AN INTRODUCTION TO LINGUISTIC SCIENCE

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PREFACE

This volume is intended for readers with no previous knowledge of linguistics; it is hoped that no one will have difficulty in reading and understanding all of it. This does not mean that scientific problems have been avoided, or that the content of linguistic science has been watered down. The guiding motto of the author has been the quotation from Thomas Huxley on the first page of the introductory chapter: "Science is . . . nothing but trained and organized common sense"; the language of our community, then, should be capable of conveying the science of our community to all its members. Technical terms have generally been avoided if the terminology of ordinary speech would do instead, and such technical terms as seemed necessary have been explained.

Obviously a book of this size is far from complete. It is hoped that most readers will go on to fuller discussions of the subject. By far the best book to follow this is Leonard Bloomfield's Language.[1] Other books will be referred to in the following pages.

All foreign words and forms are cited in transcription. Greek is written with Latin letters according to the system developed by the Romans, except that αι is written *ai*; ει, *ei*; οι, *oi*; ᾳ, *āi*; ῃ, *ēi*; ῳ, *ōi*. It should be noted that Greek κ is represented by *c*, and χ by *ch*. I have occasionally marked with a prefixed star a word that is not citable from any text, but I have not used this symbol before reconstructed forms that are clearly labeled as such in the context. The symbol > means "becomes" or "becoming," and < stands for "comes from" or "coming from."

Thanks are due to the many scholars who have contributed in one way or another to this book, especially to Leonard Bloomfield and Bernard Bloch of Yale and to Adelaide Hahn of Hunter College.

1. New York, Henry Holt and Co. (1933).

PHONETIC SYMBOLS USED IN THIS BOOK

æ Like *a* in English *cat.*
b § 18.
β § 20.
ç Like *ch* in German *ich.*
č § 28.
d § 14.
ð § 14.
e § 21.
ɛ § 21.
ə Like *a* in English *sofa.*
f §§ 11, 20.
ɸ § 20.
g § 13.
ɣ § 13.
h Like *h* in English *hat.*
ħ § 12.
ʿ §§ 16, 18.
ɪ § 21.
j Like *y* in English *yet.*
k § 13.
m § 13.
hm § 19.
m̥ § 19.
ŋ Like *n* in English *ink.*
n̥ Like *en* in English *fatten.*
o § 21.
ɔ § 21.
ɸ § 21.
p §§ 16, 17.
p § 17.
R § 13.
s § 14.
š § 14.
t §§ 14, 16.
θ § 14.
u § 21.
ʊ § 21.
ɯ § 19.
v §§ 11, 20.
w § 20.
hw § 20.
x § 13.
y § 21.
z § 14.
ž § 14.
ʔ §§ 11, 16.
· § 22. Indicates that the preceding character represents a long sound.
˛ e.g. [ą] Indicates that the character to which it is attached represents a nasalized sound, as *en* in French *cent.*

CONTENTS

CHAPTER I

INTRODUCTORY

1. The English language, as everyone knows, has a double vocabulary; in addition to the words used in everyday life, we have another set of terms that tend to be used in books and public addresses, and also in conversation when the occasion is formal or when the subject-matter calls for precision. Since a large proportion of the words in this second vocabulary are loans from other languages, it has been called the **foreign-learned vocabulary.** It includes not only a great many learned-sounding synonyms for very plain words, such as *prestidigitation* for *sleight-of-hand* or *expectorate* for *spit,* but also most of our technical terminology.

2. An example of a foreign-learned term is the phrase *linguistic science* [1] in the title of this book. The word *linguistic* is merely the more formal and imposing synonym of the adjective *language;* in everyday speech one might as well say language science. Even that phrase, however, would have a special—a technical—sense, and so both words need further clarification.

