, quite independently of their content, the fact of interrogation. This intonation can even dispense with words and take the form of an inarticulate murmur.

In the dialogues of novels or magazine stories this kind of wordless question is sometimes transcribed into writing in the form of an unaccompanied question mark (-?). The interrogative or exclamatory intonations, and all other phonic means of registering appeal or emotion, in short all the phonic devices of expressive language, are directly related to the expressed emotion or appeal. For example, in Russian the expressive lengthening of a stressed vowel (*milyj* 'dearest') or a pretonic vowel (*spāsibo* 'thank you very much'), or in French the expressive displacement of stress (*fórmidable* 'marvellous') indicate by themselves the intensity of the emotion. What is directly signified by the phonic devices in question is the fact of the emotion or the appeal themselves.

All of these facts which we have mentioned conform to the definition of the sign which was given by the Scholastics, and which was taken up by the theorist of language Karl Bühler in his vast treatise *Sprachtheorie* (Jena, 1934): *aliquid stat pro aliquo*. A word, and also a morpheme, such as a root or an affix, takes the place of some particular conceptual content; it represents it, so to speak. 'A word', said Ferdinand de Saussure, 'can be exchanged for something unlike itself: *an idea*'. Those phonic devices which delimit and subdivide sentences can be exchanged for the divisions in the chain of concepts, and expressive phonic devices for the expressed emotion. But what is the counterpart of a phoneme?

Signifier: phonic property; signified: ? The phoneme (and its components, to which we will return later) differs from all other linguistic values in that it is not endowed with any specific meaning. A morpheme, or even a word, can be composed of a single phoneme; for example, in French the nasal *a* phoneme serves as the inflexion of the present participle (*cach-ant* 'hiding', *all-ant* 'going') but also as an independent noun (*an* 'year'); but the nasal *a* phoneme in words such as *entrer* 'to enter', *vent* 'wind', *vente* 'sale', *sang* 'blood', *cancan* 'gossip', has nothing to do with these meanings, whereas the interrogative intonation always indicates a question, the lengthening of a vowel in Russian serves only to register emotion, and the prevocalic glottal stop in German never introduces anything but the beginning of a word. The linguistic value of the nasal *a* phoneme in French, and in general of any phoneme in any language whatever, is *only its power to distinguish the word containing this phoneme from*

any words which, similar in all other respects, contain some other phoneme. Thus *sang* is distinguished from *son*, *sein*, *ça*, *sceau*, *sou*, *si*, *su*, etc.; *cachant* is distinguished from *cachons*, *cacha*, *cacher*, *cachot*, *cachou*, etc.; the word *an* is distinguished from *on*, *eau*, *où*, *eu*, etc. If two words are distinguished by means of several phonemes or by the order of the phonemes then it is these phonemes which have the task of marking the distinction, and they share this task between them. For example, in Russian the following infinitives are distinguished solely by their initial consonants – *drat'* 'to skin', *brat'* 'to take', *vrat'* 'to lie', *žrat'* 'to devour'; and the following infinitives are contrasted with them by the order of the first two consonants – *rvat'* 'to tear away', *ržat'* 'to neigh'.

The Scholastic formula *aliquid stat pro aliquo* is applicable to all signs and to all integral elements of signs. We have seen that all grammatical and lexical components of language conform to this formula, as do all those phonic devices which characterise sentences and all the devices of expressive language. Each of these elements has in the system of any given language its own specific and fixed value. To the phonic form of each of these elements there corresponds a specific content. But what content corresponds to the phonic form of the phoneme? Difference of meaning, a difference which is specific and fixed, corresponds to the difference between two morphemes. The difference between a question and a reply corresponds to the difference between two intonations of the sentence, but what value corresponds to the difference between two phonemes? What corresponds to the difference between two phonemes is solely the *fact* of a difference

in meaning, whereas the *content* of these different meanings varies from one word to another.

The most subtle treatment of the problem of the sign, and in particular of the problem of the linguistic sign and its elements, was that of Mediaeval philosophy. Thomas Aquinas understood clearly that, in the case we are discussing, we are dealing with conventional signifiers (*significancia artificialiter*) which serve *ad significandum* but which, at the same time, taken in themselves signify nothing. It is precisely this fact, that in this respect the position of the phoneme in the linguistic system (and in the world of signs in general) is completely unique and exceptional, it is this fact which is crucial for the analysis of the phoneme.

Unfortunately, instead of emphasising this crucial difference, instead of stressing it, researchers have rather sought to play it down, or even to eliminate it altogether. For example, some writers, and in particular the Hungarian linguist Laziczius, have recently put forward the idea that there is no difference in kind but only differences in degree, secondary differences, between phonemes on the one hand and other phonic devices of language, for example delimitative and expressive devices, on the other. However, as we have already pointed out, this difference is in fact striking and essential. Whereas all other elements have specific, positive content, direct meaning, phonemes by contrast have a solely differential value, thus a purely negative value. In as much as the implications of this contrast have not been recognised the analysis of the phoneme has remained blocked and has not been carried through to its conclusions. Ferdinand de

Saussure understood the purely differential and negative character of phonemes perfectly well, but instead of drawing out the implications of this for the analysis of the phoneme he overhastily generalised this characterisation and sought to apply it to all linguistic entities. He went so far as to assert that there are in language only differences with no positive terms. From a Saussurian point of view the grammatical categories are themselves also only negative values; the only significant thing about each category is its lack of identity with other, contrasting categories. Now on this point Saussure committed the serious mistake of confusing two different ideas. Grammatical categories are relative entities, and their meanings are determined by the whole system of categories of a given language, and by the play of oppositions within this system. For example, it is obvious that the grammatical category of the plural presupposes and implies the existence of an opposite category, that of the singular. But what is crucial for the plural category, what legitimates its existence in the language, is its own positive value, i.e., the designation of a plurality. Saussure gives us an example from the German: the singular *Nacht* 'night', and the plural *Nächte* 'nights'. It is true that the two members of this pair mutually presuppose each other, but we cannot go along with Saussure when he tells us: 'Taken in isolation neither *Nacht* nor *Nächte* are anything'. We cannot accept this, because for all speakers *Nächte* is an independent and direct designation of a concrete plurality. But on the other hand it would be perfectly correct for us to say that taken in isolation the nasal *a* phoneme is nothing, because its sole value in French is its non-identity with all the other pho-

nemes of the French language. All opposition of grammatical categories necessarily has a positive content, whereas the opposition of two phonemes never has. Phonemes, according to Saussure's *Course*, are above all else oppositive, relative, and negative entities. Now grammatical categories are also oppositive and relative entities, but they are not negative. This, then, is the distinction which has been confused.

In characterising phonemes as differential and negative entities, Saussure was led to declare that an identical state of affairs exists in that other sign system, writing. He held that 'the value of letters is purely negative and differential'; thus a person may write the same grapheme in a variety of ways, and the only essential thing is that this sign is not confused 'with the other graphemes'. It goes without saying that the existence of a determinate system of graphemes is a necessary prerequisite for the arrangement of each letter. But the thing which is of primary significance here is the specific, positive value of each grapheme. Of course the letter *beta* must be distinguished from the letters *alpha*, *gamma*, *delta*, etc., but the *raison d'être* for the Greek grapheme *beta* is its designation of the phoneme *b*, and all the other graphemes have a similar task to perform. The graphic image functions as a signifier and the phoneme as its signified.

So the phoneme, this cardinal element on which everything in the linguistic system hinges, stands in contrast to all the other integral parts of this system, and has a completely exceptional and distinctive character, a character which is not to be found in any entity analogous to the phoneme in the other sign systems. There is no entity similar in this respect either

in the language of gesture, nor in that of scientific formulae, nor in the symbolism of heraldry, the fine arts, or ritual. Karl Bühler tried to compare the phoneme with other signs such as postage stamps and seals, but the analogy is a superficial one. Postage stamps and trade marks are, of course, differential signs, but in contrast to phonemes each of these signs has also and above all its own positive, specific and fixed meaning. Thus American 2 cent and 3 cent stamps designate not only a difference in value but also, and most importantly, the local destination of the letter with the 2 cent stamp and the inter-city destination of that with the 3 cent stamp. Only the phoneme is a purely differential and contentless sign. The phoneme's sole linguistic content, or more generally its sole semiotic content, is its dissimilarity from all the other phonemes of the given system. A phoneme signifies something different from another phoneme in the same position; this is its sole value. A French speaker may not be familiar with either the slang word *mek* (*mec*, 'bloke') nor with the specialised word *mok* (*moque*, a nautical term for a particular kind of wooden pulley), but hearing these words he will assume that they signify two different things because they differ in one of their phonemes. For the phoneme the *aliquo* in the formula mentioned above is just this value of alterity or otherness.

Therefore language, in the narrow sense of the word, is distinguished from other sign systems by the very basis of its constitution. Language is the only system which is composed of elements which are signifiers and yet at the same time signify nothing. Thus the phoneme is the element which is specific to

language. Philosophical terminology tends to call the various sign systems *languages* and language properly so-called *word language*. It would perhaps be possible to identify it more accurately by calling it *phoneme language*. This phoneme language is the most important of the various sign systems, it is for us language *par excellence*, language properly so-called, language *tout court*, and one might ask whether this special status of phoneme language is not due precisely to the specific character of its components, to the paradoxical character of elements which simultaneously signify and yet are devoid of all meaning.

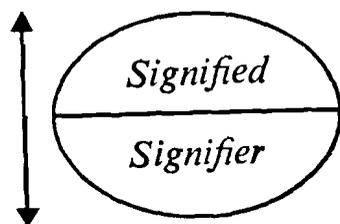
IV

THE FUNCTIONING of phonemes in language is a phenomenon which leads us to the conclusion: the phoneme functions, *ergo* it exists. There has been too much discussion about the mode of this existence: this problem, which concerns not only the phoneme but all linguistic values, indeed all semiotic values in general, obviously falls outside the concerns of phonology, and even of linguistics as a whole, and it would be more sensible to hand it over to philosophy, and in particular to ontology, that branch of philosophy which speculates on questions of being. The job that is demanded of the linguist is the deeper analysis of the phoneme, the systematic investigation of its structure. We have arrived above at the view that phonemes, phonic elements by means of which words are differentiated, differ from all the other phonic devices of language, and from all linguistic values in general, in that they have no positive and fixed meaning of their own. Of all sign systems it is only language properly so-called, and within this it is words, which consist of elements which at one and the same time signify and yet are devoid of meaning.

Ferdinand de Saussure, in that chapter of his *Course* which deals with 'Linguistic Value', makes the penetrating observation that two factors are necessary for the existence of any linguistic value, two relations – one heterogeneous, the other homogeneous. Linguistic values 'always consist of:

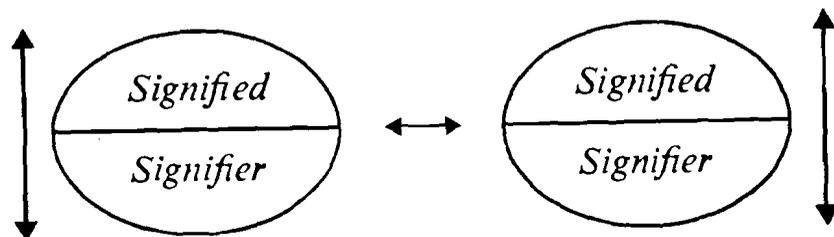
'(1) a *dissimilar* thing which is susceptible of being

exchanged for the thing of which the value is to be determined':



(For example, in Latin the concept of the accusative *amic-um* is exchangeable for the auditory image of the inflexion *-um* and vice versa.)

'(2) *similar* things which can be *compared* with the thing of which the value is under consideration':



Thus two values which belong to the same system are compared – *amic-um* and *amic-ō*: on the level of the signifier these are two different phonic forms, in this case *-um* and *-ō*, and on the level of the signified these are two different, or more accurately, opposed grammatical meanings. Phonemes also are themselves entities with two sides, but their specificity consists in the fact that the distinction between two phonemes includes only one concrete and fixed difference. This difference occurs on the level of the signifier, whereas on the level of the signified there is only the simple possibility of distinguishing between meanings; it is

a matter, therefore, of an indeterminate number of concrete differences.

It follows from this that the classification of morphemes, i.e., of those elements which are grammatically the smallest and indivisible, such as roots or simple affixes, and similarly the classification of all linguistic entities endowed with their own positive and determinate meanings, is essentially different from the classification of phonemes. The system of general morphological and grammatical oppositions is based on the level of the signified. Thus it is the oppositions signified by the cases which underlie and determine the declensions. For example, in Latin there is a clear opposition between the general meaning of the dative and that of the accusative, and an analogous opposition between the general meaning of the nominative and that of the ablative. On the other hand the meaning of the nominative is logically opposed to that of the accusative and, in the same way, the meaning of the ablative to that of the dative. As for the external form of all these case inflexions, it is simply represented by distinct phonic groups between which there is no logical opposition at all. The idea of an indirect object of an action necessarily evokes that of a direct object; in short the meaning of the dative implies that of the accusative; but the phonic form of the inflexion *-ō* in no way implies that of the inflexion *-um*. The indication that the action involves an object is a common character of the accusative and the dative; this indication has its necessary counterpart in the absence of such an indication, an absence which constitutes a character common to the nominative and the ablative. The meaning of the plural implies the

existence of the singular, but the plural inflexion *-i* does not by its phonic form necessitate *a priori* the corresponding singular inflexion *-us*.

By contrast, a pair of phonemes do not refer to any positive content, and in this case the opposition is dependent only on the signifiers. Let us consider, for example, the phonemes of French: nasal vowels or consonants (/ã/ or /n/) are opposed to the non-nasals (/a/ or /d/); constrictive consonants (/s/ or /f/) are opposed to occlusives (/t/ or /p/) and rounded vowels (/ü/ or /ö/) are opposed to unrounded vowels (/i/ or /e/). On the level of the signifier then we have the oppositions

<u> </u> ã - a	<u> </u> s - t	<u> </u> ü - i
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etc.

But on the level of the signified all these different oppositions have only a single counterpart, the same in each case: the fact of distinguishing between the meanings of words;

<u>x ≠ y</u>	<u>x ≠ y</u>	<u>x ≠ y</u>
<u> </u> ã - a	<u> </u> s - t	<u> </u> ü - i

Consequently what is *specific* to each given pair of phonemes is solely their opposition on the level of the signifier. These oppositions are the only ones which determine the location of the various phonemes in the phonological system of a given language. This implies that the classification of phonemes can only be based on the level of the signifier. Now observation has

shown that any signifier which is related to a positive, fixed and homogeneous signified, tends to become firmly, even indissolubly, bound to it, and where such a fixed relationship exists then the signifier is recognisable with particular ease.

Numerous and varied experiments have demonstrated that dogs are capable of distinguishing and identifying the most subtle auditory signals. Pavlovian biologists have demonstrated that if the arrival of a dog's food is always signalled to it by a sound of a particular pitch then the dog will show that it can recognise the meaning of this pitch, and can distinguish it from all others, even those which are very close to it.

According to Italian scientists even fish possess a similar faculty. It is claimed that certain species of fish have extremely precise hearing and that they are capable of discriminating the different meanings of acoustic signals with quite amazing accuracy. Given one particular signal the fish in an aquarium recognise that they are going to receive their food; another, slightly different, signal warns them to expect something nasty, and none of the other signals announce anything, either good or bad. After a period of training the fish become used to this 'language' of signals. They come to the surface given the first signal, they hide given the second, and remain indifferent to all the others. They recognise the signals according to their meanings, and only because of their meanings, because of a constant and mechanical association between signified and signifier.

We learn from experimental psychology that we are perfectly capable of recognising the most varied audi-

tory impressions even when they are disorganised and only perceptible with difficulty, and that we can discriminate between them and identify them, on condition that for us also they are rigorously and intimately conjoined with specific meanings and that they thereby function as simple signals. If, on the contrary, our auditory impressions are not decomposable, if they are disorganised and also lack immediate meaning, then these stimuli are found to be scarcely recognisable, scarcely discriminable, scarcely capable of being imprinted on our memory.