Says Thomas Huxley, *Collected Essays,* 3.45: "Science is, I believe, nothing but trained and organized common sense." In other words, science is based upon the common man's tacit assumption that the evidence of the senses is valid. Of course the common man is always ready to revise his first interpretation of this evidence when he is compelled to do so. I once saw a man, walking along a hotel corridor, meet another man walking in the opposite direction. He bent his course a little to the right, but the other man turned left by an equal amount, and they would have collided if they had not both stopped short. Then the first man tried to pass on the left, but the second man moved to the right. Presently the man I had originally noticed revised his interpretation of the evidence: he was facing his own reflection in a mirror. So he walked off at a right angle to his original course. Just so science must frequently revise its conclusions, as when it became necessary to give up

1. A common variant for *linguistic science* is *the science of language.* More in harmony with the names of other sciences is *linguistics,* which implies the general term science as much as *physics* or *chemistry* does. We shall use the three terms interchangeably.

the naïve belief that the sun actually rises in the east and sets in the west. But after all it is the evidence of the senses upon which both the common man and the scientist base all their conclusions; for both, the philosopher's attempt to find a cogent theory of knowledge is irrelevant.

The common sense of one age differs from that of another; many of the obvious first conclusions of common sense have been permanently revised for all members of our community. None of our friends believe that the earth is flat and that the sun and moon move upward in the eastern sky and downward in the west.

The community of scientists devoted to a single subject is very much smaller than most social groups and it maintains accurate records of its observations and conclusions; each scientist is able to start where his predecessors left off. This is why the progress of science is so much more rapid than that of common sense. We may sum the matter up by saying that science is cumulative. A corollary is that a writer who neglects the work of his predecessors and contemporaries is wasting his time and the time of his readers; he has no right to call himself a scientist.

3. We shall have to examine the word *language* somewhat more carefully, since it indicates the branch of science that we are going to study. For our immediate purpose we may set up the following definition, and then consider several of the terms employed in it:

A language is a system of arbitrary vocal symbols by which members of a social group coöperate and interact.

The word *system* marks a language off from mere sets of nonsense syllables like *ta-ra-ra-boom-de-ay* or *a-heigh-and-a-ho-and-a-heigh-nonny-no*. With the proper rhythm and intonation these or any other groups of syllables can carry a highly emotional message, but they do not form a part of the systematic structure of the English language. In contrast the sentence *the dog bites the man* is thoroughly systematic; we can transpose the words *dog* and *man* and still be understood by all English-speaking hearers, although the meaning of the sentence *the man bites the dog* is absurd. In spite of an entirely different mechanism the two Latin sentences: *canis hominem mordet* and *homō canem mordet,* stand in a similar relative position; it is only the system of the Latin language that compels us to take the second sentence in a sense that defies all experience.

The key word of the phrase *arbitrary vocal symbols* is the noun *symbols*. A symbol necessarily involves a dualism; there must be something

that stands for or represents something else. This may be indicated by a diagram:

$$\frac{\text{the signifier}^{2}}{\text{the signified}} \quad \text{or better} \quad \frac{\text{form}}{\text{meaning}}$$

In the case before us the *form* is any meaningful segment of an utterance, and the *meaning* is the meaning of that segment. An *arbitrary symbol* is one whose form has no necessary or natural connection with its meaning. English *dog* has roughly the same meaning as German *Hund,* French *chien,* Latin *canis,* and hundreds of other words in as many other languages. The only reason why *dog* carries this meaning is that the speakers of English use it with this meaning. The word *vocal* stands in the definition to exclude the human activities denoted by the phrases *gesture language, sign language, written language,* etc. All of these are important activities and proper subjects of investigation, and besides they have obvious connections with audible speech. The only reason for excluding them from our definition is convenience; they are found not to behave in the same way as audible language, and so they cannot conveniently be treated scientifically at the same time.[3]

The final clause of the definition *by which the members of a social group coöperate and interact* designates the chief function of language in society. There are, of course, other means of coöperation between living beings, as witness the wolf pack, the swarm of bees, etc. Even men may coöperate not only by writing or by gesture but by actual physical compulsion or by a smile or by the raising of an eyebrow. All we mean to say is that among men language is by far the commonest and most important means of coöperation. Society as now constituted could not long continue without the use of language.[4] We must not forget, however, that language may also be used to interfere with the action of a group or to oppose one group to another; we cannot end our definition with the word *coöperate.*

A corollary of the final clause of the definition is that a language cannot function normally unless there are at least two speakers of it. When only one speaker remains, the language may be said to be dead.