Now as we have already pointed out, phonemes do not in themselves have their own particular meanings; also, the auditory differences between the various phonemes of any given language are often so minute and so subtle that it is sometimes difficult to detect them even with sensitive instruments. Modern specialists in the field of acoustics wonder with bewilderment how it is possible that the human ear has no difficulty in recognising the great variety of sounds in a language given that they are so numerous and their variations so imperceptible. Can it really be that it is a purely auditory faculty that is involved here? No, not at all! What we recognise in spoken language is not sound differences in themselves but the different uses to which they are put by the language, i.e., differences which, though without meaning in themselves, are used in discriminating one from another entities of a higher level (morphemes, words). The minutest phonic differences, to the extent that they perform a discriminative role in a given language, are accurately perceived by all the native speakers of that language without exception, whereas a foreigner, even a trained

observer, or even a professional linguist, often has great difficulty in perceiving these differences if they do not perform this discriminative function in his native language.

We could give a host of examples to illustrate this point. Thus the difference between the palatalised and the non-palatalised consonants has differentiating value in Russian. It is used to differentiate words. In Russian the palatalised *t* (/t'/) and the non-palatalised *t* are two distinct phonemes, as are /s'/ and /s/, /p'/ and /p/, and so on. By the time he or she is three years old a Russian child grasps this difference without difficulty and puts it to use. It is as clear and distinct for Russians as is for native French speakers the difference between rounded and unrounded vowels, for example the difference between an *ö* and an *e*. But the difference between the palatalised and the non-palatalised consonants, which is so obvious and striking for a Russian, is practically imperceptible, almost non-existent, for a Czech, a Swede or a French person, as I have often been in a position to observe. I have pronounced in front of Czech or Swedish students pairs of words such as *krov* 'blood' and *krov* 'shelter'. The former ends with a palatalised *f* and the latter with an *f* with no palatalisation. I say *krof*', and nobody knows whether I'm talking about blood or shelters. A Russian says *udar*' and *udar*: *udar*' with a palatalised *r* is the imperative of the verb 'to beat', and *udar* with a non-palatalised *r* is a noun meaning 'blow' or 'knock'. A foreigner who does not use this opposition between palatalised and non-palatalised phonemes has to make a real effort to hear this difference which any Russian can hear without difficulty.

Obviously it would be a mistake to draw the conclusion that Russians have more subtle hearing! It is a matter of how one stands in relation to these sounds, and this is determined by the system of phonemes, the phonological system, of each language. It is because the opposition between palatalised consonants and non-palatalised consonants can differentiate between words in Russian that it is perceived by Russian speakers.

Saussure rightly emphasised that the important thing as far as phonemes are concerned is not at all each phoneme's individual phonic quality considered in isolation and existing in its own right. What matters is their reciprocal oppositions within a phonological system. Each phoneme presupposes a network of oppositions with the other phonemes of the system. Saussure's view is spelled out in the formula: 'Phonemes are above all else oppositive, relative and negative entities'. We have discussed the central point in this fundamental thesis. Now we will try to draw out its implications.

First of all we should recall what logic teaches us on the subject of oppositions. The opposed terms are two in number and they are interrelated in a quite specific way: if one of them is present the mind educes the other. In an oppositive duality, if one of the terms is given then the other, though not present, is evoked in thought. To the idea of white there is opposed only that of black, to the idea of beauty that of ugliness, to the idea of large that of small, to the idea of closed that of open, and so on. Opposites are so intimately interconnected that the appearance of one of them inevitably elicits the other.

Let us try to apply these simple logical truths to a pair of phonemes. For example, let us analyse the reciprocal relation between two vocalic phonemes: *u* and *a*. It is certain that one can think of each one of these two phonemes without evoking the other. One cannot think of largeness without eliciting the idea of smallness. The idea of expensiveness is necessarily opposed to that of cheapness. But the idea of the phoneme *a* in no way anticipates that of the phoneme *u*. There is no necessary connection between these two ideas. Should we conclude then that we have simply made a mistake in referring to the relation between phonemes as one of opposition, that in fact in this case it is a matter of simple differences, simple contingent dualities and not of real oppositions?

Before replying to this question I want to go on to another. We have said that the important thing as far as phonemes are concerned is differences, those differences which serve to distinguish between words. This is the sole linguistic value of phonemes. These differences are precisely the point of departure for any investigation of phonemes. Differences which have differentiating value are, as we have seen, more accessible to perception and to memory than differences which have no value at all, but on the other hand differences between phonemes, since they lack particular meanings, strain perception and memory and necessarily require a great deal of them. We would expect, therefore, that the number of these primordial and unmotivated values would be relatively small for any given language.

To clarify this problem we can try shifting to the domain of visual phenomena. Suppose that we want

to learn an unfamiliar script, for example the Coptic script. This would be an extremely arduous task if it involved a mere conglomeration of meaningless arabesques. It would, for example, be horribly difficult to reproduce a Coptic text from memory if we had no idea of the values of its components, but the task would be an easy one if each of the letters had for us a positive, fixed and specific value. Besides these two cases there is another possibility, an intermediate case, in which the positive value of the letters remained unknown to us. In this case we would not know the phonic significance of the terms in the Coptic text, but we would have been shown the meaning of each of its words; we would have a word-for-word translation. Consequently the letters would function for us as purely discriminative elements, elements which would serve to differentiate the meanings of the words but which at the same time would have no meanings of their own. Considered from a functional point of view the letters would then correspond to our phonemes. Learning the script would certainly be much easier in this situation than in that of our first imaginary case in which the letters had for us no relation to meaning and were therefore, as seen by us, no more than simple pen marks. Nevertheless it is also true that learning the script would, in this intermediate case, present serious difficulties compared with the second case in which each letter had for us its own positive value. The intermediate case, let us recall, is as follows: the meanings of the Coptic letters remain unknown to us, all we do know is the meaning of each written word in the Coptic text.

The more the different letters could be reduced to

simple and ordered graphic differences the greater would be our chances of success in our efforts to learn this language in its graphic form. But as a rule systems of writing are fairly complicated and cannot be reduced to a limited number of distinct visual oppositions, and so our goal would scarcely be attainable. The meanings of written words can be indicated to deaf-mute children, in the same way that one makes other children understand the meanings of spoken words. But we learn from specialists in the teaching of language to deaf-mutes the instructive fact that the assimilation and stabilisation of reading and writing are not possible as long as acquaintance with language in its phonic form remains deficient. Yet the acquisition of phonemes appears to present problems which are basically completely identical.

Let us try to analyse an example. The vocalic system of the Turkish language is comprised of eight phonemes:

o	a	ö	e
u	y	ü	i

These eight phonemes produce, following the mathematical formula for combinations, twenty-eight distinctions, thus twenty-eight binary relations. Ferdinand de Saussure showed us that the phoneme is constituted solely of relations. Now if we follow this Saussurian tradition and take these twenty-eight distinctions as the primary values for Turkish and take the phoneme in itself as secondary and derived, then we are in danger of arriving at a paradoxical conclusion, namely that the number of primary values is much higher than that of the derived values: twenty-eight

compared with eight! Thus we are apparently confronted with a second contradiction – the first, remember, being that the ‘opposition’ between phonemes does not conform to the logical rules of opposition.

To remove both contradictions with one stroke it is enough simply to give up one presupposition which it has become traditional to make and which has threatened to lead all phonological research into error. We have been taught that phonemic oppositions, and above all the phoneme as such, are not decomposable. Taking the lead from Baudouin de Courtenay and Saussure, phonological research has accepted the following definition as its starting point: ‘The phoneme is a phonological element which is not susceptible to subdivision into smaller and simpler phonological elements’. Now, this definition (which was submitted twelve years ago to the first Phonological Assembly, in our ‘Project for a standardised phonological terminology’, and which was adopted by that international meeting) has turned out to be incorrect. In the Turkish phonological system the vowels o, a, ö, e are opposed to the vowels u, y, ü, i as open phonemes to closed phonemes; the vowels o, u, a, y are opposed to the vowels ö, ü, e, i as back phonemes to front phonemes, and the vowels o, u, ö, ü are opposed to the vowels a, y, e, i as rounded phonemes to unrounded phonemes. In this way the alleged twenty-eight vocalic oppositions of Turkish can in fact be reduced to three basic oppositions: (1) openness and closure, (2) back and front, (3) roundness and unroundness. It is by means of these three pairs of differential elements, really non-decomposable this time, that the eight vocalic phonemes of Turkish are formed. Thus, for example, the

Turkish phoneme *i* is a complex entity composed of the three following differential elements: closed, front, unrounded.

The reasons why we have just characterised the differential elements in terms which pertain to the act of phonation are firstly because these terms are more familiar, and secondly because the corresponding acoustic definitions, while they would be more appropriate as a way of indicating the salient features of the qualities in question, would stand in need of some explanation, and this would take too much of our time at present. So we will do no more now than emphasise that each differential element exhibits one clear and easily identifiable acoustic feature, and that in analysing phonation precisely in the light of this acoustic effect we are always in a position to separate out from the multitude of phonatory movements a single basic factor which produces the acoustic effect in question.

It is not only the differences between the vocalic phonemes of Turkish which are resolvable into simple and indivisible binary oppositions, but all the differences between all the phonemes of every language. It follows that all the phonemes of each particular language, both the vowels and the consonants, can be dissociated into non-decomposable *distinctive features*. The apparent contradictions are now removed. The oppositions of such differential qualities are real binary oppositions, as defined in logic, i.e., they are such that each of the terms of the opposition *necessarily* implies its opposite. Thus, the idea of closure is opposed only by the idea of openness; the front and back features mutually imply each other, and so on.

The relation between two phonemes, by contrast, is

complex and may be made up of several simple oppositions. Thus in Turkish the distinction between the phonemes *u* and *o* is made up of only a single opposition, that between closure and openness; but the distinction between the phonemes *u* and *a* is made up in addition of the opposition between the features roundness and unroundness, and the distinction between the phonemes *u* and *e* includes, in addition to the oppositions already mentioned, a third one, that between the features back and front. In any given language the number of differences between the phonemes is obviously greater than the number of phonemes, whereas the number of distinctive features is considerably lower. We should recall that the differential elements, while they serve to distinguish between the meanings of words, do not themselves have meanings, and that it is precisely the fact that these empty entities are limited in number, that there are few of them in each given language, which enables the members of each linguistic community to perceive them, to retain them in memory and to put them to use.

The 'differential elements' (or in other terms 'distinctive qualities or properties', or finally 'distinctive features') appear in language combined in bundles. The phoneme is a bundle of differential elements. But the differential elements have in themselves their own role in the organisation of languages; they operate in language in an autonomous manner. For example, we find in many languages different forms of what is called 'vowel harmony'. In such languages all the vowels of a word must have a common distinctive quality. For example in the majority of Turkic languages front and back vowels cannot appear together within a word: the

vowels are either all front or all back; in Turkish the plural suffix takes the form *-ler* following a root with a front vowel, and the form *-lar* if the root has a back vowel: thus, *ev-ler* 'houses' and *at-lar* 'horses'. So the front-back opposition operates here in an autonomous manner. In Turkic languages there is moreover a labial vowel harmony: in these languages rounded vowels cannot go together within a word with unrounded vowels. Finally, there are certain languages, for example those of the Manchu group, which do not allow closed and open vowels to both appear within the same word. For example, in Gold, a language of the Amur river region, the closed vowels *u-y-i* are opposed to the open vowels *o-a-e*: thus, *ga* 'to buy', *bi* 'to exist', and *ga-pogo* 'in order to buy', *bi-pugu* 'in order to exist'. In all cases like this, one of the differential elements takes on an autonomous function, abstracting from the various phonemes of which the element is a part.

In Russian the repertory of vocalic phonemes allowed after the palatalised consonants is different from that of those which can appear after the non-palatalised consonants. (In native words the vowel *a* cannot be preceded by *non*-palatalised consonants and the pretonic *a* by palatalised ones.) In this case, therefore, palatalisation in itself plays a part in the ordering of the language.

The analysis of the phonological system must necessarily start with an identification of the distinctive features, because it is these which have been shown to be strictly mutually comparable. A distinctive feature present in the phonological system of one given language is fundamentally similar to the same

feature when it is part of another system. But if we compare the phonemes of different languages without resolving them into their distinctive features we run the risk of equating entities which are in fact identical in appearance only. For example, the phoneme *i* has a different phonological content in Turkish, in Russian, in American English, in Cherkess and in Albanian:

Turkish: i = closed, front, unrounded;

American English: i = closed, front (in the variant of *Standard American English* described by Bloomfield, who reduces the difference between one of the pairs of the front/back system to the opposition between a front vowel (/a/ in *alms*) and a back vowel (/â/ in *odd*) and thus confines the common denominator of the two mutually opposed columns of vowels to a single dimension);

Russian: i = closed, unrounded. In the opposition of the phonemes /i/ and /u/ the sole fixed property is the roundness which is always present in /u/ but always absent in /i/. The degree of more or less front or back quality is determined by the context. Thus, between two palatalised consonants the phoneme /u/ becomes close to the front vowels and in words such as *l'ul'ka* 'cradle' it tends to be pronounced as *ũ*, whereas the phoneme /i/ acquires a back position after non-palatalised consonants.

In cases where there is considerable divergence between two sounds, as for example between the front *i* and the back *y* in Russian, linguists have debated the question of whether these two sounds can be interpreted as variants of one and the same phoneme. They have been puzzled by the problem of what criterion would legitimate counting two or more clearly dis-

similar sounds as a single phoneme: so they have tried, although without success, to turn to a criterion deriving from introspection – the subjective intuition of speakers of the language. But if we consider the phoneme as *a bundle of differential elements* then it follows, quite objectively and unambiguously, that the front vowel /i/ and the back vowel /y/ implement the same phoneme in Russian, since they do not stand in a relation of distinctive opposition and each share a common set of elements, a bundle of distinctive features which discriminate them from all the other phonemes of this particular language: each of them is a *closed, unrounded vowel*. Thus, the phoneme /i/ distinguishes *byk* 'bull' from words such as *buk* 'beech tree', *bak* 'reservoir', and *bok* 'side', and similarly it distinguishes *lik* /l'ik/ 'face' from *ljuk* /l'uk/ 'trap', *ljag* /l'ak/ imperative 'go to bed', *ljog* /l'ok/ 'went to bed'. Baudouin de Courtenay discovered that front *i* and back *y* represent the same phoneme in Russian, and he called it '*i mutabile*'. This term is inaccurate, however, because the phoneme remains unchanged in all its representations, the phoneme being nothing other than a bundle of fixed distinctive features. The phoneme is not to be identified with the sound, yet nor is it external to the sound; it is necessarily present in the sound, being both inherent in it and superposed upon it: it is what remains invariant behind the variations.

The vocalic phoneme under consideration consists of a bundle of two differential elements: closure and unroundness. This combination is objectively present in the Russian front sound *i* and in the back sound *y* of the same language. Now this bundle is at the same

time superposed upon the two sounds, since it is present in each of them; it is superposed upon them as a distinctive value. This value is part of the Russian phonological system, in short of the Russian language. Every constitutive element of a language, and in particular every phoneme and every distinctive feature is endowed with a social value. The phoneme under discussion belongs to the pattern, to the set of norms called 'the Russian language', and this phoneme is supposed to be implemented in any speech act, in every *i* and in every *y* uttered by subjects speaking Russian. In order for these sounds to perform their function the set of the two differential elements – closure and unroundness, i.e., precisely the phoneme in question – must be present in each *i* and in each *y* emitted by Russian speaking people.

To make the problem clearer we can abandon for a moment the sphere of linguistic values and look instead at a different domain of values. Imagine three dollars, one of which is paper, and two are metal coins, one of which is worn and the other shining new. A child might set apart the worn coin from the new coin, and a numismatist might classify them according to the year in which they were coined. But for the community at large the three dollars all have the same fiduciary value.

Or we can take a different example, this time from musicology: we learn that the elements which require a native to consider two performances of an African melody to be two reproductions of one and the same piece can be heard by a European observer as two different compositions, and that, inversely, all effort by this observer to reproduce the particular melod

would appear false to the native. These divergent judgements stem from the dissimilarities between the two systems of musical values. What is pertinent and invariable for one judge is for the other merely an accidental and vacuous variation. The description of a system of values and the classification of its elements can only be made from that system's own perspective, i.e., from the perspective of the tasks that the system fulfils. From the point of view of monetary value coins cannot be divided into brilliant and dull, and similarly one cannot attribute to the components of a musical system or to the phonemes of a phonological system qualities which are appropriate to quite different systems. We will proceed, in the light of this, to an examination of the system of the consonants of the French language.