2. Cf. Ferdinand de Saussure, Cours de linguistique générale, Paris (1922). The horizontal line may be read, "combined with" or "simultaneous with."

3. We shall have to discuss writing in Chapter III and elsewhere, but only because writing embodies almost our only records of the speech of the past.

4. Cf. Bloomfield, Language, p. 24.

THE POSITION OF LINGUISTICS AMONG THE SCIENCES

4. *Physiology* and *Physics*. Since all speech sounds are produced by certain bodily organs and received by certain others, an important part of linguistics obviously belongs also to physiology. Both the action of these same organs in producing and receiving sounds and also the transmission of the sound waves from speaker to hearer fall within the sphere of physics. Those parts of linguistics that belong also to physiology or to physics are grouped under the term **phonetics.** Here linguistics is chiefly a learner; since their problems can be studied in simpler form elsewhere, physiologists and physicists are not likely to work with linguistic material.

5. *Psychology*. Any bit of human behavior may be designated as a person's reaction to his situation, where *situation* includes the total experience of the person and his physiological condition, as well as his surroundings at the moment. The situation and the reaction are connected by the person, who is affected by the one and performs the other. We may represent the entire process by this diagram,

situation → person → reaction

Psychology treats of the part of the process denoted here by the word person, namely, all that connects the situation with the reaction. There are two kinds of evidence available for this investigation.

(1). Each subject or person can report what seems to him to take place while the situation is leading to his reaction. Although no one else can directly check on his report, the psychologists have developed techniques for systematizing and standardizing such reports.

(2). It is possible to study quite objectively the situation and the reaction and their concomitant variations. Such study lends itself to laboratory experiment, and it can be checked in the same way as physical or chemical observation and experiment.

Either situation or reaction may consist in part of speech; if we disregard for the moment the residual factors, our diagram may become:

situation → person → speech

or: speech → person → reaction

pens within him between situation and reaction takes the form of speech;

or: speech → person → speech

Furthermore, the "person" sometimes reports that part of what hap- e.g., "When he hit me, I said to myself, 'nobody can do that to me and get

away with it,' and then I hit him back." We may then modify our diagram thus:

situation → (internal) speech → reaction

Such talking to one's self, either aloud or silently, seems to accompany the solution of most, if not all, intricate problems, and it has long been held by many scholars that what we habitually call thinking is just this. It seems likely, however, that very simple or very familiar problems do not require the use of words. An experienced driver of an automobile can, in an emergency, apply his brakes or turn his steering wheel much more quickly than he can describe his operations. A hungry ape has been known to secure bananas hung above his head by putting one box on top of another and standing on top of the second; since the ape can do this without the aid of speech, we must conclude that a man can also do it without speech. Only more intricate problems are reasonably certain to make a man talk. I stand on the bank of a stream and I try to reach a floating object with a stick; if all the available sticks are too short, I may say to myself: "If I had a piece of string, I could tie two sticks together."

When it comes to such a problem as putting a plank over a stream, it is altogether likely that the use of language is essential. That is possibly just the reason why a man can do so many things that speechless animals have never been known to do.

It follows that linguistics and psychology are very close together and that the kind of experimentation that has done so much for psychology must be available also as a help on linguistic problems. We need scholars who are thoroughly at home in both fields.

6. In the meantime it seems wise for linguists not to subscribe to any of the schools which have hitherto divided the psychologists. George Lane has published [5] a brief account of how psychologic doctrines and doctrinaires have misled our science. Just possibly he might have included the American behaviorists with Herbart and Wundt; at any rate present-day psychologists seem to be less dogmatic mechanists than are certain linguists—including Lane himself! Nevertheless I heartily agree with Lane's conclusion, if I may delete one adjective and change another:

> It is a great relief to turn finally from the mass of psychological discussion prevailing at the turn of the century to the clear-cut statement of Bloomfield: "that we can pursue the study of language without reference to any

5. Studies in Philology, 42. 405–472 (1945).

one psychological doctrine, and that to do so safeguards our results and makes them more significant to workers in related fields" (Language, p. vii). When any one of the [mentalistic (*delete*)] systems of psychology becomes capable of demonstrating objectively that its particular theory of the operation of the mind is fact, then and only then, need the scientific linguist take it into account. It seems to me that we are far from that stage in the development of such systems. In the meantime the linguist will do well if he maintains a purely [mechanistic, *read:*] objective view of language.