IN ORDER to be in a position to describe the phonological system of a given language, in other words the system of phonic means which serve to distinguish words of different meanings, we must first identify and classify all the system's elements. As we have pointed out before, in order to do this it is necessary to consider all of these elements from the point of view of their function in the given language. Any attempt at a purely external description of the phonic elements of a language, any attempt to classify these elements in abstraction from their functions within the language in question, any attempt to describe and classify the sounds of a language without taking account of their relation to meaning, is inevitably doomed to failure. The elements of two different phonological systems, even though externally similar, can perform completely different tasks in the two systems, and as a consequence of their dissimilarity in function their places in the respective systems can vary from one language to another.

Let us look, in the light of this, at the system of the consonants of modern French. To save time we will leave aside those phonemes which occupy a place intermediate between the consonantal and the vocalic systems, i.e., the liquids. Phonetics, which primarily takes into consideration the point of articulation of each consonant, arrives approximately at the following table:

	velar	prepalatal	alveolopalatal	alveolar	apical	labiodental	bilabial
nasal		n			n		m
occlusive	k/g		š/ž	s/z	t/d	f/v	p/b
constrictive							

These consonants can all serve to distinguish words with different meanings. They are therefore distinct phonemes, and our task is to analyse them, in other words to identify the distinctive features of which each of these phonemes is composed, the distinctive qualities to which each of them can be reduced. We can see first of all a fundamental opposition between the nasal consonants on the one hand and the non-nasal or oral consonants on the other. The nasal consonants have, in addition to the oral timbre, a nasal timbre which is lacking in the oral consonants. The oral consonants can in turn be subdivided into occlusives and constrictives, the former opposing complete closure to the incomplete closure of the latter. Thus, examining the phonological functioning of the consonants of the French language we straight away arrive at a dichotomous classification of the phonemes:

nasals	
orals	{ occlusives constrictives

Furthermore, all the oral consonants of this system, both the occlusives and the constrictives, exemplify a binary opposition: presence and absence of the voice. To the voiced *g* there is opposed the unvoiced *k*, to *ž* is opposed *š*, to *d* is opposed *t*, and so on.

If we look within each series (the nasal, the occlusive and the constrictive) we observe in each of them three zones of articulation, and these play a discriminative role within them. But it has proved impossible to reduce these three series to a common denominator because each point of articulation has been considered in itself, or because several points of articulation have been combined into higher order classes without reference to criteria deriving from the system under consideration.

For example, velar and prepalatal consonants have been set apart from each other even though this distinction has significance only for languages endowed with consonants which differ only in being velar or prepalatal, all other features being equal. For example there are in Czech, Slovak and Hungarian occlusives which differ from each other solely in that they oppose velar to prepalatal articulations: *k* on the one hand as opposed to *t* on the other. Numerous Asiatic and African languages discriminate between a velar nasal and a prepalatal nasal, whereas European languages have at most a velar (as in English) or a prepalatal (as in French) nasal consonant (cf. English *sing* /sɪŋ/ and French *signe* /siɲ/). In general there are in French no consonants which, *ceteris paribus*, are distinguished from each other solely by the opposition between velar and palatal articulations. Consequently we can, indeed we must, combine the velar and prepalatal

consonants of French into one category, that of the velopalatal consonants, which are articulated at the palate, either soft or hard.

Usually, not only the apicals and the hissing sibilants but also the hushing alveopalatal fricatives are combined into one class, that of the dentals or the anterolinguals. For example, Paul Passy, in his handbook *Les sons du français*, distinguishes the velars, the palatals, the linguals and the labials. The author constructs the class of linguals (in fact the anterolinguals), of which the articulation involves primarily the front part of the tongue, and he is not the only one to confuse in his classification the roles of the active (the tongue) and the passive (hard or soft palate) organs. In his class of linguals he includes not only *t, d, n, s* and *z*, but also the alveopalatal hushing *š* and *ž*. Now this common and still current practice of combining the alveopalatal fricatives and the sibilants into one common class manifests the absence of a functional approach. This classification fails to recognise the opposition between the hushing sibilants (*š, ž*) and the hissing sibilants (*s, z*) and relies instead on the arbitrary criterion, which in this case is superficial and unproductive, of separating those consonants which are articulated in the region between the alveolar ridge and the arch of the palate, i.e., the alveopalatal (hushing) consonants, from those consonants which are properly speaking palatal. In point of fact, however, the hushing consonants belong to the class of palatals and to the higher order class of velopalatal consonants.

If, instead of blindly concentrating on the various points of articulation considered in themselves, we

ask ourselves the question of what essential effects correspond to these differences, we will immediately see that for the velopalatal (or, in other terms, centrifugal) consonants the point of articulation is *behind* the sole or dominant resonance chamber, whereas for all the other consonants, i.e., for the dentals and the labials (grouped together as centripetal consonants) the point of articulation is located *in front of* this resonance chamber. This fundamental difference corresponds to the fact that the centrifugal consonants have a fuller, more perceptible sound, and the centripetal consonants a less full and less perceptible sound. Thus the hushing sibilants differ from the hissing sibilants, just as all the centrifugal consonants differ from the corresponding centripetal consonants, precisely in that the point of articulation is located behind (rather than in front of) the dominant buccal resonance chamber and in the fuller sound which results from this location. The make up of the nasal series can thus be seen to be just the same as that of the two oral series, and the principle of dichotomy is consequently applicable to the whole consonant system of the French language.

	centrifugal	centripetal	
		dental	labial
nasal	<u>n</u>	n	m
oral {	occlusive	t/d	p/b
	constrictive	š/ž	f/v

The centripetal consonants are divided into dentals and labials. The acuteness of the dentals is opposed to

the gravity of the labials. The gravity of the labials results from the long and undivided resonance chamber and from the contraction of the posterior aperture, whereas for the dentals the tongue divides the mouth cavity into two short resonance chambers and the pharynx, the posterior aperture of the mouth cavity, is enlarged. The acute quality of the dentals derives precisely from this resonance chamber which is both compartmented and provided with an enlarged aperture. So the consonant system of French can be seen to be perfectly coherent and symmetrical as soon as the classification of its constituent elements is based on intrinsic criteria.

A sequence of phonemes is not a simple mechanical aggregation but a structure which manifests certain additional indices. For example, the Russian phoneme *i* by itself only comprises two differential elements: it is a closed and unrounded phoneme; but the combination of phonemes can add to these distinctive qualities some specifically contextual characters, namely the character 'back' [y] when following a non-palatalised consonant and the character 'front' [i] in all other combinations. We have already seen that in the French consonantal system there is among the velopalatal phonemes only one unvoiced occlusive. This is the phoneme /k/ which, according to its context, can take on various combinatory properties, in particular a more back character before the back vowels and a more front character before the front vowels, especially before an *i*. It is enough to compare *cou* 'neck' and *qui* 'who' to clearly grasp this distinction.

In some languages the differences between such combinatory variants is very much more striking. For

example, in Indo-Iranian the corresponding phoneme was implemented before a back vowel as a velar occlusive [k] and before a front vowel as a hushing affricate [č]. Since neither the opposition between simple occlusives and affricates, nor that between velars and alveolopalatals, possessed any differentiating value in this language, the distance between the combinatory variants [k] and [č] in no way detracts from the unity of the phoneme.

Everything that has just been said about the combination of successive phonemes could equally be applied to the simultaneous combination of the distinctive features into phonemes. For the phoneme also cannot be regarded as a simple mechanical aggregation of the differential elements of which it is made up; the phoneme, also, is a structure which manifests certain combinatory characters. For example, within the French consonantal system the velopalatal, or in other words centrifugal character, takes on a variety of combinatory properties according to the bundle to which this differential element belongs. Thus, when combined with the occlusive feature it takes on a velar character (k/g), whereas when combined with the constrictive feature it takes on a hushing character (š/ž). Since in this language the opposition between velar and hushing character is without differentiating value, this distance between the variants in no way detracts from the unity of the distinctive feature.

Overall there are five oppositions of distinctive features at work in the French consonantal system: (1) presence or absence of nasality; (2) complete or incomplete closure going together with weaker or stronger air friction; (3) tense or lax articulation to-

gether with absence or presence of the voice; (4) centrifugal or centripetal character; (5) buccal resonance chamber undivided or compartmented. These five oppositions are all that is required to constitute the fifteen consonants which we have just examined; these five oppositions of qualities are enough for the functioning of the entire French consonantal system which in the French language has a considerable functional load: in short, in French it is the system of consonantal oppositions which is employed to a very large extent in the differentiation of words, and this whole system is based on only five opposite features. As was pointed out at the beginning of these lectures, the problem was to extract the ultimate phonic elements endowed with a sense-discriminating function. These elements are precisely the *distinctive features*, qualities which are isolated by dissociating – or to put it metaphorically, by breaking up – the phoneme into its quanta. The formula which Saussure sought to apply to phonemes is fully applicable to the differential elements only. The differential elements are clearly and uniquely ‘opposite, relative and negative entities’.

Our present task is to give a more detailed account of the relation between the distinctive features and the phoneme and to sketch in the model of the latter. We can start by asking the following question: how did it come about that the distinctive features and their oppositions have been more or less disregarded, and that the phoneme has continued to be regarded as indivisible, as the smallest and simplest phonological entity? There seem to have been two decisive reasons for this oversight.

First, phonological research, and especially the analysis of phonemes, has only little by little been liberated from the boundless power of empiricism. For a long time the tendency has been to substitute a purely material image of the *sound* for the functional concept of the phoneme. It has been so habitual to register the particulars of phonation in a purely mechanistic way that it has been impossible to begin by throwing light on the question of which features are *pertinent* to each phoneme. Some binary oppositions were quite obvious, but others remained hidden. In particular the consonants, differentiated by reference to their places of articulation, for a long time escaped any dichotomous classification.

A second obstacle, no less serious, has impeded the analysis of the phoneme into its constituents. A law formulated by Saussure and considered by him to be one of the two basic principles governing the linguistic sign, asserted the linear character of the signifier: this character was attributed to the external form of all linguistic signs. As it was stated in the *Course*, ‘the signifier, being of an auditory nature, unfolds only in time and its characteristics are those which derive from time: (a) it has an extension, and (b) this extension is measurable on a single dimension: it is a line’. One may be astonished that this principle became so firmly established among the very Genevan school which succeeded in demonstrating the non-linear character of the other side of linguistic signs, the non-linearity, or ‘dystaxia’, of the signified. For instance Charles Bally, a faithful disciple of Saussure, vigorously rejected the simplistic belief that discourse is normally linear and that the lines of discourse are merely juxta-

posed sequentially. In his book *Linguistique générale et linguistique française* (Berne, 1932) he showed that a sign can accumulate different signifieds simultaneously and at one and the same point. Bally held that 'there is a *concurrence* (cumul) of signifieds when a single and indivisible signifier comprises several values' which can be clearly analysed by virtue of a set of oppositions. Thus, the desinence *-ō* of the Latin verb *am-ō* includes the idea of the first person in opposition to the desinence of *am-ās*, the idea of the singular in opposition to the desinence of *amāmus*, the idea of the present in opposition to the desinence of *amābam*, and so on.

Now, in relation to the phonic aspect of linguistic value, i.e., in the domain of the signifier, we have shown in a similar manner a completely analogous phenomenon that could be called *concurrence* (cumul) of signifiers. Thus the French phoneme /b/ has a lax articulation (with voicing) in opposition to the tense phoneme /p/, is occlusive (with weak friction) in opposition to /v/, includes no nasal resonance in opposition to /m/, has a grave timbre (due to an undivided resonator) in opposition to /d/, and so on. Bally himself was in theory inclined to look for a phenomenon in the phonological system corresponding to the concurrence of signifieds, but a particular obstacle stood in his way. Saussure's *Course* (p. 171 of the 2nd French edition; p. 123 of the English edition)* taught that 'the

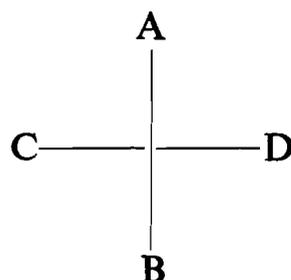
* All translations of quotations from Saussure's *Cours* are my own. Wherever Jakobson gives a page reference I add the page reference to the English edition, for convenience: e.g., 171/123 – the first number refers to the French, and the second to the English, editions. *Trans.*

linear character of language precludes the possibility of pronouncing two elements simultaneously', and Bally, faithful to his master's doctrine, arrived at the thesis that it is impossible to pronounce two sounds at the same time! This argument is a *petitio principii*, since by 'sound' here is meant precisely the *whole* set of articulatory motions which are produced, or rather which are believed to be produced, simultaneously. In other words the definition of what a sound is makes it impossible that two units of this kind could be pronounced at the same time. Two phonemes cannot be emitted simultaneously. But it is perfectly possible to emit several distinctive features at the same time. Not only is this possible, it is what is normally done, since *phonemes are complex entities*.

Saussure himself touched on the problem of distinctive qualities when he set himself the task of identifying, in his own words, 'the differential elements of phonemes' (*Course*, 68/42), but he was unable to resolve it primarily because of his own postulate concerning the 'linear character of the signifier'. According to Saussure the unity of the phonatory act precludes the possibility of accumulating 'different significative elements at one and the same point' (*Course*, 103/70). But, in the first place, the unity of a phonatory act in no way precludes its complexity. In this respect it can be compared to a musical chord, which is at one and the same time a unity and a 'bundle' of units. Baudouin de Courtenay had already thought of this analogy. Saussure himself remarked in another context that each phoneme brings several 'factors into play', each of which is endowed with a 'differentiating value' (*Course*, 69/43). Most importantly, how does Saussure

specify the identity of a phonatory act? The sound chain, he declares, is divided into segments each characterised by the unity of an acoustic impression, and the phonatory act corresponding to such a unit is, by virtue of this correspondence, similarly taken to be a unit.

Saussure on many occasions warned that linguistics, and all sciences which are concerned with values, must be very careful to ascertain the axes on which the entities under consideration are located. He rigorously distinguished two axes: '(1) *the axis of simultaneity* (AB) which concerns relations between coexisting things, and from which any intervention by time is excluded, and (2) *the axis of succession* (CD)'.



On which axis does Saussure construct the unity and the irreducibility of the phonatory act? As we have already seen above he does this on the axis of succession. 'It is', he says, 'in the extended speech chain that it is directly perceived whether or not a sound remains identical; as long as one has an impression of something homogeneous then this is a single sound.' The time of articulation which corresponds to this homogeneous acoustic time is taken to be unitary. Because of the homogeneous character of the acoustic time, the

articulatory time corresponding to it is equally given the value of one unit. This is the unity of the phonatory act. It is a matter, therefore, of unity in time, of homogeneity in time, of irreducibility in time. Such phenomena are ordered on the axis of succession, and from them nothing follows concerning the unity, homogeneity and irreducibility of the phonatory act and of the phoneme on the axis of simultaneity. Consequently the facts referred to by Saussure can offer no support at all for the linear character of the signifier nor refute the plurality of distinctive features.

The Saussurian conception of a linear signifier, a conception which is implicitly accepted and applied in the majority of works on linguistics, is all the more odd in the light of the fact that Saussure positively recognised the ubiquitous operation in language of both of the axes, both of these orders of coordination. It is the play of this double system, he tells us, it is this set of habitual relations which constitutes language and which governs its operation. Whether it is a matter of words within a syntactical unit, of morphemes within a word, or of phonemes within a morpheme, it is always a matter of things ranged in succession to one another, i.e., on the axis of succession. On the other hand, in language each of these units necessarily belongs to a system of similar and opposable values. These series of interdependent values are ranged on the axis of simultaneity. Thus, on the axis of succession, *amō* might be linked with *patriam*, or more accurately the transitive verb combines with the accusative of the noun; and, on the axis of simultaneity, *amō* is connected on the one hand with *amās*, *amāmus*, *amābam*, etc., and on the other hand with

ōdi, invideō, etc. On the axis of succession the phoneme /u/ in the word *sourd* 'deaf' is linked with the phoneme /s/ which comes before it and with the phoneme /r/ which follows it, and on the axis of simultaneity this vowel *u* is related to any other phoneme which could occupy the same place, for example to /i/ (*sire* 'sir') or /ü/ (*sûr* 'sure') or /o/ (*sort* 'lot') or /ö/ (*sæur* 'sister').