7. *The Social Sciences.* Our definition of a language (§ 3) gives it a social function. A language can exist only in a social group, except that an isolated speaker of a language does not immediately forget it. And if the social group is necessary to the language, the language is quite as essential for the social group; since it is the one important set of signals from man to man, it does for the group what the nervous system does for the individual.

The use of a single language by widely separated groups of men implies the former existence of a single social group; the English of America, Australia, South Africa, etc., is explained by the migration of many speakers of the language from England. Just so a genetic relationship of a number of languages implies the former existence of a single language spoken by a single social group; the Romance languages imply the Roman nation, and the Indo-European languages imply the former existence of an Indo-European nation.

Linguistics is a social science, but it cannot be coördinated with the commonly recognized social sciences. These are primarily history, anthropology, and sociology. History is differentiated from the other two by its prevailing interest in the past. Sociology studies the present state of European and American Society, and anthropology the present state of other societies or cultures.[6] Most anthropologists include in their study of a particular culture more or less attention to the language of that culture, and some anthropologists are primarily interested in language. The sociologists do not pay much attention to languages, no doubt because other groups of scholars are at work upon the languages associated with European culture. Similarly the historians are interested in languages

6. The lines of division are not sharp; anthropologists treat of the history of a culture that has been neglected by historians. I leave out of account physical anthropology and also such subjects as economics and political science, since they have no close connection with linguistics.

only as tools, and in linguistics only as it furnishes evidence on prehistoric migrations. They leave the history of languages almost entirely to the linguists.

A logical division of social science would coördinate the science of language with the study of religion and mythology, the study of customs, and the study of government, each of these topics covering all mankind both in the present and in the past. Of course no such division is contemplated; and without it linguistics, as such, doesn't fit very well into the organization of the social sciences.

8. *Science in General.* All the sciences state their observations, problems, and conclusions in language; but this fact does not provide an additional bond between them and the science of language. Language is the one tool that man employs in nearly all his activities—in hunting, fishing, farming, and retail trade no less than in science and philosophy. All speech is raw material for the linguist, but that does not make the linguist a good farmer or storekeeper or physicist. Neither does it justify the claim of certain scholars that linguistics can make a noteworthy contribution to physics or to mathematics.

9. *Philology* [7] is a word with a wide range of meaning. I use it here to designate the study of written documents. The philologist devotes his attention first to establishing a correct text. He must often read and supplement more or less imperfect or mutilated inscriptions and manuscripts, and when he has several copies of a lost original he must determine the latter by comparing variant readings. Since all conclusions in this process must be checked against the possibilities provided by the language, he has to take account of linguistics at every step.

No less important is it to interpret the text when it has been established and to draw from it all possible information on history and culture, including language.

Since written documents contain all the information we have about the languages of the past, it is clear that all students of historical linguistics must deal with philology. It would be desirable for the linguist to deal fully with the philology of every text from which he cites even a single form, but for this he hasn't time. In accord with the usual division of scientific labor he must often rely upon the philological work of others. He must, however, be familiar with the methods and principles

7. See E. H. Sturtevant and Roland Kent, Classical Weekly, 22. 9–13 (1928); G. M Bolling, Language, 5. 27–32 (1929); and references.

of philology, and he must know how to check his philological authorities in case of need.

This situation justifies the traditional close connection of historical linguistics with philology. Since the various stages of a language demand comparison, and since all languages, present or past, contribute to our generalizations about language, it would be inefficient to distribute the various aspects of linguistics among several departments.

In spite of the social importance of language, linguistic science must for the present continue to be grouped with the humanities.

CHAPTER II

PHONETICS AND PHONEMICS

10. The science of **phonetics** treats of the production, transmission, and reception of speech. It includes a description of the physiological mechanism of the lungs, throat, mouth, and nose, and also of the ear. A complete treatment of the subject would involve also an account of the nerves which control the production of sound, and of those which connect the ear with the brain. Equally essential is the physics of sound production and reception, and of the sound waves that pass from speaker to hearer. To handle the subject with any thoroughness, extensive laboratory equipment is necessary.

It is found in practice, however, that the laboratory phonetician spends only a relatively small part of his time on problems of direct concern to linguistics, and the linguist, on the other hand, cannot spare much time for laboratory work on phonetics if he is to get on with his study of other phases of language. Consequently a much abbreviated treatment of the subject from the point of view of general linguistics has been developed. The sole justification of this as of all other partitions of the field of science is the necessity for a division of labor. Practical phonetics as conducted by linguists confines itself to a description of the action of the organs of the throat and mouth in producing speech sounds.[1]

Even this is more than we can undertake to treat here; we have space for only a few specimen remarks, and we shall attempt to do just two things. First we shall identify the most important of the speech organs and give a few illustrations of what they can do. Then we shall give an account of the action of the lips in sufficient detail to suggest the infinite range of possible speech sounds.[2] We include in square brackets the symbols used in this book for each sound described.

1. It is not easy to draw a sharp line between sounds used in speech and other sounds made by the speech-organs. Therefore Kenneth L. Pike, Phonetics, a Critical Analysis of Phonetic Theory and a Technic for the Practical Description of Sounds, Ann Arbor (1943), includes all sounds produced in the throat, mouth, and nose.

2. For a much fuller but still brief treatment of phonetics see Bernard Bloch and George L. Trager, Outline of Linguistic Analysis, pp. 10–37, Baltimore (1942); see also references on pp. 80 f.

11. As the stream of air passes outward from the lungs, the first place where it can be checked is in the **larynx**, the box of cartilage at the top of the wind pipe, which is sometimes called the **Adam's apple**. This box contains two ridges or shelves of tissue running from back to front; they are called the **vocal cords**, and the space between them is called the **glottis**. When the vocal cords are brought together the glottis is closed and the stream of breath is completely stopped. If pressure from the lungs compresses the air behind the glottis and then the vocal cords are suddenly drawn apart, the result is a slight cough, which is known as a **glottal stop** [ʔ]. This sound is often heard in English; it serves for a *t* in certain words (e.g., *mountain*) in some American dialects, and it is well known in the Scotch pronunciation of *Saturday, bottle,* etc. If the vocal cords are drawn near together without complete closure of the glottis, the passage of the air sets their edges into rapid vibration, thereby causing the musical tone called voice; the chief difference between English [f] and [v] is that the latter is a voiced sound; if you place your hands over the ears and pronounce these two sounds, you will hear the buzz which accompanies the latter but not the former. If while the glottis is in this position, the vocal cords are stiffened to prevent vibration, the passage of the air produces a whisper. The glottis is fully open in the production of voiceless sounds like English [f].

12. As the air continues its journey, it comes next to the **pharynx**, the chamber between the tongue and the back wall of the throat. An incomplete closure of the passage may be produced here by retraction of the root of the tongue. Thus is produced Arabic voiceless [ħ].

13. At the top of the pharynx the stream of breath reaches the **soft palate** or **velum** (the back part of the roof of the mouth). An important function of the velum is to rise until it closes the passage between the mouth and the nose; this is its position while we swallow food and also during the utterance of a majority of the speech sounds. With the velum lowered so that the passage into the nose is opened, we pronounce the nasal consonants and all nasalized vowels and consonants. The chief difference between English [b] and [m] is that for the latter the nasal passage is open.

The **uvula** is the small flexible body that hangs from the back edge of the velum. If it is loosely cradled in a groove of the back surface of the tongue, the stream of air may set it in vibration; the result is the trilled

uvular [R] of North German and of the French of certain provincial cities.