In an attempt to uphold the principle of the linear signifier Saussure remarked that on the axis of succession the relation is *in praesentia*: 'It holds between two or more terms which are all present in an actual series', whereas the axis of simultaneity 'unites terms *in absentia* in a virtual mnemonic series' (*Course*, 171/123). But it is precisely this virtual series, this latent system, which provides the oppositions which are necessary for the constitution of the sign. Consider yet again the verb *amo*. Of course the *forms* to which it is opposed are not part of this sign, they are *in absentia*, but as for the *opposite qualities*, these are inherent in this sign, they are *in praesentia*, and it is they which constitute the sign. In the present example it is a matter of the first person singular, the present, etc. If we consider the vowel component of the word *sourd*, the phoneme /u/, we can see again here that the other vowel phonemes are absent from the actual series, but it is because of their presence in the language, because of the possibility of their replacing the given phoneme, that this latter contains the opposite qualities of which it is constituted. Each phoneme comprises *in praesentia* a bundle of distinctive features.

This amounts to saying that signifiers in fact make use of both axes, and that their components form a chain not only on the axis of succession but equally on

the axis of simultaneity. As Saussure points out, the sequence on the axis of succession is made manifest as soon as the consecutive elements are represented in writing and a spatially extended line of graphic signs is substituted for succession in time. In our writing this line is a horizontal one. But writing can equally well represent the axis of simultaneity, by substituting a vertical line of diacritical signs for the concurrence of distinctive qualities. Consider for example the diacritical signs which are written above and below letters. In phonological transcription each distinctive feature can be written as *one* sign and the concurrence of features, i.e., each phoneme, can be represented along a vertical line in imitation, *mutatis mutandis*, of the notation of musical chords.

On the axis of simultaneity the phoneme, as a bundle of distinctive features, displays so to speak an 'extension'. But how does the phoneme behave on the axis of succession? For Saussure every group of phonemes is linear and every phoneme considered in isolation is like a point. According to the *Course* (66/40), it is an 'irreducible fragment' which 'can be considered *in abstracto*, outside time'. In refutation of this doctrine the phoneme manifests, not only on the axis of simultaneity but also on that of succession, an extension and not a point. Let us try to prove this! Saussure was aware that phonemes can have unequal durations, but it is the qualitative homogeneity and not quantitative equality which seemed to him to determine the unity of the phoneme. 'The important thing', he says, 'is not . . . its duration in quavers or in semiquavers . . . but the *quality* of the impression'.

In some languages a distinction is made between

short vowels and long vowels (- = u u). If the two parts of a long vowel are homogeneous then there is no problem. In this case the phoneme's unity is obvious. But consider, for example, the long vowels of ancient Greek. They were pronounced with two quite distinct intonations, one called acute, the other circumflex. In one case the second mora of the vowel was higher than the first, and in the other case it was on the contrary the first mora which had the higher tone. In both cases then the first mora, the first half of the long vowel, was different from the second. None the less, Saussure's suggestion that it is the qualitative unity of the phoneme which is decisive remains valid in this case. The ancient Greek two-morae vowel, whether under acute intonation or circumflex intonation, represents only a single phoneme. The inherent features of each of the two morae are identical, and as for their difference in relative pitch this is not a matter of an atemporal quality, but of a rising or a falling in pitch, i.e., of a relation on the time axis, on the axis of succession. It is by a comparison of the successive morae that the value of a higher or lower mora is obtained.

All such properties, labelled *prosodic*, are distinguished from the inherent distinctive features of the phoneme precisely by the fact that the former function on the axis of succession. They are always relations which are based on the temporal axis, on the sequence of the successive units. For example, stress is a property which presupposes in an actual sequence an opposition between units endowed with stress and those devoid of stress. An isolated monosyllable can be neither stressed nor unstressed. Or to take another

example: language opposes syllabic phonemes, i.e., phonemes which form syllables and function as syllabic peaks, to phonemes deprived of such a function. Now this opposition between syllabic and non-syllabic phonemes operates on the axis of succession. It presupposes an actual series of phonemes; it is no more than a relation between the consecutive phonemes in a sequence. This opposition is not applicable to phonemes in isolation. It is immediately evident that oppositions of quantity – the opposition between long and short, the opposition between a pair of morae and a single one, the opposition between linear and point-like – are necessarily founded on the axis of succession. In short, the phoneme is tied to this axis by the prosodic features. Hence, it would be mistaken to take the phoneme to be a necessarily irreducible unit on the axis of succession. Thus, the two-morae vowels clearly refute the assumption that the phoneme is never dissociable on this axis into smaller phonological elements.

If we take two morae to be a *single* phoneme then this is based on the fact of their identity on the axis of simultaneity:

closed front unrounded		closed front unrounded		=		ī
ī	+	ī				ī

If we take several distinctive features to be a *single* phoneme this is based on the fact that they correspond to a unity on the axis of succession.

A mora is point-like, irreducible, on the axis of succession, and a distinctive feature is point-like, irreducible, on the axis of simultaneity. In other words, the *mora* is a unit which cannot be subdivided into smaller units on the axis of succession; and the *distinctive feature* is a unit which cannot be subdivided into more limited units on the axis of simultaneity. As for the phoneme, it is a two-dimensional unit which cannot be subdivided into smaller bidimensional units; it operates on the two axes, and it is thus the smallest phonological unit with two axes.

The view that the phoneme in itself, and more generally the linguistic sign and language as a whole, are atemporal, is only justified in as far as we are talking about *measurable physical time*. But time as a relation plays an essential role in the system of linguistic values, from language as a whole down to the simple phoneme. In postulating that the science of language has values as its object, the Saussurian doctrine failed to take cognisance of the fact that in a system of values the time factor itself becomes a value. In particular, time with respect to its role in language proves to be a constitutive value of the latter, i.e., to be a linguistic value. We have settled the model of the phoneme, and in the light of this model we have been able to take a new look at the principle of the linear signifier.

In the light of this same model one could also revise the principle of the arbitrariness of the sign. This, together with the principle of linearity, were the two general principles attributed by Saussure to all linguistic signs. But to what extent can the selection of phonemes operating in a given language be regarded

as arbitrary? What internal laws govern the relations between the functioning distinctive features, for example between the five oppositive qualities which constitute the French consonantal system? Here we arrive at one of the primary and ultimate problems, that of the constitution of phonological systems.

VI

TO START the last of our discussions on sounds and meaning I want to summarise rapidly the points raised in my earlier lectures. Speech sounds cannot be understood, delimited, classified and explained except in the light of the tasks which they perform in language. Motor, acoustic and auditory description of phonic matter must be subordinated to a structural analysis of it. In other words the auxiliary discipline of *phonetics* must be placed in the service of *phonology*, which is an integral part of linguistics. Phonology, which in its early days relied far too much on a mechanistic and creeping empiricism, inherited from an obsolete form of phonetics, now seeks more and more to overcome these vestiges. The task is to investigate speech sounds in relation to the meanings with which they are invested, i.e., sounds viewed as signifiers, and above all to throw light on the structure of the relation between sounds and meaning. In analysing a word from the point of view of its phonic aspect we decompose it into a sequence of distinctive units, or phonemes. The phoneme, although it is an element at the service of meaning, is itself devoid of meaning. What distinguishes it from all other linguistic, and more generally, semiotic values, is that it has only a negative charge.

The phoneme is dissociable into distinctive features. It is a bundle of these features; therefore, notwithstanding outmoded but still current conceptions, the phoneme is a complex entity: it is not the phoneme

but each of its distinctive features which is an irreducible and purely oppositive entity. Every linguistic sign is located on two axes: the axis of simultaneity and that of succession. The phoneme is the smallest linguistic entity which disposes of these two axes. The distinctive features are subdivided into a class of inherent features, which are bound to the axis of simultaneity, and a class of prosodic features which involve the other axis, that of succession.