A closure between the back surface of the tongue and the velum produces English [k] and (voiced) [g]. There are many possible points in the velum for this closure and an equal number of possible varieties of [k] and of [g]. An incomplete closure in a similar position allows the air to pass with audible friction, producing the German *ch* in *ach* [x] or a corresponding voiced sound [γ].

14. An incomplete closure between the front surface of the tongue and the hard palate (the front part of the roof of the mouth) produces English [š] and [ž], as in *sure* and *azure*. With the tip of the tongue turned back and more or less approaching the hard palate one produces various types of American *r*.

The tip of the tongue may also articulate with various hard surfaces in front of the hard palate. With closure or partial closure against the **alveolar ridge** (just behind the roots of the upper teeth) one pronounces English [t, d, s, z]. The articulation of French [t, d] is further front, against the upper **teeth.** English *th* [θ, ð] may be produced with the tip of the tongue between the tips of the upper and lower teeth.

15. The easiest to observe of all speech organs are the **lips;** for this reason we select them for more extended treatment. We shall emphasize the variety of action of these organs in coöperation with the other speech organs already discussed. Although most of the sounds we are about to mention are often called **labials** or **labio-dentals,** not one of them could be produced by the lips or by the lips and teeth alone. All the speech sounds are produced while all the speech organs are in some position or other, and a complete account of any speech sound would have to record the position or the movement of each organ between lungs and lips.

16. A [p] between vowels is formed by closing the lips, impounding behind them breath under pressure from the lungs, and then suddenly parting the lips so as to release the impounded breath with a slight explosion. Like [t, k, ʔ], it is a member of the class of sounds called variously **stops** or **explosives.** There are several varieties of [p]. In English *pin* the explosion is followed by a vigorous puff of breath, but in English *spin* there is no such puff; in *pin* we have an aspirate [pʰ], but in *spin* a non-aspirate [p]. Most English speakers are unaware of this difference,

but if one holds his hand before his mouth and pronounces the two words, he will feel the impact of the puff of breath as he speaks the former word. An equally clear demonstration is to reverse the direction of a phonograph record of the word *pin;* one hears something like [n·ɪhp]. In French and many other languages only a non-aspirate [p] is employed. In some languages [p] is formed, not with air under lung pressure, but with air compressed by raising the larynx; the glottis is closed and then the entire larynx lifted in such a way as to lessen the cubic contents of the mouth. Such a *p* is said to be **glottalized.** Many other voiceless consonants may be glottalized by a similar movement of the larynx, but at the moment we are considering only the labial sounds.

17. If *pin* is the first word in a sentence, the first step in its production may be omitted; the lips need not be brought together if they are already closed. If [m] precedes [p], as in English *ample,* the act of closure at the beginning of [p] is impossible; instead the velum is raised to close the passage to the nose. If English *dip* closes a sentence, the speaker need not open the lips at all; the explosion may be altogether omitted. In English *apt* the lips are not opened until the oral passage has been closed by the tongue against the alveolar ridge; there is no explosion for [p]. In the phrase *lamp mat,* the closure is made for the first [m] and is maintained for the second [m]; there is neither closure nor opening of the lips for [p], which therefore is marked solely by the release of breath through the nose when the second [m] begins.

While the lips are closed the back of the tongue may be pressed against the soft palate and then the entire tongue moved back so as to increase the cubic contents of the mouth. If then the closure of the lips is released, the result is a kiss. A somewhat similar sound, induced by lowering the larynx while the glottis is closed, is employed in certain languages of South Africa This **labial click** may conveniently be written [p˘].

18. French [b] differs from [p] in having musical tone or voice throughout. English [b], on the other hand, is usually only partly voiced; *but,* at the beginning of a sentence, starts with the glottis open and ends with closure enough to produce voice; while [b] in such a word as *ebb* at the end of a sentence has voice only in its first part. English [b] as well as [p] lacks one or more of its parts in certain positions; cf. *ambition, abdomen, amble.* In certain languages of India an aspirated *b* [bʱ] is heard.

19. A [b] pronounced with the nasal passage open becomes [m];