Ferdinand de Saussure attributes to the linguistic sign two essential characters which he states in the form of two fundamental principles. The analysis of the phoneme, and especially of the distinctive qualities which are its constituents, has led us to abandon one of these two principles, that which asserts 'the linear character of the signifier'. The inquiry into the system of phonemes allows us also to reevaluate the other principle, 'the arbitrariness of the sign'. According to Saussure it was the pioneer of general linguistics in America, William Dwight Whitney, who in his book *The Life and Growth of Language*, published in 1875, 'pointed linguistics in the right direction' by his emphasis on the arbitrary character of verbal signs.

This principle has provoked disagreement, especially in recent years. Saussure taught (*Course*, 100/68) that in the word its 'signified' is not connected by any internal relation to the sequence of phonemes which serve as its 'signifier': 'It could equally well be represented by any other: this is proved by differences between languages, and by the very existence of different languages: the signified 'ox' has as its signifier *b-ö-f* (*bœuf*) on one side of the border and *o-k-s* (*Ochs*) on

the other'. Now this theory is in blatant contradiction with the most valuable and the most fertile ideas of Saussurian linguistics. This theory would have us believe that different languages use a variety of signifiers to correspond to one common and unvarying signified, but it was Saussure himself who, in his *Course*, correctly defended the view that the meanings of words themselves vary from one language to another. The scope of the word *bœuf* and that of the word *Ochs* do not coincide; Saussure himself cites 'the difference in value' between the French *mouton* and the English *sheep* (*Course*, 160/115). There is no meaning in and by itself; meaning always belongs to something which we use as a sign; for example, we interpret the meaning of a linguistic sign, the meaning of a word. In language there is neither signified without signifier nor signifier without signified.

The most profound of modern French linguists, Émile Benveniste, in his article 'Nature du signe linguistique' which appeared in the first volume of *Acta Linguistica* (1939), says in opposition to Saussure that 'the connection between the signifier and the signified is not arbitrary; on the contrary, it is *necessary*'. From the point of view of the French language the signified 'bœuf' is inevitably tantamount to the signifier, the phonic group *b-ö-f*. 'The two have been imprinted on my mind together', Benveniste stresses; 'they are mutually evocative in all circumstances. There is between them such an intimate symbiosis that the concept "bœuf" is like the soul of the acoustic image *b-ö-f*'.

Saussure invokes the differences between languages, but actually the question of the arbitrary relation or

the necessary connection between the signified and the signifier cannot be answered except by reference to a given state of a given language. Recall Saussure's own shrewd advice: 'It would be absurd to draw a panorama of the Alps from the points of view of several peaks of the Jura simultaneously; a panorama must be drawn from a single point'. And, from the point of view of her native language, a peasant woman from Francophone Switzerland was right to be astonished: how can cheese be called *Käse* since *fromage* is its only natural name.

Contrary to Saussure's thesis, the connection between signifier and signified, or in other words between the sequence of phonemes and meaning, is a necessary one; but the only necessary relation between the two aspects is here an association based on contiguity, and thus on an external relation, whereas association based on resemblance (on an internal relation) is only occasional. It only appears on the periphery of the conceptual lexicon, in onomatopoeic and expressive words such as *cuckoo*, *zigzag*, *crack*, etc. But the question of the internal relation between the sounds and the meaning of a word is not thereby exhausted. Lack of time prevents us from being able to do more than touch on this subtle and complex question. We have said that distinctive features, while performing a significative function, are themselves devoid of meaning. Neither a distinctive feature taken in isolation, nor a bundle of concurrent distinctive features (i.e., a phoneme) taken in isolation, means anything. Neither nasality as such nor the nasal phoneme /n/ has any meaning of its own.

✓ But this void seeks to be filled. The intimacy of the

connection between the sounds and the meaning of a word gives rise to a desire by speakers to add an internal relation to the external relation, resemblance to contiguity, to complement the signified by a rudimentary image. Owing to the neuropsychological laws of synaesthesia, phonic oppositions can themselves evoke relations with musical, chromatic, olfactory, tactile, etc. sensations. For example, the opposition between acute and grave phonemes has the capacity to suggest an image of bright and dark, of pointed and rounded, of thin and thick, of light and heavy, etc. This 'sound symbolism', as it was called by one of its original investigators, Edward Sapir, this inner value of the distinctive features, although latent, is brought to life as soon as it finds a correspondence in the meaning of a given word and in our emotional or aesthetic attitude towards this word and even more towards pairs of words with two opposite meanings.

In poetic language, in which the sign as such takes on an autonomous value, this sound symbolism becomes an actual factor and creates a sort of accompaniment to the signified. The Czech words *den* 'day' and *noc* 'night', which contain a vocalic opposition between acute and grave, are easily associated in poetry with the contrast between the brightness of midday and the nocturnal darkness. Mallarmé deplored the collision between the sounds and the meanings of the French words *jour* 'day' and *nuit* 'night'. But poetry successfully eliminates this discordance by surrounding the word *jour* with acute vowelled vocables and the word *nuit* with grave vowelled vocables; or alternatively it highlights semantic contrasts which are in harmony with that of the grave and acute vowels, such

as that between the heaviness of the day and the mildness of the night.

The search for the symbolic value of phonemes, each taken as a whole, runs the risk of giving rise to ambiguous and trivial interpretations because phonemes are complex entities, bundles of different distinctive features. These latter are invested with a purely oppositive character and each of these oppositions lends itself to the action of synaesthesia, as is demonstrated in the most striking way in the language of children.

For Whitney everything in the formation of a linguistic sign is arbitrary and fortuitous, including the selection of its constitutive elements. Saussure remarked in this connection: 'Whitney goes too far when he says that the vocal organs were selected by us quite by chance' and that 'men would have been able equally well to choose gesture and to use visual images instead of acoustic images'. The Genevan master correctly objects that the vocal organs 'were certainly in some way imposed on us by nature', but at the same time Saussure believes that the American linguist was right on the essential point: 'Language is a convention, and the nature of the sign which is agreed upon makes no difference'. In discussing the relations between 'static linguistics and evolutionary linguistics' Saussure, followed by his disciples, went so far as to say that in the science of language 'there is no place for natural givens', and to assert 'the always *fortuitous* character' of any state of any language as well as of whatever change brought this state about. The repository of distinctive elements of any given language can only be contingent, and any one of these elements

could be replaced by another one which, though completely lacking any material similarity with the former, would be invested with, indeed would embody, the same distinctive value. Saussure identifies this state of things with the game of chess in which one can replace a destroyed or mislaid piece by one of completely different shape as long as one gives it the same role in the game. So the question is raised of whether the assortment of distinctive features, whether the assortment of phonemes in operation, is in reality purely arbitrary or whether this assortment, although obviously a social phenomenon, is not – just like the very fact of using the vocal apparatus – 'in some way imposed on us by nature'.

We have pointed out that the distinctive features of the phonemes are strictly oppositive entities. It follows from this that a distinctive property never stands alone in the phonological system. Because of the nature, in particular the logical nature, of oppositions, each of these properties implies the coexistence in the same system of the opposite property; length could not exist without shortness, voicing without voicelessness, the acute character without the grave character, and vice versa. The duality of opposites is therefore not arbitrary, but necessary. The oppositions themselves also do not stand alone in the phonological system. The oppositions of the distinctive features are interdependent, i.e., the existence of one opposition implies, permits or precludes the coexistence of such and such other opposition in the same phonological system, in the same way that the presence of one particular distinctive feature implies the absence, or the necessary (or at least probable) presence of such and such other

distinctive properties in the same phoneme. Here again arbitrariness has very restricted scope.

Apart from the typological study of the greatest variety of the world's language systems, it is the structural analysis of language in the process of development – the analysis of children's language and its general laws – and of language in the process of disintegration – aphasic language – which enables us to throw light on the selection of phonemes, the distinctive features, and their mutual relations, and to get closer to the main principles of this selection and of this interdependence so as to be in a position to establish and explain the universal laws which underlie the phonological structure of the world's languages. The systematic investigation of the way in which phonological resources are put to use in the construction of grammatical forms, which was initiated by Baudouin's school and by the Prague circle under the name of 'morphology', promises to construct an indispensable bridge between the study of sound and that of meaning, as long as one takes into account the range of linguistic levels and what is specifically fundamental to each of them.